## Understanding and prevention of salt damage to restoration plasters. The COMPASS project

EU project EVK4-CT-2001-0047 - DG XII

## Problem

- · Poor performance of restoration plasters
- Lack of scientific justification of working principles of restoration plasters

## Aim

- · Furnish guidelines for the choice of better compatible (salt resistant) plasters for the built **Cultural Heritage**
- · Develop a model describing salt transport and degradation





## Results





#### Salt damage model: a new hypothesis

n of damage

NaCl crystallises as a layer on the pore wall and causes irreversible dilation. After repeated crystallisation/dissolution cycles damage occurs in the material.



The difference in pore size distribution of the substrate and the plaster determines the location of the salt damage.

Transport and degradation model





MDDS (Monument Damage Diagnostic System): practical use of the results



nage types

and checking hypoth



An effective accelerated test method was developed

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# Understanding and prevention of salt damage to restoration plasters. The COMPASS project

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Key words: Restoration plasters, salt damage mechanism, testing, expert system, requirements

#### Introduction and content

The main aim of the project was to provide those in charge of the maintenance of the built Cultural Heritage (architects, owners and Cultural Heritage authorities) with a set of clear principles for the choice of better compatible (salt resistant) plasters [1].

The starting points of the research were the poor performance of restoration plasters, the lack of scientific justification of principles and mechanisms upon which the performance of a plaster should be based, and the insufficient knowledge on the limits in the performance of a plaster.

Research was carried out aiming at the development of:

- A model describing moisture and salt transport and degradation.
- Requirements for plasters to be used on salt loaded substrates.
- Guidelines for the choice of the most adequate solution (plaster type, application...) in a given situation.

Research on salt damage mechanisms and durability of plasters was carried out in the laboratory and in practice, seeking a constant correlation between the two lines of investigation. Case studies were carried out in all participating countries to get a better insight in the mechanisms of salt damage and in the performance or the failure of plasters on salt loaded substrates (fig. 1).



Figure 1: Damage to a restoration plaster, applied on a salt loaded substrate. Detail

#### **European dimension**

The working principles of the available plasters and the salt damage mechanisms were better understood and a new test developed: such achievements form the basis for creating compatible restoration plasters, a need felt all over Europe. Requirements for plasters and guidelines for end users, together with all achieved results, were made available in a practical and targeted way, by means of the Expert System MDDS.

#### **Innovation and originality**

The research carried out within this project contributed in clarifying the relationship between pore size distribution of plasters and salt crystallisation damage. ESEM investigations on plasters showed that NaCl crystallises on the surface of the pore, without filling it, which suggests that the damage is not always caused by the pressure exerted by the crystals filling the pore. The new explanation of salt crystallisation damage (NaCl and some other salts) is centred on the dilation of the plaster caused by each crystallization cycle, which is an irreversible process, leading to bulging of the surface of the plaster and loss of cohesion (sanding) (fig. 2).



Figure 2: Damage to plaster due to salt, RH cycles leading to irreversible dilation

A more effective laboratory test was developed presenting the following innovative developments:

1. Less time needed for testing: damage is obtained in an average period of four months, whereas in an existing RILEM test ca. 2-3 years' time was necessary, thanks to the chosen substrate, the salt load and the drying conditions.

2. Durability is considered: the COMPASS test is further different from an existing WTA test with respect to the fact that performance and durability are taken into account. Also the procedure is different: not only the plaster is tested, but a combination of plaster and substrate.

The drying process of the plaster and substrate was studied by means of NMR. Salt accumulates in the when this has finer pores than the substrate. Thus the difference in pore size distribution of the substrate and the plaster determines the location of salt damage.

The difference in salt compatibility between different plasters was assessed. The working principles were also assessed (fig. 3).



Figure 3: Classification of most relevant plaster types for salt loaded substrates

The knowledge resulting from the research was not only disseminated in traditional ways, but also entrusted to the Expert System MDDS (Monument Damage Diagnostic System). The System was furnished with damage Atlases, far-reaching background information to support the investigations, and a decision model for a correct choice of restoration plasters under given circumstances (fig. 4).

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Figure 4: The report generated by the Expert System MDDS

#### Impacts

A clear step forward towards a sustainable approach to the maintenance of the Cultural Heritage was taken, implying relevant economic consequences: the basis for the creation of more suitable plasters for salt and moisture loaded substrates was laid, which will help the EU industry to obtain a leading position. The measures to hinder damage may lead to a better maintained heritage, with positive consequences for cities inhabitants (quality of life) and tourism.

### Acknowledgements

The Compass project was carried out in the 5<sup>th</sup> Framework Programme of the EC. The researchers thank the EU for the support given. Further financing: Netherlands Ministry of Economic Affairs, NL Government Building Agency, NL Department of Conservation, Remmers Bouwchemie and Hoofdbedrijfsschap Afbouw (HAO). See also the *Final Report* [1].

### References

[1] COMPASS *Final Report*, Contract No: EVK4-CT-2001-0047-DG XI, in which all relevant references and publications are mentioned.

### European project details

COMPASS, Contract No.: EVK4-CT-2001-00047, *Compatibility of Plasters and Renders with Salt loaded Substrates in Historic Buildings*, Co-ordinator: Prof. Ir. R.P.J. van Hees, TNO Bouw, Delft, Netherlands.

Partners in the project: Lab. de Recherche des Monuments Historiques, V. Verges-Belmin, Champs sur Marne, France; University of Technology, Fac. of Civil Engineering and Geosciences, C.J.W.P. Groot, Delft, Netherlands; Inst. Eduardo Torroja de Ciencias de la Construcción, M. P. Luxán Gómez del Campillo, Madrid, Spain; LNEC, Dep. of Geotechnique, J. Delgado Rodrigues, Lisboa, Portugal; Technical University of Eindhoven, Dep. of Appl. Phys. L. Pel, Eindhoven, Netherlands; For the complete list of partners and end users, please see the *Final Report* [1].

## Monitoring of painted facades the Momorex project as a first step to the future maintainance program Christophorus

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Over the past few decades the deterioration process on outdoor monuments and architectural heritage has become clearly visible, taking on increasingly alarming dimensions.

Scientific analysis applied to works of art has made a noteworthy contribution in identifying the by-products that can form on monuments and architectural surfaces, as well as in understanding the mechanisms of deterioration.

It is well known that the main causes of deterioration are atmospheric pollutants, substances that have drastically changed air quality over the past fifty years.

Today we are faced with a further change in the composition of pollution agents themselves due to new choices made in energy sources, characterised by the different categories of combustibles used for industry, motor traffic and heating fuels. On outdoor monuments, this change is seen in a decreased tendency to form gypsum-based black crusts and an increase in the corrosive processes produced by acid rain and acid condensation and a noticeable growth of suspended particulate in the air resulting in monuments that are progressively more corroded as well as being disfigured by greyish deposits adding to the overall perception of dirt.

Faced with these unfavourable prospects, the conservation of outdoor monuments and architectural heritage must be increasingly characterised by a policy of programmed maintenance as a follow-up to restoration treatment. This means fewer invasive and more systematic interventions; and as we all know, this is a practice that still encounters difficulties in its implementation in each individual country.

The Momorex project, as an European Culture 2000 project collected, filtered and developed monitoring concepts for out door paintings, recently restored. In the Collaboration between the CNR – ICVBC, Istituto per la Conservazione e la Valorizzazione dei Beni Culturali, Firenze (I), the HfBK, Hochschule für Bildende Künste, Dresden (D) and the BDA, Bundesdenkmalamt, Werkstätten, Wien (A), 3 facades were analysed, monitoring methods, techniques and equipments modellike proved, developed and presented in an exhibition shown in the three countries, with about 15.000 visitors.

These first step, in a methodical comparison of maintenance programs on European level should be followed up in a wider long term programme focusing on the survival of an extremely endangered European artistic phenomena, the representations of S. CHRISTOPORUS. These giants are a unique feature in the European art, with there enormous size, up to 15 Meters high, mainly situated at the outside of churches. Unfortunately these well known patron to the travellers is specially in danger by the pollution, as result of the traffic. These presentations are mainly concentrated in the alpine areas (Italy, Austria, Switzerland; Germany, France) but also in other countries like Great Britain, Denmark, Czech Republic etc., has to be seen as European cultural property and identity under real threat to disappear.

Concepts of maintenance, related to a crucial inventory work, priority programs for preventive conservation and actual conservation work have to be worked out. This needs a straight collaboration and interaction of different disciplines, developing strategies from passive – active intervention to maintenance programs. Apart from technical questions about how to intervene and maintain this is a problem of recognizing the importance of the topic on a social level, from central to local organisations. It is a challenge to enforce especially local identification processes catalyzed by public relation (with partners like the Austrian, German, and Italian Drivers association).

The Program CHRISTOPHORUS is foreseen to integrate, Italy, Austria, Germany, Czech Republic, Denmark, Switzerland, Hungary, Croatia, Slovenia, France etc. Main aspects in the program will be:

- Data based inventory and art historical research on the representation of S. Christoph
- Development of database related monitoring programs
- Developing of further monitoring techniques and features
- Creation of an European Christophorus network
- Creation of European travel routes for S. Christophorus
- Sensitize central and local organisations for the program
- Establishing of local initiatives for maintenance and conservation programs under a covering shelter organisation.

#### Partners:

- National research centres in maintenance of cultural properties
- Conservation and Restoration Centres
- Organisation of Inventory
- Local organisations
- Drivers associations
- National Heritage organisations
- Universities as research and training centres.

## STRUCTURAL BEHAVIOUR OF HISTORIC CARPENTRY JOINTS

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## Structural behaviour of historic carpentry joints

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Key words: timber, carpentry joints, repeated loading, testing

#### Introduction and content

The poster presents a review of experimental and theoretical research into the structural behaviour and technological aspects of traditional historic carpentry joints. Four types of joints were studied: classical tenon joints, halved dovetail joints, mortice and tenon joints between the rafter and tie beam and a special halved scarf joints with oblique cut ends used usually for repair of rotten ends of timber ceiling joists walled in the masonry.

All types of joints were tested experimentally under static and in some cases even repeated loading and their deformation behaviour as well as the load carrying capacity were measured. The all timber carpentry joints need well trained and skilled carpenters and, therefore, the research was carried out in cooperation with Czech SMEs – traditional carpentry and design companies. The experience from carpentry work with traditional tools is utilized for analysis of traces on the surface of the ancient hewn wood.

The poster further presents examples of the application of carpentry joints in restoration projects on important Czech architectural monuments.

The behaviour of classical tenon joints has been tested on original roof framework parts taken from a historical XVIII<sup>th</sup> Century structure which was demolished. The halved dovetail joints were made from ancient wood (XVIII<sup>th</sup> C.) as replicas of traditional joints. A skilled carpenter produced the test specimens using traditional carpentry tools. The series of specimens of both types were subjected to cyclic loading and



Figure 1: Testing set-up

the moment capacity as well as cumulation of deformation was measured. The acquired data were utilized for development and calibration of computational models for predicting the response of individual joints during the loading. The results were further used for studies of sensitivity of typical historic roof frames to a real stiffness of their joints.

In the case of the halved scarf joints with oblique cut ends, which were strengthened with oak dowels and connected with oak pins, the behaviour was compared to the response of halved joints connected with steel bolts with spike shear plates, which is a typical engineering approach in problems of lengthening of ancient damaged beams. For the sake of



comparison, three basic kinds of beams were investigated: i) integral one piece beams without joints, ii) beams lengthened by means of halved scarf joints with oblique cut ends connected with wooden shear connectors (dowels) and wooden pins, Fig. 3, and iii) the halved jointed beams of the same geometry connected by means of steel bolts and shear plates (spiked grids). The length of the halved joint depends on the transmitted forces and on the beam cross-section dimensions. It should exceed six times the height of the beam and the scarf ratio should be about one half of the height. The oblique cut ratio is about one to six. The scarf angle changed for different series of test specimens being 50°, 62° and 72°. A review of experimental results is presented in Figure 4, from which it follows that the four point bending strength of the tested beams is 5-10% lower than the strength of beams with bolted connections, on the other hand, the stiffness of the all timber carpentry assembly is better than in the case of the bolted one. Taking into account the fact that the design load is far below the ultimate load carrying capacity



Figure 3: Tested specimens

and deformability is mostly the controlling design parameter, the all timber structure exhibit generally better performance than the bolted variant.



Figure 4: Results (bellow)





Figure 5: Different mechanisms of failure (spruce left, oak right)

The last series of tests studied the behaviour of classical rafter/tie beam connections. Two series of specimens were made from spruce and oak wood. Typical combined moment and axial force in the rafter was simulated and the joint behaviour including failure mechanisms was analysed.

#### **European dimension**

These research projects are a part of a wider international programme of studies of historical roof frames, mainly based on a bi-lateral co-operation. He results have been used in a project studying development of roof framework types in different European regions, e.g. "Roofs". A part of this research was done in bilateral Czech Romanian cooperation supported from the 5<sup>th</sup> EC Framework Programme of the ARCCHIP Centre of Excellence (Project No. ICA1-CT-2000-70013).

#### **Innovation and originality**

Study of behaviour of real and authentic historical timber structural elements and carpentry joints under cyclic loading represents an original approach to wood research. There are presented innovative models for the prediction of deformations of traditional carpentry joints subjected to repeated loading, which is quite realistic situation and may occur during earthquake or windstorm events. A close interactive cooperation between research institutions and SMEs can be seen as another innovative approach.

#### Impacts

The results help to improve assessment of overall framework deformations of historical roof buildings, to enhance computational methods for safety and performance analysis of historical timber structures and to design remedial measures at safeguarding architectural heritage. It further facilitates re-introduction and strengthening of traditional carpentry in restoration and rehabilitation of historical wood architecture. The results have been used at restoration of important Czech architectural monuments, e.g. the medieval royal Castle Karlštejn, Fig. 6.



Figure 6: Repaired ceiling joists

### References

- Drdácký, M., Wald, F., Mareš, J.: Modelling of Real Historic Timber Joints, in Structural Studies, Repairs and Maintenace of Historical Buildings VI, (ed. C. A. Brebbia and W. Jäger), pp. 169-178, "Advances in Architecture Series" WIT Press Southampton-Boston, June 1999.
- [2] Drdácký, M., Wald, F., Sokol, Z.: Sensitivity of Historic Timber Structures to Joint Response, Proceedings of the 40<sup>th</sup> Anniversary Congress of IASS Madrid (ed. R. Astudillo and A.J. Madrid), Vol. II, pp. G1-G10, CEDEX Madrid, September 1999.
- [3] Drdácký, M., Wald, F., Mareš, J., Sokol, Z.: Component method for historical timber joints, in "The Paramount Role of Joints into the Reliable Response of Structures" (ed. C.C. Baniotopoulos and F. Wald), NATO Science Series, ISBN 0-7923-6701-4 (PB), ISBN 0-7923-6700-6 (HB), pp. 417-424, Kluwer Academic Publishers, Dordrecht/Boston/London, 2000.
- [4] Drdácký, M.F.: New technologies for safeguarding historical structures in the Czech Republic, in "European Research on Cultural Heritage – State-of-the-Art Studies" (M. Drdácký ed.), Vol. 3, pp. 657-670, ISBN 80-86246-24-8 (80-86246-21-3 (all)), ITAM, Praha 2004.
- [5] Drdácký, M., Mlázovský, V., Růžička, P.: Historic Carpentry in Europe: Discoveries and Potential, APT Bulletin: The Journal of Preservation Technology, Vol. XXXV, No. 2-3, pp. 33-41, ISSN 00449466, (article awarded with "Anne de Fort-Menares Award" for the year 2004).
- [6] Kirizsán, I.: Praktice of historic roof structure conservation. Case studies: Gothic roof structures from Transylvania, in Proceedings "Conservation of Historic Wooden Structures" (G. Tampone, ed.), Vol. 1, pp. 127-131, Collegio degli Ingegneri della Toscana, Florence 2005.
- [7] Szabó, B., Kirizsán, I.: Continental Historic Roof Structures in Central Europe, in "European Research on Cultural Heritage – State-of-the-Art Studies" (M. Drdácký ed.), Vol. 4, pp. 449-476, ISBN 80-86246-25-6 (80-86246-21-3 (all)), ITAM, Praha 2006.

# CONSERVATION OF WESTERN STYLE HERITAGES IN THE EASTERN CONTEXT

Tianxin ZHANG

#### 1. Introduction

Western style heritages in China can be seen in colonial cities such as Harbin, Guangzhou, Shanghai, Tsingtao, etc. The western style buildings in these cities are normally a gathering of various western styles influenced directly by respective European countries.

In the mean time, there are also other types that were formed under indirect European influences. For example, Western influences can also be seen in remote regions like Dali. Buildings in these places tend to mix Western styles with local Chinese styles, and their form and style would transform to fit the eastern context.

Therefore, it should be argued that conservation of the western style buildings in different locations around China would follow different routs from the Western countries as well as from each other.

### 2. Dilemma of Western Style Buildings in China

Because most western style buildings are relatively new compared with Chinese ancient buildings, they tend to be ignored at the first stage of urban heritage conservation. In 1982 in China, for example, the first group of 24 cities was designated as "Historically and culturally famous cities". Among them there were no cities characterized as western style cities except Guangzhou.

But from the second stage around 1986, the value of Western style cities began to be recognized and the most characteristic ones such as Shanghai, Tianjin and Wuhan were listed as the culturally famous cities that deserve conservation. They amount to 3 among 38 other Chinese style cities.

From this number, it is still hard to say that western style buildings have received full recognition. There are mainly two reasons for this ignorance: 1) China has a long history and an abundance of marvelous traditional

buildings and historic cities that deserves notice. 2) Western scholars also keep their eyes on the excellent Chinese style

buildings and cities, while on the other hand, they tend to take the western buildings in China as an exception compared with the mainstream classical buildings in the Western world.

Due to the above reasons, western style buildings are not easy to earn fund for restoration as Chinese style heritages are.

#### 3. Value of Western Style Buildings in China

However, I argue that western style buildings in China as well as other Eastern countries have their irreplaceable value:

 They are formed in a totally different context, and thus form a distinctive cultural landscape.

2) They form an intermediate field that mixes and integrates both the east and the west and therefore show a mixed character of both the east and the west, that seldom exists in western countries.



 Due to their height and volume, they often become the new landmarks in Chinese cities which competes with the Chinese traditional landscapes like pagoda.

 They function as a proof of western style transformation throughout the world.

#### 4. Conclusion

1) The challenges western styles buildings face in the eastern context are quite different from those in European countries.

 The world needs a common voice and action on more efficient preservation of these western style buildings in the eastern countries.

 A better understanding of the local culture and philosophy are needed to understand the eastern landscape within which western style buildings are located.



Shanghai Waitari's Panorama



Chrisban church, Jiangsu road 158 (German Church), German Castle style, composed of a Zhonglou and a Libaitang, Height 16m, Two stores, Contains a Mousand people.





580m long beach, visitors come since 1902, from 1930's, western hotels and other facilities began to built, visitors reached 10000 people/day now 250-300 thousand people/day



Western red-roof builtings against the background of Chinese landscape and buildings, with a Chinese style Pagoda as the landmark sculpturing the assabore skyline



1932

ashi Villa, built by

Guest welcome house



German embassy

## Conservation of western style heritages in the eastern context

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Key words: western style heritage, eastern context, protection

#### Introduction

Western style heritages in China can be seen in colonial cities such as Harbin, Guangzhou, Shanghai, Tsingtao, etc. The western style buildings in these cities are normally a gathering of various western styles influenced directly by respective European countries. In the mean time, there are also other types that were formed under indirect European influences. For example, Western influences can also be seen in remote regions like Dali. Buildings in these places tend to mix Western styles with local Chinese styles, and their form and style would transform to fit the eastern context. Therefore, it should be argued that conservation of the western style buildings in different locations around China would follow different routs from the Western countries as well as from each other.

#### Dilemma of western style buildings in China

Because most western style buildings are relatively new compared with Chinese ancient buildings, they tend to be ignored at the first stage of urban heritage conservation. In 1982 in China, for example, the first group of 24 cities was designated as "Historically and culturally famous cities". Among them there were no cities characterized as western style cities began to be recognized and the most characteristic ones such as Shanghai, Tianjin and Wuhan were listed as the culturally famous cities that deserve conservation. They amount to 3 among 38 other Chinese style cities. From this number, it is still hard to say that western style buildings have received full recognition. There are mainly two reasons for this ignorance: 1) China has a long history and an abundance of marvelous traditional buildings and historic cities that deserves notice. 2) Western scholars also keep their eyes on the excellent Chinese style buildings and cities, while on the other hand, they tend to take the western buildings in China as an exception compared with the mainstream classical buildings in the Western world. Due to the above reasons, western style buildings are not easy to earn fund for restoration as Chinese style heritages are.

#### Recognize the value of western style buildings in China

However, I argue that western style buildings in China as well as other Eastern countries have their irreplaceable value: 1) They are formed in a totally different context, and thus form a distinctive cultural landscape. 2) They form an intermediate field that mixes and integrates both the east and the west and therefore show a mixed character of both the east and the west, that seldom exists in western countries. 3) Due to their height and volume, they often become the new landmarks in Chinese cities which compete with the Chinese traditional landscapes like pagoda. 4) They function as a proof of western style transformation throughout the world.

### Conclusion

1) The challenges western styles buildings face in the eastern context are quite different from those in European countries. 2) The world needs a common voice and action on more efficient preservation of these western style buildings in the eastern countries. 3) A better understanding of the local culture and philosophy are needed to understand the eastern landscape within which western style buildings are located.



# THE RECONSTRUCTION OF THE FORTRESS KAYAN AND IT'S FORGOTTEN HISTORY

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#### **INTRODUCTION**

The fortress Kayan is the one of the many fortresses of the Kingdom "Tashir-Dzoraget" (9.-11. centuries), and was one of the main security constructions on the way to the border of neighbour Georgia and security point for the monastery complex Haghbat, one of the main religious centres of the North Armenia. The Ruins of the fortress are placed in the North part of Armenia, in the region of Lori, about 9 km far from the district centre Alaverdi, and about 500 m air line from the village Haghbat. The inhabitants of the villages are telling many interesting stories and legends, and even some writers used them in their works. Also some of the legends were the reason that the monument and the environment were destroyed by treasure searchers and vandals. Today the fortress is visited by only few of the many tourists which are coming to this region and sometimes by pilgrims.



#### Graphic 1. The m ain plan of fortess Kavan

#### INTENTIONS OF THE RESEARCH

Detaily architectural, archaeological, historical, literatural and strategical analysis of the monument, because the difficult position didn't allow many scientists to analyse it and the information which is possible to meet is only literatural and not scientific. - The restoring of the historical past and the strategical importance of that in medieval time.

- Checking the originality of the existing legends and stories.

- Checking and analysing the historical connection between the main monument and other constructions in the environment.

- Complete reconstruction of the fortress by the existing dates of the history of it.

#### RESEARCH

The first stage of the research was the exploring of the area of the fortress and neighbour hills, looking for any historical inscriptions. After this work was fixed one inscription on the west elevation of the church, and was telling that the church was erected in 1233 by archbishop Hovhannes from Haghbat. From this was made first conclusion about the establishing of the fortress, ca. 13th century.



Picture 1: - The inscription on the west elevation of the church "Dse-vank - St. God mother"

The second stage of the research was the searching the name of the fortress and the region in a connection with some historical events. In this stage was the discovery of the time of erecting and enlarging of the fortress and the name of the possible erector

The third stage of the research was the architectural and archaeological analysis of the main monument and all objects in the environment.

- During this stage were done following works.
- Detaily measurement of the fortress and all existing fragments.
- Photo documentation of the fortress, fragments and monuments in environment.
- Exploring ca. 1m<sup>2</sup> territories; hills, rocks, gorges.
- Collecting the stories, legends, witnesses, etc.
- Archaeological research (not detaily).
- Fourth stage of the research was the analysis of the collected information:
- Checking the connection between fortress and neighbour objects.
- Checking the originality of the legends from literatural and historical sources.
- Searching for existing researches in archives and libraries.
- Comparison of the present work with previous researches.
- Classification of done information
- Reconstruction of the whole historical view (with the remark on possible changes if would be taken some detaily archaeological excavation.

#### References

- V. Harutyunyan History of the armenian Architecture, Yerevan 1993
- G. Shakhkyan Lori, the stone pages of the history, Yerevan 1985 Kirakos Gandzaketsi The history of Armenia, Tpghis 1898 S. Jalalyants Trip to great Armenia, book B, Tpghis 1887
- Cetral archive of the State board of the protection of the monuments



Pictures 2.3.4.5: - West elevation of church, ara ross stone South east view of tortress

#### **RESULTS AND DISCUSSION**

The fortress was erected in the last quarter of 10th century.
The name of erector is Holum Vasak, who was the one of the field commandos of the Family of Kings Bagratuni.

- In 12th century the fortress was taken by the family Zakaryan which was governing in the kingdom of Tashir-Dzoraget, and enlarged (bath, dinning house, living boxes). - The first function of the fortress was the watching the federal way to Georgia, and keeping safe the way to Haghbat.

- As assistant construction was erected the Cave-Fortress "Zarner" on the West hill of the plateau Haghbat.

- For the quick evacuating were erected in the rocks two secret ways; first ca. 300m long, and second about 100m.





Pictures 6,7: - The position of the evacuation caves on the hill, and interior of one cave

- Probably it had also underground flour because of the big difference of height between North and South parts, also discovered fragments, and holes on the ground of South part (on this question can answer only detaily archaeological excavation). For the provision of the drink water was constructed ca. 4km long stone pipe line from village Akner.

- The church "Dsevank - St. God mother" is the last construction of the fortress and was erected by archbishop from Haghbat Hovhannes in 1233.

- After erection of the South part of the fortress (ca. 12th century), there started to live also farmers, weapon specialists and their families.

- Some of the stories came until our time with some changes, but they still saved their originality (Story about taking over in 1344 and story about prince Avag)

- The life in the fortress was until 1344, when was destroyed by Seljuk forces - The dome of the church "Dsevank" was destroyed from earthquake in 1827 and in

1831 was reconstructed by Margar Yerznkean. This form exists also until now. - For the reconstruction of previous view of the dome was used the method of analysis of proportions of the building with same typology and erecting time. As such was taken the church of St. God mother of Haghbat.

-For the detaily results it's important to lead detaily archaeological excavations and that could bring some changes in the whole reconstruction work.



Graphic 2, 3: The analyses of the proportions of the churches Dsevank (left) and Haghbat

#### CONCLUSION

The present work reveals some interesting historical, strategical, architectural and archaeological aspects of the fortress, which is even not much visible in the environment, and gives clearer picture about this construction, security organization and fortification art of that time and region

"Amberd" - The measurments of the fortress Amberd done by chair of the history of architecture of University of Milano

- V. Harutyunyan The bridges and Karavan-sarays of medieval Armenia, Yerevan 1965
- M. Hovhannisyan The fortresses of Armenia, Venice 1965
- K. Ghafadaryan Haghbat, Yerevan 1963
- R. Yerznkeants The Description of the place on old language, Tpghis 1897

# The reconstruction of the fortress Kayan and it's forgotten history

## Levon Vardanyan

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Key words: Armenia, Lori, Fortification art, Tashir-Dzoraget, medieval, Kayan

### Introduction

The fortress Kayan is the one of the many fortresses of the Kingdom "Tashir-Dzoraget" (9.-11. centuries), and was one of the main security constructions on the way to the border of neighbour Georgia and security point for the monastery complex Haghbat, one of the main religious centres of the North Armenia. The Ruins of the fortress are placed in the North part of Armenia, in the region of Lori, about 9 km far from the district centre Alaverdi, and about 500 m air line from the village Haghbat. The inhabitants of the villages are telling many interesting stories and legends, and even some writers used them in their works. Also some of the legends were the reason that the monument and the environment were destroyed by treasure searchers and vandals. Today the fortress is visited by only few of the many tourists which are coming to this region and sometimes by pilgrims.

### Intentions of the research

- Detaily architectural, archaeological, historical, literatural and strategical analysis of the monument, because the difficult position didn't allow many scientists to analyse it and the information which is possible to meet is only literatural and not scientific.
- The restoring of the historical past and the strategical importance of that in medieval time.
- Checking the originality of the existing legends and stories.
- Checking and analysing the historical connection between the main monument and other constructions in the environment.
- Complete reconstruction of the fortress by the existing dates of the history of it.

### Research

The first stage of the research was the exploring of the area of the fortress and neighbour hills, looking for any historical inscriptions. After this work was fixed one inscription on the west elevation of the church, and was telling that the church was erected in 1233 by archbishop Hovhannes from Haghbat. From this was made first conclusion about the establishing of the fortress, ca. 13<sup>th</sup> century.



Figure 1: The inscription about the establishment of the church

The second stage of the research was the searching the name of the fortress and the region in a connection with some historical events. In this stage was the discovery of the time of erecting and enlarging of the fortress and the name of the possible erector.

The third stage of the research was the architectural and archaeological analysis of the main monument and all objects in the environment.

During this stage were done following works:

- Detailed measurement of the fortress and all existing fragments.
- Photo documentation of the fortress, fragments and monuments in environment.
- Exploring ca.  $1 \text{ m}^2$  territories; hills, rocks, gorges.
- Collecting the stories, legends, witnesses, etc.
- Archaeological research (not detailed).

Fourth stage of the research was the analysis of the collected information:

- Checking the connection between fortress and neighbour objects.
- Checking the originality of the legends from literatural and historical sources.
- Searching for existing researches in archives and libraries.
- Comparison of the present work with previous researches.
- Classification of done information.
- Reconstruction of the whole historical view (with the remark on possible changes if would be taken some detaily archaeological excavation.







Figure 2: The South-West view of the Figure 3: The Grave-Stone Figure 4: The Cross-Stone church "Dsevank"



Figure 5: The South-East view of the fortress

#### **Results and discussion**

- The fortress was erected in the last quarter of 10<sup>th</sup> century.
- The name of erector is Holum Vasak, who was the one of the field commandos of the Family of Kings Bagratuni.
- In 12<sup>th</sup> century the fortress was taken by the family Zakaryan which was governing in the kingdom of Tashir-Dzoraget, and enlarged (bath, dinning house, living boxes).
- The first function of the fortress was the watching the federal way to Georgia, and keeping safe the way to Haghbat.
- As assistant construction was erected the Cave-Fortress "Zarner" on the West hill of the plateau Haghbat.
- For the quick evacuating were erected in the rocks two secret ways; first ca. 300 m long, and second about 100 m.
- Probably it had also underground floor because of the big difference of height between North and South parts, also discovered fragments, and holes on the ground of South part (on this question can answer only detaily archaeological excavation).
- For the provision of the dring water was constructed ca. 4 km long stone pipe line from village Akner.
- The church "Dsevank St. God mother" is the last construction of the fortress and was erected by archbishop from Haghbat Hovhannes in 1233.
- After erection of the South part of the fortress (ca. 12<sup>th</sup> century), there started to live also farmers, weapon specialists and their families.
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- The life in the fortress was until 1344, when was destroyed by Seljuk forces.
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- For the detaily results it's important to lead detailed archaeological excavations and that could bring some changes in the whole reconstruction work.

#### Conclusion

The present work reveals some interesting historical, strategical, architectural and archaeological aspects of the fortress, which is even not much visible in the environment, and gives clearer picture about this construction, security organization and fortification art of that time and region.

#### References

V. Harutyunyan – History of Armenian architecture, Yerevan 1993.

G. Shakhkyan – Lori, the stone pages of the history, Yerevan 1985.

Kirakos Gandzakeci – The history of Armenia, Tpghis 1898.

S. Jalalyants – Trip to great Armenia, book B, Tpghis 1887.

Central archive of the State Board of the protection of the monuments.

"Amberd" – The measurements of the fortress Amberd done by chair of history of architecture of University of Milano.

V. Harutyunyan - The bridges and Caravan-Sarays of medieval Armenia, Yerevan 1965.

M. Hovhannisyan – The fortresses of Armenia, Venice 1965.

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R. Yerznkeants – The description of the Place on old language, Tpghis 1897.



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Reversible mixed technologies for seismic protection: set up of calculation methods

Proposal of codification on the use of reversible mixed technologies in the seismic protection of historical buildin Project management



SIXTH FRAMEWORK PROGRAMME PRIORITY FP6-2002-INCO-MPC-1 Prohitech project Contract No. INCO-CT-2004-509119 Responsible. Prof. Federico M. Mazzolani University of Naples Tederico II, Italy

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Prof. Federico M. MAZZOLANI

STEERING COMMIT

Prof. Glanfranco DE MATTEIS Mrs. Xiaoling SONG

## The PROHITECH project: a summary of ongoing activity

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Keywords: Structural rehabilitation, Seismic protection, Historical buildings, Reversible mixed technologies

#### Introduction and content

The research project PROHITECH is framed within the INCO thematic areas INCO-B.2, INCO-2002-B2.1 and INCO-2002-B2.2 of the 6<sup>th</sup> Framework Programme (FP6), devoted to "Protection and conservation of cultural heritage" in the Mediterranean area. The project tackles the very important subject of the seismic protection of constructions dating back from the ancient age up to the mid of the 20<sup>th</sup> century [1]. Its main objective is to develop sustainable methodologies for the use of reversible mixed technologies in the seismic protection of existing constructions, with particular emphasis to buildings of historical and artistic interest. Reversible mixed technologies exploit the peculiarities of both innovative materials and special devices, allowing ease of removal if necessary. At the same time, the combined use of different materials and techniques yields an optimisation of the global behaviour under seismic actions. The endpoint of the research is the proposal of a codification for the use of such technologies in seismic protection of existing constructions, which is intended to meet in both language and philosophy the most up-to-dated European codification issues [1, 2]. To this purpose, an extensive activity is in progress at both numerical and experimental level, aimed at a significant advancement of the state of the art in the field of seismic protection. The research program involves 16 academic institutions coming from 12 countries mostly belonging to the South European and Mediterranean area. The workplan is based on 12 scientific workpackages, dealing with 16 project deliverables [3-6]. The scientific activity is broken down into 4 parts, corresponding to 4 main deliverables [7], to be developed in 3 years.

#### **European dimension**

In almost all the southern part of Europe, the preservation of existing constructions against seismic risk is one of the main concerns. The difficulty to apply such a seismic protection at a large scale is mainly related to the difficulty of the problem itself, which interests many interconnected aspects, to the poor quality of materials and structural systems generally used in these Countries, which provide a scarce seismic response of the constructions against earthquakes and, last but not least, to the uncertainty of building industry and specialized operators, which are not supported by uniform and harmonised guidelines for applying appropriate intervention techniques. For this reason, both retrofit and rehabilitation of constructions is a process that requires a very large team-work, conjugating different competences of specialists coming from different Countries, so as to account for the several construction systems and methods traditionally adopted in each European and Mediterranean Country. The PROHITECH project contributes to the improvement of knowledge at European level in this important field, addressing most of the possible effective intervention techniques and finalising these efforts in the set up of appropriate design guidelines, meanwhile allowing for a prompt and large dissemination of the main project achievements. For this reason, the consortium working on this project is constituted by 12 different Countries belonging to the Mediterranean and Balkan areas, which are characterised by both considerable seismic risk and posses valuable historical heritage. Furthermore, selected representative Partners are acknowledged experts in the field of seismic design and structural retrofitting. As main final

achievement of the research project, a comprehensive codification development at European level is expected, which will allow for the definition of the first harmonized international regulation and standardization document in this field. In this way, the achieved results could be easily and fully exploited in the majority of Members and Associated States interested in the seismic protection of constructions, in the form of guidelines for the structural interventions aimed at the seismic upgrading of constructions. Furthermore, the whole European building industry could advantageously benefit of the achieved results, due to the possibility to address future efforts in the seismic protection of both ordinary and monumental constructions, as well as to the development and application of innovative materials, special devices, advanced intervention techniques and upgrading structural systems.

#### **Innovation and originality**

Research on Reversible Mixed Technologies profits of the considerable development in the field of seismic protection in progress at the moment. The present state of the art, in fact, allows new targets to be set in the seismic safeguard of constructions, characterised by unprecedented levels of structural reliability under earthquake actions. In this field, the concept of Reversible Mixed Technologies can be exploited through the use of both innovative materials and special devices purposely conceived for the enhancement of seismic performance. The importance as well as the innovative character of Mixed Technologies within European research is demonstrated by a large amount of initiatives and research projects activated in recent years both at national and international level [1-2]. The interest and novelty of this topic are also testified by the several activities recently developed at European level with the support of the European Commission, such as, for example, the COST C12 Action "Improving building structural quality by new technologies", and the COST C26 Action "Urban Habitat Constructions Under Catastrophic Events", both of them aimed at promoting mobility and exchange of researchers at European level. The PROHITECH programme, grounded on an wide scale cooperation of scientists, engineers and architects, has been proposed to complement this research activity in progress in Europe, by facing the aspects which are presently not yet covered by previous or ongoing researches. The need to study the application of mixed technologies to seismic protection of existing buildings is due to the fact that most of the present knowledge on such systems has been accumulated from studies on new structures. The most original and innovative feature of PROHITECH is that it is aimed at assessing and developing new reversible mixed solutions for seismic rehabilitation of historical constructions, in order to reach a framing of this subject as comprehensive as possible. As a conclusion of the research work, a wider knowledge about proposed solutions will be available, together with essential elements for supporting practical applications, both from design and execution point of view.

### Impacts

The situation in Europe for the development of Reversible Mixed Technologies aimed at the increase of structural integrity threshold under seismic action is now very good. Significant results have been already achieved in the field of new urban buildings, where Mixed Technologies demonstrated the chance to both widen the creative possibilities of designers and to improve, the global urban building quality in terms of economy, technical reliability of the physical city (building and infrastructures), and impact of the construction works on the functioning of the city. A similar perspective is deemed to exist for the seismic retrofit of historical constructions, too. For these reasons, a research project like PROHITECH, to which many reputable earthquake engineers and scientists from several European and neighbouring Countries are contributing, is likely to have a large impact on the engineering community in Europe. Awareness of innovative systems for reducing the seismic vulnerability of existing structures, in fact, will undoubtedly lead to better constructional practices and, as a consequence, to higher protection of life and property. Benefits resulting from the consideration of such aspects can affect not only the constructional process, but also the end-users and their communities, as well as local and global environments. In this respect, the range

of benefits given by Mixed Technologies involves: the Owners, for which Mixed Technologies may significantly reduce the construction time, resulting in a global economy of constructional costs (with the advantages of less financial interests and earlier income), and in an optimisation between safety and economy; the Architects, to whom Mixed Technologies offers greater freedom for creativity and innovation by enlarging the field of available structural systems for buildings; the Planners, who can profit of the new technologies to fulfil social and environmental requirements set by local and European legislation; the Engineers, who can find new possibilities to create slim and slender structural elements, simpler structural connections and innovative structural systems by the combination of different construction methods and materials; the Fabricators, for the optimised use of manufacturing possibilities; the Users, who can enjoy a greater comfort and higher quality at serviceability limit state, savings in energy costs and an increase of safety at ultimate limit state when exceptional actions occur; the urban Environment, thank to the reduced disturbance during erection due to little construction time, less noise and pollution, cleanness of construction, limited disruption of traffic into the city; the global Environment, savings on material and energy consumption, ensuring at the same time ease of dismantling and recycling. How new techniques, new materials and new methods of mixing materials can help to meet the objective of designers and authorities as far as the above aspects are concerned is the most relevant objective of research in this field. The whole of above properties is even more important in the field of rehabilitation, where their exploitation can be maximised, leading to results not achievable by means of traditional technologies. As for new constructions, these features gain importance in case of historical buildings if one assumes that most of such constructions need not only to be preserved, but also to be used, providing the same standards, in terms of global safety and comfort, as new buildings.

#### Acknowledgement

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#### References

- [1] Mazzolani, F.M., "Earthquake protection of historical buildings by reversible mixed technologies: the PROHITECH project", 2<sup>nd</sup> H & mH International Conference on "Vulnerability of 20<sup>th</sup> Century cultural heritage to hazards and prevention measures", KOS, Greece, 2005.
- [2] Mazzolani, F.M., "Earthquake protection of historical buildings by reversible mixed technologies: the PROHITECH project", Proceedings of the Symposium on Damage and repair of historical and monumental buildings, Venice, 2005.
- [3] Mandara, A. (ed), PROHITECH project deliverable D1 "Overview of traditional technological systems adopted for seismic rehabilitation of historical buildings in European and Mediterranean Countries", 2005.
- [4] Altay Askar, G. (ed), PROHITECH project deliverable D2 "Assessment of earthquake-induced structural damage in historical buildings of the Mediterranean area", 2005.
- [5] Iben Brahim, A. (ed), PROHITECH project deliverable D3 "Assessment of seismic risk maps and evaluation of seismic vulnerability of historical building heritage in the Mediterranean area", 2005.
- [6] Lungu, D. (ed), PROHITECH project deliverable D4 "Definition of methodologies for seismic upgrading of constructions based on both strengthening of structural elements and control of the seismic response", 2005.
- [7] Mazzolani, F.M., De Matteis, G., Mandara, A., Altay Askar, G., Lungu, D. (eds), PROHITECH First main deliverable D-I "Assessment of intervention strategies for the seismic protection of historical building heritage in the Mediterranean basin", 2005.

#### **European project details**

PROHITECH, 6<sup>th</sup> Framework Programme, Contract No. PL 509119, "Earthquake Protection of Historical Buildings by Reversible Mixed Technologies", Coordinator F. M. Mazzolani, Dep. of Structural Analysis and Design, University Federico II of Naples, Italy (global cost 2500 k€).



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## PRAGUE, CZECH REPUBLIC 31st MAY - 3rd JUNE 2006

CULTURAL

HERITAGE

HECHIARDIDIS

COORDINATOR: SAFEGUARDED LABEIN (Spain). Dr. J. Tomás San-José Fundación Santa Maria la Real, C.E.R. (Spain), University of Patras (Greece) American University of Beirut (Lebanon) Fyfe Europe (Greece) Cairo University, Engineering Centre for Archaeology and Environment (Egypt) Supreme Council of Antiquities (Egypt) Centre de Formation à la Rehabilitation du Patrimonie Architectural (France)

Studio Progettazione Controlli, Srl (Italy) Royal Scientific Society (Jordan) Ministry of Tourism and Antiquities / Department of Antiquities (Jordan) Belent enterprise (Algeria)

Open and fully compatible next generation of strengthening system for the rehabilitation of Mediterranean building heritage. OPERHA - 517765 (INCO)

Dr. José T. San-José, Dr. Isabel Rz-Maribona, Amaia Garai and Isaac Garrucho LABEIN-tecnalia (Spain). www.labein.es

# Understanding & Viability for the Enlarged Europe

This project aims at the the design, development, testing and validation of an adaptable and reversible restoration solution for structural strengthening of historical buildings in Europe and the Mediterranean Area, focused in the use of the fibre reinforced polymer (FRP).

Main advances with regards to state of the art are expected in both the laminate and anchoring system

The selection of buildings has been done on the basis of their geographical location, common uses, their material and structural components, seismic conditions and their environmental conditions.

The work plan has been divided into seven WPs: two of which address specific socioeconomic and cultural objective, three are focused on research, technological and innovation activities and the remaining two ones relate to dissemination and exploitation activities and project management.

## Open and fully compatible next generation of strengthening system for the rehabilitation of Mediterranean building heritage

José T. San-José, Isabel Rz-Maribona, Amaya Garay and Isaac Garrucho

LABEIN-tecnalia, Spain

Key words: adhesive, anchorage, architectural, dynamic, laminate, mortar, FRP, static, testing, textile

#### Introduction and content

This project aims at the design, development, testing and validation of an adaptable and reversible restoration solution for structural strengthening of historical buildings in Europe and the Mediterranean Area, focused in the use of the fibre reinforced polymer (FRP). The aim is to provide an integrated solution, bridging technical, architectural and socio-economic settings. The restoration has to be made by paying attention to reduce the impact over the ancient building, having in mind minimum intervention derived actions over the structure during and after its strengthening. The flexibility and integration of all technical, cultural, societal and economical aspects, requires multidisciplinary human work teams. As such, the OPERHA consortium is composed by experienced professionals in architecture, engineering, sociology, archaeology and history in the field of the building Heritage restoration all over Europe and the Mediterranean Area. The scientific and technological testing and validation will be done at lab scale. The validation of final solution will be done in pilot proofs. These trials will be made at different real Heritage buildings in all round the Mediterranean countries. The selection of buildings has been done on the basis of their geographical location, common uses, their material and structural components, seismic conditions and their environmental conditions. The work plan has been divided into seven WPs: two of which address specific socio-economic and cultural objective, three are focused on research, technological and innovation activities and the remaining two ones relate to dissemination and exploitation activities and project management.

#### **European dimension**

The European and Mediterranean Area architectural Heritage constitute one of most important cultural attractions because of its historical and artistic significance, and architectural uniqueness. Preserving this cultural legacy is strategic for European and Mediterranean Countries since it contributes to maintain and enhance the cultural idiosyncrasy and attractiveness of important sites and also as a whole, contribute to the economy and employment through tourism. The Mediterranean has been historically the growing of representative cultures and civilizations, widespread distributed throughout the Mediterranean countries (Roman, Phoenicians, Greeks, etc.) thus justifying common research in Cultural Heritage Topics. Consequently any effort to develop preventive measures to reduce these risks would be efficient if considered at European and Mediterranean level. As such, the OPERHA consortium has European and Mediterranean level. As such, the OPERHA consortium has European and Mediterranean dimensions that will involve organisations from *Algeria, Egypt, Jordan and Lebanon outside Europe*, and from *France, Greece, Italy and Spain inside Europe*.

#### **Innovation and originality**

The main innovative aspects of the project lie directly with the main objective. That is, the aim of developing a novel strengthening system, based on FRP solutions. FRP strengthening systems started to be developed some years ago, mainly to be applied to civil works, and,

although there is still lack of research in this topic, which implies a constant evolution of the commercial products existing nowadays, a design specifically adapted to cultural heritage requirements, considering cultural, technical, societal and economical aspects, has not been developed until now. Main innovations in the new product are: the creation of a next generation FRP products (textiles, laminates or strips) made of a combination of long carbon, glass or aramid fibres in different directions (multidirectional) and the creation of innovative fixing systems. In parallel, new anchorage systems will be designed with regards to reduce the visual and structural impacts of the intervention by reducing the anchorage length and the volume of, in case of need, anchorage devices. The solution will come from the simple bolting at the ends of multidirectional novelty FRP products and, as a secondary possibility, the introduction of the FRP textile in the strengthened element in drilling and the pre-peg wrapping at the novelty FRP ends will be analysed. The conditioning system, composed in mortars based on lime, modified with pozzolanes and other mineral or organic additives mortars are not widely extended to the surface preparation and aesthetic covering of FRP strengthening systems. Therefore there is a lack of research in ensuring the suitability of existing products to the adherence properties and compatibility with adhesives, required for this purpose. Thus, appropriate lime mortars to fit these requirements will be selected.

#### Impacts

Success in protecting European and Mediterranean Area heritage will create prospects for doing the same in other areas abroad by exporting this expertise – East Asia, South America, etc. A particularly important target area, for the competitiveness of Europe in the cultural tourism field, is represented by the Mediterranean countries through the preservation of the most emblematic architectural legacy. The outcome of the project will contribute to consolidate the European leadership in expertise, technology and industrial capacity in the field of the preservation of the architectural heritage. In this respect, solve the previous existing deficiency, in terms of European criteria and technological strategy, relative to the performance of monuments and large masonry buildings in seismic areas. On the other hand, although any statistical studies have been found regarding the participation of men and women in the industrial sectors which will be affected by the development of the research, Tourism, Conservation of Cultural Heritage, as well as Polymer Science, are disciplines where a high ratio of women are involved. Therefore, the development of this proposal is promoting the development of sectors where women are active in highly qualified jobs. As a relevant data concerning participation of women in Cultural Heritage activities, professional requires a high degree of efficiency and expertise. Within the European Union, this work is carried out mostly by women, with a percentage of about 95 %, and 50 % of them fall into the category of "ageing", i.e. the + 45 group. As a summary, conservation of cultural heritage is an important economic factor, an important factor in the life of the community and an important factor in the broad political sense. It is not just a small part of a particular policy, but the basis, foundation and starting point of all successful policies.

#### Acknowledgement

Operha consortium, gratefully acknowledge the funding provided by the EU through the  $6^{th}$  Framework following the EC founds assigned in Contract No. 517765 (INCO).

#### References

- [1] Sharon C. Park, AIA., "*The use of substitute materials on historic building exteriors*". Preservation Briefs 16. Park Net, National Park of service, 2002.
- [2] Isabel Rz-Maribona, F.J. Jimenez & J. Cavia. "Monitoring and mathematical modellisation of structural behaviour of Santa Maria de Elexondo Church". Restauracion y Rehabilitacion, 1998.
- [3] Cobrae News, "Carbon reinforcement strips can save monumental old buildings". De Ingenieur. http://www.ingenierur.nl. February 2003.

- [4] Triantafillou, T.C., "Seismic retrofitting of structures using FRPs". Progress in structural Engineering and Materials, 3 (1), 2001, 57-65.
- [5] ICCROM, "Mortars, cements and grouts used in the conservation of historic buildings". Symposium 3-6-11-1981. Rome, 1982.
- [6] Ecole d'Avignon, "Technique et practique de la chaux". Ed. Evrolled. Paris, 2001.

#### **European project details**

OPERHA (INCO), Contract No. 517765, Open and fully compatible next generation of strengthening system for the rehabilitation of Mediterranean building heritage, LABEIN*tecnalia*, Parque Tecnológico de Bizkaia – Edificio 700, 48160 Derio (Vizcaya) – SPAIN.

# Integrated Decontamination and Rehabilitation of Buildings, Structures and Materials in Urban Renewal

A research project supported by the European Commission under the Fifth Framework Programme and contributing to the implementation of the Key Action 4 "City of Tomorrow and Cultural Heritage" within the Energy, Environment and Sustainable Development



## **Objectives of the project:**

Develop and implement a general **City concept** comprising a toolbox of improved technologies and processes, together with decisionmaking and management tools, for sustainable urban renewal, focusing on contaminated buildings, in order to protect the environment from hazardous compounds and save reusable buildings and materials (Project website: http://projweb.niras.dk/irma)

**City concept elements** 



## **Copenhagen model**







#### **PROJECT PARTNERS**

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## IRMA project: *Integrated decontamination and Rehabilitation of buildings, structures and Materials in urban renewal*

Flavio Cioffi, Rebecca Ippoliti and Maria Pia Contento

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Key words: urban renewal

#### **Introduction and contents**

The aim of this project is to develop and implement a general *City concept* comprising a toolbox of improved technologies and processes, together with decision-making and management tools, for sustainable urban renewal, focusing on contaminated buildings, in order to protect the environment from hazardous compounds and save reusable buildings and materials

#### **European dimension**

Common European problems, connected with urban renewal, are:

- very little practical applicable knowledge on the decontamination of buildings and materials is available
- there are no accepted technologies or guidelines for the decontamination of polluted buildings and materials
- there are no standards for the classification of decontaminated buildings and materials as "clean"
- the means of classification of polluted soil cannot be applied to recycled materials
- a considerable amount of vandalism (graffiti) results in the need for decontamination
- that the health and safety of personnel carrying out work on contaminated buildings is insufficiently regulated

These problems related to contaminated buildings, structures and C&DW are highly significant for all European countries and have an impact on urban development projects in all European cities. With reference to the EU's Priority Waste Stream Programme including C&DW, the problems must be tackled at the European level. Following the Council Resolution of 7 May 1990, which invited the Commission to establish proposals for action at Community level, the Priority Waste Streams Programme was initiated. C&DW was identified by member States as one such stream, even though at the time relatively little was known about the nature or volume of the flows concerned.

With this project we aim to find common solution and tools, adaptable to the different realities, for the above mentioned problems, to solve and create a city concept.

#### **Innovation and originality**

The main innovation of the project follow the objectives of the individual work packages. Individually, as well as in total, they focus on the introduction of cleaner processes and maximum waste recycling in the construction industry focusing on the urban rehabilitation and supporting safe and extended lives of buildings.

We aim to create:

- a database on pollutants appearing in buildings and building materials, their physicochemical properties and their possible interactions with building materials; preferential deposition sites; mission characteristics and methods for their quantitative analysis; efficiency of appropriate cleaning techniques;
- a Proposal for a "City Concept" of integrated decontamination and rehabilitation of buildings, structures and materials in urban renewal;
- a Code of Good Practice for Works on Contaminated Structures, providing a structured approach for the identification and safe and efficient handling of contaminated structures and leading to maximum recovery of materials and minimum consumption of resources;
- Demonstration and Training Material for training and further education of engineers and skilled workers in clean construction, refurbishment and demolition procedures Video documentation of different activities.

#### Impacts

Most EU member countries have established goals for recycling that range from 50-90 % of their Construction and Demolition Waste (C&DW) production in order to substitute natural resources, especially gravel materials, for the construction industry. Recycled gravel materials are generally less expensive than natural quarry materials, and recycling in several countries, e.g. Germany, Holland and Denmark, is less costly than disposal. However, owing to rising environmental awareness and the tightening of acceptance criteria for decontaminated soil and other materials in many EU countries today, the rehabilitation of buildings and the recycling of demolition. This means that future options for saving old buildings, including those significant in terms of cultural heritage, and the recycling of waste materials during urban development will be significantly improved.

### References

IRMA website: http://projweb.niras.dk/irma/index.php?id=643.

### European project details

A research project supported by the European Commission under the Fifth Framework Programme and contributing to the implementation of the Key Action 4 "City of Tomorrow and Cultural Heritage" within the Energy, Environment and Sustainable Development, Contract no. EVK4-CT-2002-00092.

## EFFECT OF AIR POLLUTION ON CORROSION OF METAL CULTURAL HERITAGE OBJECTS

Joanna Kobus, Magdalena Błasiak Institute of Precision Mechanics, Poland



kiennice Market

Krakow is the biggest historic gothic-renaissance city in Poland, where major cultural heritage objects are located. For 470 years (from 1139 to 1609) it had been the capital city of Poland and "golden age" of cultural, academic and politic progress. After the Second World War Krakow was endangered with destruction due to activity of great industrial objects located near the city (iron works and aluminium works). The liquidation in the end of 1980's of the aluminium works and a restructurisation of the iron works closed the period of biggest devastation. Now the greatest menace for cultural heritage objects located in towns are: increasing road transport intensity, traffic transport air pollution, ozone precursors and particulates emission as well as the vibrations.

Investigations of the metal degradation in polluted environment are carried out in Poland in several fields: degradation of the structural metals and protection organic and non-organic layers in natural conditions as well as corrosion of silver and properties of the protection layers in natural outdoor and laboratory conditions.

In Poland investigations of the atmosphere corrosivity have been performed systematically according to the standard ISO 9223:1992 at corrosion stations situated in several regions with different type of the atmosphere pollution range: industrial, urban, marine and rural.

The most aggressive corrosion agents in the area of Poland are: sulphur dioxide and ozone in the air, relative humidity, temperature and acid rains. For particular metals and sites there can be distinguished especially aggressive agents like:

for zinc - humidity, sulphur dioxide, temperature and acid rains,

for copper – ozone, temperature and acid rains,

Since 1990 a downward trend in the emission of industrial and transport pollutants has been observed on the area of Poland.



Meteorological		rological	Air pollutants		Pollutants in precipitation						
Atmosphere	parameters										
	Temp	RH	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>	sum	pН	SO42-	CI	NO <sub>3</sub> <sup>-</sup>	
Zinc											
Industrial	0,31	0,10	0,62	0,33	0,52	- 0,53	- 0,51	0,27	0,76	0,15	
Rural	0,82	0,88	0,70	0,24	0,42	0,06	- 0,51	0,37	0,70	0,31	
Urban	0,58	0,63	0,50	0,74	0,37	- 0,91	- 0,55	0,50	0,28	-	
Marine	0,36	0,50	0,10	0,67	0,67	0,79	0,26	0,77	0,60	0,29	
Copper											
Industrial	0,30	0,29	0,85	0,35	0,72	0,48	- 0,54	0,56	0,29	0,16	
Rural	0,64	0,79	0,41	0,10	0,79	0,10	- 0,29	0,41	0,10	0,24	
Urban	0,70	0,43	0,39	0,80	0,78	0,39	- 0,44	0,50	0,70	-	
Marine	0,63	0,12	0,35	0,19	0,67	0,23	-0,36	0,32	0,21	0,49	



Trends of the changes in air pollution from 1992 to 2000 in Krakow on three areas : historic, industrial and main traffic street

Since 1992 to 2000 average sulphur dioxide concentration had been falling down about four times in all town but in historic centre even five times. Unfortunately we can not say that about nitrogen dioxide concentration, but since 1998 a small diminish (about 10%) has been observed. Suspended particulates PM10 concentration from 1992 have decreased continuously in centre from year to year to about of 50 % this value in 2000, but average value for all town was in 2000 on the same level as in 1993.

11.2002-11.2003

Corrosion rates of zinc after exposition

beginning on spring and autumn



Corrosion rates of copper after exposition beginning on spring and autumn

〈〈IMP〉

Samples located in 4 positions: in front to south, in front to north, bottom site, top site

05.2002-05.2003

For zinc the differences in corrosion rate of samples in standard position and during exposition from northern side is in many cases considerable, particularly on industrial and marine areas (to 50%), similarly for bottom surface and top site of sample (30-50%). The bottom side characterises in majority of cases with smaller decreases.

In case of copper the differences in corrosion rates of samples in standard position and during exposition on northern side is about 20%, similarly how among surface from bottom and with top of sample (20-30%).

It should was also turn attention, that during exposition beginning on spring the corrosion rates were larger than during autumn exposition. The considerable influence of corpore prices and the radiation were

The considerable influence of ozone, nitrogen oxides and the radiation were visible . These results should be fed into air quality policy and would be an efficient

I hese results should be fed into air quality policy and would be an efficient tool for authorities, organisations and individuals responsible for the care of cultural heritage in the efforts to preserve objects of cultural heritage and to reduce the cost for maintenance.



MULTI-ASSESS, Contract No. EVK4-2001-00044, Model for multi-pollutant impact and assessment of threshold levels for cultural heritage, Swedish Corrosion Institute

# Effect of air pollution on corrosion of metal cultural heritage objects

#### Joanna Kobus and Magdalena Błasiak

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Key words: atmospheric corrosion, air pollution, soiling

**Characterisation of the cultural heritage objects and conditions of their exposition** In Poland major cultural heritage objects are located in big cities like Krakow, Gdansk, Warsaw, Torun, Wroclaw, Lublin as well as in smaller country towns like Malbork, Sandomierz, Zamosc. The Second World War left huge, impossible to repair damage, not only in national consciousness but in material heritage too.

From the mentioned towns only in Krakow, Zamosc and Torun the historic parts are remained after war in an almost untouched original form. The last of the mentioned cities have been in almost entirely destroyed.

Krakow is the biggest historic gothic-renaissance city in Poland with great historic and cultural importance for Polish people. For 470 years (from 1139 to 1609) it had been the capital city of Poland and "golden age" of cultural, academic and politic progress.

After the Second World War Krakow was endangered with destruction due to activity of great industrial objects located near the city (iron works and aluminium works) which had been built as a form of political restrictions directed against community of the town, unfavourable to Government.

The liquidation in the end of 1980-ies of the aluminium works and a restructuralisation of the iron works closed the period of the biggest devastation. The restoration in last 10 years was carried out in part with the use of the national and external capital (American Express Foundation, Project TEMPUS). Now the greatest menace for cultural heritage objects located in towns are: increasing road transport intensity, traffic transport air pollution, ozone precursors and particulates emission as well as the vibrations.

Investigations of the metal degradation in polluted environment are carried out in Poland in several fields: degradation of the structural metals and protection organic and non-organic layers in natural conditions as well as corrosion of silver and properties of the protection layers in natural outdoor and laboratory conditions.

#### Trends in atmospheric pollution in Poland

In Poland investigations of the atmosphere corrosivity have been performed systematically according to the standard ISO 9223:1992 at corrosion stations situated in several regions with different type of the atmosphere pollution range: industrial, urban, marine and rural.

Results of the correlation analysis presented in table (see poster) show that aggressive corrosion agents in the area of Poland are: sulphur dioxide and ozone in the air, relative humidity, temperature and acid rains. For particular metals and sites there can be distinguished especially aggressive agents like:

- for zinc humidity, sulphur dioxide, temperature and acid rains,
- for copper ozone, temperature and acid rains

Since 1990 a downward trend in the emission of industrial and transport pollutants has been observed on the area of Poland. The greatest reduction of  $SO_2$  emission, about 35% was noted in 1992-1994, which was due to political and economical changes in Poland but from trend of reduction of pollutants concentration emission were stopped.

In this same periods the very high emission of suspended particulates was observed.

The main sources of  $SO_2$  and suspended particulates emission are located in south, southwestern and central part of Poland. Economical changes and project for the restructuring of the area of the "black triangle" with Poland, Czech Republic and Germany share result in reduction of the number of the emission sources and its intensity in south-western Poland.

Practically nearly no reduction of  $NO_2$  air concentration can be found, on the contrary increasing in selected towns can be observed due to the increase in transport intensity.

The differences in the trend of the average pH-value (wet deposition) in rural and in industrial areas was noticed. In rural areas from 1993 an increase in the pH-value (about 0.6 unit) was found. In the industrial areas, at the same time, reduction of the pH-value was observed due to a big reduction of suspended particulates emission. In towns pH-value keeps from 1992 to on the same low level 4.5, with differences  $\pm 0.1$  units.

### Trends in air pollution and corrosion in area of cities

On the example of Krakow we can characterise trends of the changes in air pollution in historic urban areas. Krakow is an exceptional city on account of a very valuable big historical centre on the one hand and proximity of industrial plants agglomeration (mills and power plants in the town and 60 km in north-western direction) on the other hand.

In 2001-2003 MULTI-ASSESS project was carried out in the frame of 5<sup>th</sup> FP EU.

Thus special interest was devoted two important parameters such as the corrosive and soiling effects of particulate matter and the effect of nitric acid. Both parameters are of special interest in urban areas with dense traffic.

One of the expose sites was Krakow due to location of a major emitter in the form of a steel works within the town.

In Fig. 1 trends in the changes in air pollution from 1992 to 2000 in three Krakow districts are presented.

Since 1992 to 2000 average sulphur dioxide concentration had been falling down about four times in all town but in historic centre even five times. Unfortunately we can not say that about nitrogen dioxide concentration, but since 1998 small diminish (about 10%) has been observed. Suspended particulates PM10 concentration from 1992 have decreased continuously in centre from year to year to about of 50% this value in 2000, but average value for all town was in 2000 on the same level as in 1993.



*Figure 1: Trends of the changes in air pollution from 1992 to 2000 in Krakow on three areas: historic, industrial and main traffic street* 

Based on the results of MULTI-ASSASS project it is possible to evaluate the effect of microclimate, particularly in relation to distance from traffic and other main pollutant sources. The data consists of material loss for steel, zinc, copper and the changes in reflectance of the painted steel (Fig. 2).

The corrosion of different metals is affected in similar ways by the various microenvironments but copper tends to have the greatest variation in corrosion and zinc the least. There are different mechanisms acting between corrosion and reflectance. Thus, there is no strong correlation between the soiling and mass loss even if the very dirty sites also have greater corrosion which suggests the emitters that release the most corrosive products also tend to be dirtier. Traffic density has a smaller effect on corrosion and a greater effect on soiling.

PM is not a crucial parameter for the corrosion of materials but its main effect is instead connected to soiling.



Figure 2: Changes of surface reflectance of white plastic during exposition in different atmosphere conditions in Krakow: left – start of exposition on autumn, right – start of exposition on summer

These results should be fed into air quality policy and would be an efficient tool for authorities, organisations and individuals responsible for the care of cultural heritage in the efforts to preserve objects of cultural heritage and to reduce the cost for maintenance.

#### **European project details**

MULTI-ASSESS, Contract No EVK4-2001-00044, Model for multi-pollutant impact and assessment of threshold levels for cultural heritage, Swedish Corrosion Institute.

# THE MANOR HOUSE'S COMPLEX RENOVATION AND INTEGRATION INTO URBAN ENVIROMENT

The situation in Riga city and various development possibilities

RIGA, LATVIA

#### HARTMAN'S MANOF



THE BUILDING AT RIGA, 28 KALNCIEMA STREET, IS AN ARCHITECTURAL MONUMENT OF A NATIONAL SIGNIFICANCE. IT WAS BUILT ON 18th CENTURY. NOWADAYS THE BUILDING IS KNOWN BY THE NAME HARTMA NA MUIŽINA (HARTMAN'S MANOR) ACCORDING TO THE NAMES OF ITS OWNERS IN THE TURN OF THE 19th AND 20th CENTURIES. THE BUILDING AT KALNCIEMA STREET IS A TYPICAL EXAMPLE OF THE OUTSKIRT CONSTRUCTION OF THE ANCIENT RIGA. THE OLDEST EXTANT DOCUMENT HOLDING INFORMATION ABOUT THE MANOR IS GIVEN IN 1791. OWNERS AND RECONSTRUCTIONS FOLLOWED EACH OTHER OVER THE CENTURIES. PROFESSIONAL RESTORATION OF THE BUILDING WAS CARRIED OUT ON THE SEVENTIES OF THE 20th CENTURY. SINCE 1994 THE MANOR IS MANAGED BY COMPANY "GANDRS", WHICH TAKES CHARGE

F MAINTENANCE AND RENOVATION OF THE BUILDING.



#### NORDEKU MANOR



NORDEKU MUIŽA (NORDEKU MANOR) IS AN ARHITECTURAL MONUMENT OF A NATIONAL SIGNIFICANSE. THE MANOR WAS FIRST MENTIONED IN WRITTEN SOURCES IN 1576 WITH A NAME GRĀVES MUIŽA (GRAAVES MANOR). ITS OWNERS HAVE CHANGED OVER THE CENTURIES. NOWADAYS THE BUILDING BELONGS TO THE RIGA MUNICIPALITY BUT IT IS RESTORED BY PRIVATE PERSONS WHO RECIVE NO MATERIAL SUPPORT FROM THE MUNICIPALITY. THERE IS ALSO A PARK NEAR THE NORDEKU MANOR WHICH IS A PART OF THE MANOR'S COMPLEX. THE PARK WAS ORIGINATED IN THE 18th CENTURY AND IT IS ONE OF THE OLDEST PARKS IN RIGA. NOWADAYS THE PARK IS DIVIDED BETWEEN SEVERAL MANAGING AUTHORATIES AND THE RESTORATION PROCESS OF THE PARK IS CARRIED

OUT ONLY IN THE LEVEL OF DECISION MAKING,



# The complexes of manor houses renovation and integration into urban environment

Ieva Strazda and Madara Orupe

Latvia (Riga)

Building activity is a synonym of economical development, so the society's discontent with new edifices in Riga seems paradoxical because of parallel calls for rapid economical growth. The city is growing by plan and choices are created by political and economical forces, competing for influence in development and subsequent financial profits [1]. A number of historically buildings which has not contained city function like residential buildings, municipal buildings and shops etc. have survived during last century – manor house's complexes, most of them made by wooden construction are located in Riga and still not managed. The abstract revels main pressures to faced by owners, government and inhabitants of Riga.

Have explored three manor houses – Hartmana manor (Kalnciema street 28), Nordeku manor (Bullu treet 16) and Volfsmit manor (Kandavas street 2). They are situated on the left bank of river Daugava. Its not exactly centre of Riga but still important part of the city what is waiting to be developed in the foreseeable future. There are pleased very many wooden buildings, its great historical heritage which need to be survived and compare to another European cities where wooden architecture had demolished in forties to get free place for new living and industrial areas, in Riga was different situation [5]: wooden buildings were in quite good technical condition, and a signal from Soviet Union's government was just to keep them while the new buildings were be built and planed the new housing estates in suburb. Besides ideology was to show that the heritage of the past is not that worth to be preserved and renovated better build new. The wooden buildings "destiny" depended on climate, habitants, and some optimists whose spent their free time to save the buildings with heritage value.



Hartman manor 1.


Hartman manor 1.

Hartmana manor is located next to heavy traffic area and in the one of the building is bike shop and rent, in another wooden house located "Vides vestis" editorial office. Plan of courtyard is transformed. This building is Riga's suburb standard, built in XVIII century. This building was reconstructed without preservation part in 1960. The building lost its historical value. In 1997. had the last reconstruction – designed the bike shop using plastic details (windows). In addition, in the nineties there weren't strict and completely done legal provisions from government. Architects and owners could deal with cultural heritage like they convinced of the necessity [4].

The second manor comlekss Nordeku manor (built in XVI centuary) is covering and showing another problem range[3]. Nordeku manor's owner is private person, its not local government estate, but they do have preemptation rights. Now all restoration work depends on owner financial situation. No financial support or foundation from the government. No tax relief or flexible tax system.



Nordeku manor 2.

Only artists are collaborate with owners and making symposium in the manor's park.

The third example is Volfsmit manor. Place of homeless person, dogs and some other whose are looking for the roof above the head.

Time to time somebody is trying to commit arson. Its seams the better way how to make free land for different kind of commercial activities. Otherwise it's too complicate to "go through" to execute all local government demands.

These houses are cultural and historical heritage of Riga, need to be survived and transformed in other function. Emotional and educational problems, also connected with social environment. Most of houses are located between residential areas and have only minimum (around the buildings) piece of land – no parks, no alleys. Initial place plan do not exists anymore and no possibility to organized the same structure .The direct result what have been created during last century in Latvia. Mostly the site owners are not educated in the specific field of cultural heritage and in generally not connected with any traditions of preserving heritage, with no experience of the approaches to take. Many of buildings still are municipality's property. Involved in the restoration process are only optimists / philanthropists, who undertake the work

as a leisure activity (spending their free time). Restoration process involves with problems and difficulties to attract the funding. Priorities also change over time, as a result of which the direct costs of the restoration continue to grow.



Volfsmit manor 3.

The building legislation does not deal appropriately with the aspects specific to restoration [2]. State institutions are not fulfilling their functions with regard to putting in order the legal aspects. As a result, non – governmental organisations take on this task through self – regulation, since the problems do need to be dealt with somehow. State institutions have not set out aims for organising the heritage sphere; there is a lack of activities, and there is alack of planned research and recording to the heritage.

Adopted at the Europa Nostra Forum "Wooden Architecture in Cities" in Riga, Latvia on 7 september 2001 had made THE RIGA DECLARATION, which was the first main step to change the situation and evaluated the heritage of city in the context of Europe.

Still have a question: how important is to save these buildings for Riga city and city inhabitants?

#### References

- [1] Jānis Lejnieks. "Arhitektūra un māksla Rīgā: Idejas un objekti" Riga centre problems and solutions. Latvia. Riga. 2004, 192. p.
- [2] Ināra Heinriksone. *Problems relating to the restoration of arhitectural forms*. Restoration: Information regained, Lost and Preserved. &th Triennal Meeting for Restorers of the Baltic States Conference Materials. Latvia. Riga. 2005, 321; 322. p.
- [3] Antra Gabre "*Pērles pie Rīgas kleitas*", Rīgas Balss, 23.05.2005.
- [4] Zigfrīds Dzedulis "*Noteikumi kultūras pieminekļu privātīpašniekiem*", Latvijas Avīze, 06.01.2005. www.lursof.lv.
- [5] Sandra Vensko "Latvijas muižu spožums un sāpe", Latvijas Avīze, 10.09.2005. www.lursof.lv.

# SCENE SIGNIFICANT EUROPEAN CEMETERIES NETWORK

M. Felicori

Progetto Nuove Istituzioni Museali, Comune di Bologna, Italy ASCE, Association of Significant Cemeteries in Europe

#### Cemeteries of Europe. A Historical Heritage to Appreciate and Restore

SCENE, a project carried on by Bologna City Council (as leader), Ljubljana City Council, the Cemeteries Administration in the City of Stockholm and the Department of Cultural Heritage Protection of Lithuania was supported by the European Commission, within Culture 2000. SCENE achieved the following results:

• the *restoration* through innovative methods of four historical memorials in the involved cemeteries:

in Bologna *the crypt of the Uttini Family*, created in 1817 by Giovanni Putti (1771-1847), one of the most important Italian neo-classical sculptors, as a grave of Gaetano Gaspare Uttini (1737-1817), famous Anatomist in Bologna University; in Vilnius the classicist *monument of Maria Kazynska*, famous artist and singer of Vilnius theatre

across the XIX and the XX century; Ljubljana restored the *memorial of the victims of the IWW in Žale Cemetery,* the resting place for 5,258 Slovene, German, Austro-Hungarian, Russian, Romanian and Serbian soldiers, a modernist building by arch. Edo Ravnikar; Stockholm restored the *Wetterstedt grave monument,* situated in the Northern Cemetery, erected in 1830s;

- two workshops;
- a Best Practice Report;
- a web site on innovative restoration methods (www.scene-project.net);
- a guide of the most interesting cemeteries in Europe, with information about all the members of ASCE, the Association of Significant Cemeteries in Europe.





Uttini Crypt, Certosa di Bologna, Sculptor Giovanni Putti, 1818. Before and after the restoration works (2003-2004), carried out within the SCENE project



Wetterstedt grave chapel, Northern Cemetery, Stockholm. After the restoration works (2004) carried out within SCENE project





Maria Kazynska's Memorial, Bernardines Cemetery, Vilnius. Before and after the restoration works (2003-2004) carried out within SCENE project



Ossuary of World War I Victims, Žale Cemetery, Ljubljana. Architect Edo Ravnikar, 1918. After the restoration works (2004) carried out within SCENE project



The guide "Cemeteries of Europe"



European Project Details SCENE Project Significant European CEmeteries NEtwork Grant Agreement n. 2003 – 1416/001 CLT CA31 Project reference n° A1-CH LAB-IT-520 Co-ordinator: Progetto Nuove Istituzioni Museali City Council of Bologna, Italy mauro.felicori@comune.bologna.it



# SCENE (Significant European CEmeteries NEtwork) project: cemeteries of Europe. A historical heritage to appreciate and restore

Mauro Felicori

Progetto Nuove Istituzioni Museali, Comune di Bologna, Italy – Director ASCE, Association of Significant Cemeteries in Europe – President

Key words: historical cemeteries as new heritage, restoration, communication

#### Historical cemeteries as new heritage to discover and protect

Many European cemeteries could be considered open-air museums and they are important elements of European cultural heritage. In fact, European cemeteries are unique architectural compounds, an irreplaceable repertory of sculptures from the last two centuries, a formidable summary of the history of their cities and, last but not least, an anthology of taste and customs of different social classes. However the cultural potential of the significant European cemeteries, has not so far been properly considered.

ASCE, Association of Significant Cemeteries in Europe was created in 2001 in order to promote European cemeteries and increase the awareness of the importance of significant cemeteries among national and European institutions, media and citizens.

All the cities of ASCE consider the restoration of historical tombs a top priority among their activities and they have already organised a workshop on this subject in Vilnius, Lithuania on the 18<sup>th</sup> October 2002. During that workshop, art historians and restoration craftsmen met and had the chance to start a dialogue and share best experiences.

SCENE is therefore the logical consequence of the implemented plan and it represented the way to make restoration operators meet restoration research centres to bring innovative methods into the daily restoration practice.

Thus the principal objectives of the SCENE project was the restoration through innovative methods of four historical memorials in the involved cemeteries:

- in *Bologna* the crypt of the *Uttini Family*, created in 1817 by Giovanni Putti (1771-1847), one of the most important Italian neo-classical sculptors, as a grave of Gaetano Gaspare Uttini (1737-1817) famous Anatomist in Bologna University;
- in *Vilnius* the classicist monument of *Maria Kazynska*, famous artist and singer of Vilnius theatre across the XIX and XX century;
- Ljubljana restored the Memorial of the victims of the IWW in Žale Cemetery, the resting place for 5,258 Slovene, German, Austro-Hungarian, Russian, Romanian and Serbian soldiers, a modernist building by arch. Edo Ravnikar;
- *Stockholm* restored the *Wetterstedt* grave monument, situated in the Northern Cemetery, erected in 1830's.

The aims of the SCENE project is also to spread the knowledge about innovative restoration methods in Europe in order to achieve better results in the maintenance of an important part of our European Cultural Heritage and to raising European citizens' awareness of the importance of significant cemeteries.

The SCENE project also allowed an exchange of experiences and best practices among restorers and cultural officers thanks to the organisation of two workshops:

- during the first, which was held in *Stockholm on 4<sup>th</sup> October 2003*, the SCENE partners and their restoration operators presented the projects and were able exchange views on restoration, hypotheses, addressing the technical problems. The restorations carried out were presented to the citizens, cultural operators, academics and specialised press at he second workshop in *Bologna, on June 3<sup>rd</sup>, 2004*.

The results and conclusions of the workshop have been displayed on the SCENE web site, published in the Guide and summarised in a Best Practice Report.

Publication of the first Guide on Significant Cemeteries in Europe "Cemeteries of Europe: a Historical Heritage to Appreciate and Restore" a guide of the most interesting cemeteries in Europe, with information about all the members of ASCE, Association of Significant cemeteries. It included the reports on the restoration works that were carried out in Bologna, Ljubljana, Stockholm and Vilnius. Thanks to the active collaboration of the SCENE partners, the guide was translated into five languages: English, Italian, Lithuanian, Slovenian and Swedish. The guidebook, being an innovative and high quality editorial project, proved to be the most effective tool for the dissemination of the SCENE project results by calling the interest of local authorities, cultural operators and the general public at local and international level.

Dissemination activities: a dedicated *web site* (www.scene-project.net) was created to disseminate the progress of the restorations carried out by the project, to facilitate the organisation of the workshops, to enhance the communication among the partners and to promote the guide and the Final event.

In order to promote widespread awareness among European citizens towards cemeteries a *special event* was organised by ASCE to be repeated each year in various countries, around the first weekend of June. From 3-12 June 2004, ASCE launched a joint European cultural initiative called "*A week for discovering European Cemeteries*" with the aim of raising awareness and promoting the cultural, artistic and historical heritage of European Cemeteries.

During this week in many European cities people were invited to visit the local cemeteries and were offered guided tours, concerts and photo exhibitions. Municipalities, Ministries, Monuments and Fine Arts Offices, as well as volunteer teams were committed to the initiative, and major scholars in the field of such monumental complexes were also involved.

The SCENE Final Event opened the week after a workshop for restorers on Thursday June 3<sup>rd</sup>. On Friday June 4<sup>th</sup> the restorations done in the four cemeteries involved and the Guide to European Cemeteries were presented to local authorities, cultural and tourist officers, and press, in the presence of ASCE members. This dissemination strategy granted greater public participation and media coverage.

Through the project it was discovered that in Europe there are very different approaches to restoration, both in "philosophical" and in technical sense. So we did a first step in creating an European standard approach to such matters.

The project was carried on by Bologna City Council (as leader), Ljubljana City Council, the Cemeteries Administration in the City of Stockholm and the Department of Cultural Heritage Protection of Lithuania.

Close collaboration with the ASCE members produced sound advertising and awareness about the project and its outputs at European level, as the ASCE members were constantly briefed during the project life about progress and events. Finally, each partner organised a series of public events and official presentations of the SCENE project at local level.

The SCENE Final Event strategically combined with the opening of an important Europeanwide initiative, represented a very good opportunity to bring the SCENE results to a wider audience.

The added value of the SCENE project is that it made it possible, with the support of Culture 2000 funds, and thanks to an actively collaborating network of partners, to achieve results which go far beyond the national borders and resources of each of the countries involved. The restoration were carried out with a constant exchange of knowledge and sharing of common technical problems, innovative methodologies and possible solutions, therefore encouraging the trans-national mobility and knowledge in the restorations and cultural fields.

The guide "Cemeteries of Europe" involved 30 cemeteries from all over Europe, and the collaboration with the ASCE members granted sound advertising and awareness about the project add its output at European level.

For the first time art historians, officers and craft-men involved in cemeteries restoration started to discuss their styles and methods.

More people discovered how important cemeteries are in European heritage. Further restoration works were encouraged. Restorers were better acquainted about cemeteries as "new market" for their business. Media became more interested in the matter.

#### **SCENE Project**

Significant European CEemeteries NEetwork. Grant Agreement n. 2003 – 1416/001 CLT CA31 Project reference n° A1-CH LAB-IT-520. 1/05/2003 to 10/06/2004 Applicant organisation: Municipality of Bologna (Italy) 1<sup>st</sup> co-organiser Municipality of Stockholm (Sweden) 2<sup>nd</sup> co-organiser Municipality of Ljubljana (Slovenia)

3<sup>rd</sup> co-organiser Department of Cultural Heritage Vilnius (Lithuania)

# e-MEM

# AN INTERACTIVE GRAVEYARD INFORMATION MANAGEMENT TOOL & VIRTUAL MEMORIAM DATABASE

The e-MEM project was carried out under the framework of the EU program e-Content. Taking in account the large number of cemeteries (accounted more than 400.000) and the lack of a uniform communication and management graveyard platform in Europe, the project seeks to create a tool that enables ubiquitous collection, management and exchange of graveyard and related information over the world wide web.

The ultimate product of the project is a dynamic portal bringing together the different policies & standards of registering and offering info on the deceased in Europe, ensuring wider access to Europe's common heritage; one standard applicable to all regardless of their language, culture and religion; one standard which at the same time could serve information related to the historical and cultural value of the cemeteries and their significant monuments.



Index-page of the e-MEM pilot portal



The principal sections of the system include: a) Data Flow (Cemetery data / Remote data) b) The e-MEM Web Server

c) Data Retrieval (External Data - on demand)



Cultural heritage example - Certosa cemetery, Bologna Italy



Field work



Data input into system.



Dynamic information retrival



Multimedia data on individuals, monuments and cemeteries.

#### **European Project Details**

e-MEM - An Interactive Graveyard Information Management Tool & Virtual Memoriam Database. EDC 41036 e-MEM/28690

Co-ordinator:

Mr. Halldor Johannsson, Teikn á lofti, Iceland (halldor@teikn.is) - Administrative and Technical co-ordinator of project

#### Project partners:

Dr. Apostolos Sarris, FORTH, Greece - Geophysical and Archaeological Research Dr. Mauro Felicori, COBO, Italy - Content and technical advisor Audrone Vysniauskiene, DCHP, Lithuania - Research











# e-MEM – Interactive graveyard information management tool and virtual memoriam database

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Key words: graveyard information system, multilingual, interactive, multimedia, GIS, database, cultural heritage

#### Introduction and content

The e-MEM project was carried out under the framework of the EU program e-Content. Taking in account the large number of cemeteries (accounted over 400.000) and the lack of a uniform communication and management graveyard platform in Europe, the project seeks to create a tool that enables ubiquitous exchange of graveyard and related information over the www.

As death is and has been an inevitable part of life throughout time, the project stretches from pre-history to the future. e-MEM has investigate the possibility to build up a valuable network and databank of burial culture, burial sites, places of worship and personal information on past to present generations for the future generations.



Figure 1: Picture from Certosa Cemetery, Bologna, Italy

Apart from the obvious applications of the portal in the management and services of modern cemeteries, a number of modules of the research project were focused in the cultural dimension of the cemeteries. The project defined the best practices for portraying information on cultural monuments in the context of graveyards and investigated the evolution of funeral practices in Europe. The changing patterns of cemetery locations were also explored by creating a number of thematic maps for the island of Crete, presenting the spatial distribution of the pre-historic

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and historic cemeteries, linked to multimedia information related to them. The above information contributed in the study of the evolution of the landscapes in terms of their representation and context production.

To achieve the goals of the project, the participating members utilized mapping technologies through the use of GPS and EDM units, digitization and geo-referencing techniques, SQL database construction, GIS mapping and presentation of the geographic information through the www.

#### European dimension

In Europe there currently exists no tool for the facilitation of communication between cemeteries. This lack of communication seriously affects both the exchange of best practice between these organizations and the possibility to access important information related to our past and our Cultural Heritage. Cemeteries contain huge amounts of information about our past and our cultural history. It is essential to provide for the public convenient access to cultural heritage and genealogical information. Therefore we need a widely accepted approach and tool to guarantee good and diversified management of these sites in order to activate and deploy their potentialities.

e-MEM has underlined the importance of graveyards as sources of social, historical and cultural information, and promoted how they can be better managed, and exploited for research purposes and cultural tourism. A graveyard information portal pilot has been developed taking into account the findings of the project and the specifications arrived there from. The consortium has identified the data transfer needed for the system to work. For that e-MEM will create a Document Type Definition. The purpose of this DTD is to ensure that data from various data providers is encrypted into e-MEM standards before the data enters the system. As a result e-MEM can make sure, that all data output is in standardized format no matter what or how the source of the data is.

The portal will be introduced as a base for centrally hosted pan-European information portal for its members and other cemeteries in Europe.

#### **Innovation and originality**

No cross-European standards based product with distributed access is currently available on the market, as has been identified in the research behind the e-MEM project but there are large companies in the CMS and related markets that could provide substitute products as well as companies providing computer service to cemeteries. The consortium has concluded that the amount of valuable data in graveyards all over Europe is vast and is seriously affected by the lack of standard in collection and storage. It is a further conclusion that the collection of data from graveyards must start by mapping out the entities involved, then the type of information (we call them documents) flowing between them, then the exact data from each, then how it is stored, etc. This gives a general description of each entity (which the system users can then define further themselves), general description of each document (which each user can then adapt to their environment, meaning adding, deleting fields) and then adaption of the information, data flow and communication accordingly.

It is the conclusion of the partners that the e-MEM solution must ultimately be an integrated centrally hosted web-based system offering in principal the following value added service:

**Graveyard administration**: a) Diversified communication through protected Forum, Message board & Project areas; b) CMS to edit the public part; c) Easy to use management tools for grave reg., maintaining records on relatives responsible for graves, link to social records;

d) Portfolio of management software such as for accounting, geographic info (GIS), etc. and other to be defined.

**Public:** e) Centralized search for info and location of graveyards, deceased relatives, cultural monuments, major events calendar, etc.; f) Limited CMS access, managed by next of kin, for creating and editing home pages for deceased relatives and building of family trees; g) services such as grave reservation, grave maintenance, flower ordering, etc.

Based on the observations and research conducted the system architecture has been defined. The system has to work with and interpret very mixed data. The data is found to come from various servers, that e-MEM has and will not have control over, but must communicate with. The technical standard can be very different, from complex GIS data to excel documents. Many of the smaller cemeteries and Eastern European countries do not currently even have data in digital format. The tool must therefore provide ways of inserting data in a flexible and user-friendly way.

#### Impacts

In the research the consortium as dicovered that even though there are many differences in the funeral process in Europe there are many comparisons and shared needs that encourage the efford of increasing co-operation and best practise in the field. The process is complicated where diverse identities have to be accounted for.

The consortium has concluded that the amount of valuable data in graveyards all over Europe is vast and is seriously affected by the lack of standard in collection and storage. A template for standardized data collection has been produced. It is a further conclusion that the e-MEM solution is very viable and could become widely accepted but must ultimately be an integrated web-based system that can offer graveyard administrators and the public with value-added services. The consensus is that the current websites operated by cemeteries can be improved and that the public is the main target when maintaining a website. The need for an up-to-date CMS system with a mapping tool is also evident.

#### Acknowledgement

Apart from the project coordinators many of the staff of the project partners contributed valuably to the project as well as many of the members of ASCE that took part in a survey on the current practise in European cemeteries and their future vision.

A number of pilot cemeteries were brought in the pool of the e-MEM portal in order to evaluate current data and practice at different levels. Included are:

The modern Orthodox cemetery of Rethymno, Crete.

The Deutsche Soldaten Friedhof at Chania, Crete.

The Moslem Cemetery of Yeni Mahalle at Komotini, Greece.

The Certosa Municipal cemetery of Bologna, Italy, one of the most technically advanced cemeteries of Europe which has invested heavily in digitizing its data using their own system. The Bernardines Polish cemetery in Vilnius, Lithuania. There extensive data is available in archives in written format but no digital data was found.

#### European project details

e-MEM, EDC 41036 e-MEM/28690, Interactive graveyard information management tool and virtual memoriam database, Halldor Johannsson, Teikn á Lofti, Iceland. www.e-mem.org

# RURAL ARCHITECTURE AND LANDSCAPE BETWEEN TRADITION AND INNOVATION

Daniela Bosia - Giovanna Franco - Stefano F. Musso Turin Polytechnic, Italy - Genoa University, Italy - Genoa University, Italy









European Project Details

EURARC - Culture 2000 Program Agreement No. 2004 - 1393/001 - 001 CLT CA 12 "Current and Rural Architecture and Landscape between Tradition and Innovation" Co-ordinator: Daniela Bosia - Turin Polytechnic, Italy - e-mail: daniela.bosia@polito.it

#### The Project

The following research units have participated actively in the Project: - Turin Polytechnic - Ce.S.Mo. - site of Mondovì - project leader - project manager: arch. Daniela Bosia

- Genoa University - DSA - coorganizer - research unit manager: prof, arch. Stefano F. Musso

- École d'Architecture de Lille - coorganizer - research unit manager: prof. arch. Suzanne Hirschi

Gdansk University of Technology
 Faculty of Architecture, co-organizer
 research unit manager: prof. arch.
 Andrzej Baranowski

Direzione regionale per i Beni
 Culturali e Paesaggistici della Liguria
 partner - research unit manager:
 arch. Liliana Pittarello



The Objectives of the Project

The main objectives of the project can be summarized as follows:

- to identify the common elements and the technical and cultural diversities that characterise the rural building heritage of every country and the problems related to its sustainable rehabilitation, with a view to developing common strategies for counteracting the risks of abandonment of rural territories and the unchecked reuse of the building legacy;

legacy; - to develop strategies that aim for sustainable rehabilitation and valorisation of the rural building heritage, by studying the methods for rehabilitating the landscape and the man-made structures, while respecting the existing buildings, local cultures, and the economic circumstances of each country.

- to identify and advance the methodological structures and technical procedures to support the rehabilitation activity, applicable to the various countries, with attention paid to the use of innovative energy technologies (renewable and ecocompatible energy sources), controlled in terms of integration with the environment and the landscape and the effective economic competitiveness.

#### The Project Results

The main results of the project and contributions that the various work units in the participating countries have supplied for research have been collected in a volume titled "Rural Architecture in Europe between Tradition and Innovation". The web-site - www.eurarc.com - and the itinerant exhibition are the main channels of circulation of the project results. The exhibition has been set ) up in each of the participating countries and it is available to be eventually shown at other locations.



CULTURE 2000

# Rural architecture and landscape between tradition and innovation

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Key words: rural architecture, landscape, sustainability, rehabilitation

#### Introduction and content

The research, recently ended, has been carried out inside the European Program "Culture 2000" between Italian, French and Polish partners, under the co-ordination of the Politecnico of Turin.

The project springs from the belief, shared by all research units, that the architecture and the landscape in rural areas constitute fundamental and inimitable components of the culture and the identity of locations in all Countries participating in the project.

The issue of the protection and enhancement of the countryside and rural architectural heritage has been dealt with by the various research units in a coordinated way, though with respect for the autonomy of each working group and for the different aspects that the issue presents in the various Countries and in the territorial environments studied. It is, in fact, a complex issue which can be dealt by emphasizing, in turn, different aspects, not only linked to the countryside and architecture, but also to economic, social and productive factors, which, together, define it.

The aspects which have been emphasized in this project are mainly linked to the architectural and landscape components of the issue, with particular attention to factors linked with know how, laws, and methodological and operative instruments in support of work on building constructions in the alpine and pre alpine valleys, aimed at the restoration of existing architecture in line with the eco-compatibility and the control of the quality of the environment.

The main objectives of the project can be summarized as follows:

- to identify the common elements and the technical and cultural diversities that characterise the rural building heritage of every country and the problems related to its sustainable rehabilitation, with a view to developing common strategies for counteracting the risks of abandonment of rural territories and the unchecked reuse of the building legacy;
- to develop strategies that aim for sustainable rehabilitation and valorisation of the rural building heritage, by studying the methods for rehabilitating the landscape and the manmade structures, while respecting the existing buildings, local cultures, and the economic circumstances of each country, and aiming also for widespread sharing of such objectives;
- to identify and advance the methodological structures and technical procedures to support the rehabilitation activity, applicable to the various countries, with attention paid to the use of innovative energy technologies (renewable and eco-compatible

energy sources), controlled in terms of integration with the environment and the landscape and the effective economic competitiveness.

Main results are:

- the publication of a book (Figure 1) [1] and the edition of a web site [2], in order to set up a data bank that can be progressively implemented;
- the dissemination of a "best practices code", not purely technical but also with a cultural and economic framework for the sustainable rehabilitation and valorisation of the landscape and rural architecture.

The itinerant exhibition is one of the major channels of circulation of the project results. It has been set up in each of the participating countries and it is available to be eventually shown at other locations.

#### **European dimension**

The new comparison between different experiences and cultures is the main added value of the project as regards the cooperation on a European level. It is intended as a constructive method based on practical experiences and studies of each country to find out the common elements of different situations and to plan general and specific methodologies aimed at valorisation, protection and recovering identity of place and rural territories that have in common progressive and widespread problems of depopulation, abandonment and re-use of architectural heritage incompatible with the environment. Identifying and applying common strategies aims at stopping the trends underway today in different geographic, social, economic and cultural contexts of contemporary Europe and attempts to generalize the theme of sustainable rehabilitation of the landscape and rural architecture. The results of the project should raise and enhance the community's awareness of these issues and hopefully lead to implementation of virtuous economic and technical processes that can reverse the trends currently in progress in each country and that can trigger processes of cross breeding, hybridization and spin offs.

#### **Innovation and originality**

A positive research result is to have recognised the specific topics linked to the rural areas and to the architecture recovery and the ways to face them in each country. Some of them are shared from the three European region (the depopulation, the building reuse, etc) and others are specific of each (the protection policy, the re-building of some rural architecture in museum in Poland, new forms of restoration for residential or tourist use in Italy and France, etc).

The itinerant exhibition is one of the major channels of circulation of the project results. It has been set up in each of the participating countries and it is available to be shown at other locations. The exhibition is intended not only to show illustrations but above all as an interactive exhibition; a real opportunity for cross-cultural reflection on the knowledge and restoration of rural buildings, as part of a wider operative research program which aims to enhance the resources of European territory.

The website, which is also usable after the closure of the project, could constitute a tool for divulgation, consultation and support for professional categories involved in the building, environmental and technical sectors – technicians and project workers at various levels – as well as for businesses and training organisations – construction and craft companies, training schools, etc., for experts in the sector and the public in general. During the final phase, collaboration has been requested from academics, administrators, local authorities, public and private research organisations, etc., (not only from countries participating in the project) who, according to their own specialisation, deal with the issue of protection and valorisation of the landscape and rural architecture. This collaboration has taken the form of material and

contributions to include in the various sections of the project website. In total, about a thousand requests for collaboration have been sent.

#### Impacts

The hoped for results, in the long term, include setting up a data bank that can be implemented progressively through the website; dissemination and use of a "best practices code", not purely technical but also with a cultural and economic framework for the rehabilitation and valorisation of the landscape and rural architecture, to stimulate active participation in the local population.

In particular, the results of the project and their dissemination should lead in the future to improvements in the economic and technical qualities of the work on the rural building legacy in several countries, in the full respect for the cultural idiosyncrasies of each population, with a more general view to sustainable rehabilitation of the existing building heritage and the anthropized surroundings. Organization of "consulting bureaus" for rehabilitation of the landscape and rural architecture, designed with a common framework in each of the participating countries, can also represent a further aspect of added value on a European level.

The results of the project, in fact, should raise and enhance the community's awareness of these issues and hopefully lead to implementation of virtuous economic and technical processes that can reverse the trends currently in progress in each country. This is also why the beneficiaries of the project will first and foremost be the central and peripheral administrations of the countries participating in the project, as well as other European countries, that can make use of and adopt the support instruments developed during the course of the project, also because the project calls for their subsequent continuous and orderly implementation. The local administrations will also draw benefits from the results of the project when setting up specific policies, strategies and methodological and technical support for the rehabilitation efforts on the landscape and rural architecture, with a view to environmental sustainability and cultural valorisation. Thanks to the web site and the research and management structure that supports it, they can count on across-the-board technical and informational support, valid throughout the territory in question (also extendible to the entire European territory, with appropriate variations), and on a local level through the consulting bureaus, among other places.

#### Acknowledgement

Thanks to all the members of the project research units who have worked with great enthusiasm to reach the conclusion of the project and to produce the results described.

#### References

- [1] Awtuch A., Baranowski A., Bobbio R.A., Bohm A., Bosia D., Bouillon D., De Marco L., Franco G., Hirschi S., Lipinska B., Moretti G., Musso S.F., Szarejko K., *Rural architecture in Europe between tradition and innovation. Researches, ideas, actions, Alinea, Firenze, 2005.*
- [2] URL: http://www.eurarc.com.

# Methodology for supporting the under touristic development Poliphimos cave in Maronia, Thrace, Greece

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#### The Cave

The cave is known from the mythology and "Odyssey" as Poliphimos residence. It is under development for touristic purposes and is located in a distance of 5 km from Maronia Town, near Komotini City, in Thrace – Eastern Greece. The cave is full of beautiful stalactites and stalagmites and it is of great palaeontological and touristic interest. The cave is 2000 m long and covers an area of 10.000 m2 [1]. The proposed visiting route is 355 m. The inside temperature is about 16 oC. For the development an integrated study was performed regarding to its geotechnical stability, together with speleological and ecological studies..

#### **Geotechnics**

In the present paper the stability conditions were studied regarding to wedge and planar failures. For this purpose, all the tectonic data (of NNW-SSE and E-W directions) were determined and recorded separately for each site in the cave and tectonic and stability diagrams were elaborated, in order to determine stability factors. Furthermore the quality of the rock mass was classified according to RMR method (RMR= 61-70, RQD= 75-90, UCS= 35-60 MPa) and the results were used in order the more appropriate support measures to be chosen.

#### Initial consideration

A stress-strain analysis as performed in tunnelling is not recommended in cases of natural caves because of the slow procedure of its formation which allows the full relief of the applied stresses.

So the stability analysis of the natural cave is based only on the behaviour of the blocks formed by the tectonic features. The geometry of the blocks formed by the combination of the vertical discontinuities sets with the horizontal bedding creates potential instability conditions, which are mainly related to unstable blocks falling from the roof.

#### **Purpose**

The main purpose, after determining any type of potential failure, was to propose the more appropriate stability methods. It is obvious that all the ordinary methods, used in underground construction, are not appropriate for use in caves. Supporting methods have to be adapted, taking into account the already existing natural stability conditions, the safety of visitors and the monumental character of the cave.

#### **Conclusions and Recommendations**

According to the stability analysis of the cave, the main failure mechanism is the falling of wedges from the roof. The sides of the cave seem to be stable. For the reinforcement support of the roof, an arrangement of stainless pre-tensioned self-drilling rockbolts is suggested (2X2m and 2X2.5m, length 3m and 5m [Table 1]) as the optimum scenario of intervention, giving safety factors >2 [2].



Table 1: Proposed support measures

Section	Potential wedges	Arrangement and length of rockbolts	Safety Factors after bolting
152-151	kl1-kl3-ss2	2,0 x 2,5 m – L=3 m	2,24
	kl1-kl2-ss2	2,0 x 2,5 m – L=3 m	2,04
154-153	kl1-kl2-ss2	2,0 x 2,0 m – L=3 m	3,32
	kl1-kl3-ss2	2,0 x 2,0 m – L=3 m	2,00
156-155	kl1-kl3-ss2	2,0 x 2,0 m – L=3 m	2,33
158-157	kl1-kl3-ss2	2,0 x 2,0 m – L=5 m	2,21
	KI2-kI3-ss2	2,0 x 2,0 m – L=5 m	2,51
160-159	kl1-kl3-ss2	2,0 x 2,0 m – L=5 m	2,31
	KI1-kI2-ss2	2,0 x 2,0 m – L=5 m	2,14
162-161	kl1-kl3-ss2	2,0 x 2,0 m – L=5 m	1,97
151-150	kl1-kl3-ss2	2,0 x 2,5 m – L=3 m	2,45











#### **Acknowledgement**

The present research is funded by the 3rd EU Support framework for Greece and the District of Macedonia and Thrace.

#### **References**

<sup>1</sup> Petrohilou, A. (1984). The caves of Greece. Ekdotiki Athinon Ltd.

<sup>2</sup> Christaras, B., Chatzigogos, Th., Dimitriou, An., Chatzigogos, N., Makedon, Th., Filippides, S. (2004). Stability of Polifimos cave, in Maronia City of Thrace, N. Grrece, Bull. Geol. Soc. Gr., vol. XXXVI/4, Thessaloniki, pp. 1892-1901.

## Methodology for supporting the under touristic development Poliphimos cave in Maronia, Thrace

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Key words: cultural heritage, poliphimos cave, cave support

#### Introduction and content

The cave is known from the mythology and "Odyssey" as Poliphimos residence. It is under development for touristic purposes and is located in a distance of 5 km from Maronia Town, near Komotini City, in Thrace – Eastern Greece. The cave is full of beautiful stalactites and stalagmites and it is of great palaeontological and touristic interest. The cave is 2000 m long and covers an area of 10.000 m<sup>2</sup> [1]. The proposed visiting route is 355 m. The inside temperature is about 16 °C. For the development an integrated study was performed regarding to its geotechnical stability, together with speleological and ecological studies.



Figure 1: Topographic sketch including studded cross-sections ("Geographein", Komotini City)

In the present paper the stability conditions were studied regarding to wedge and planar failures. For this purpose, all the tectonic data were determined and recorded separately for each site in the cave and tectonic and stability diagrams were elaborated, in order to determine stability factors. A stress-strain analysis as performed in tunneling is not recommended in cases of natural caves because of the slow procedure of its formation which allows the full relief of the applied stresses. So the stability analysis of the natural cave is based only on the behavior of the blocks formed by the tectonic features. The geometry of the blocks formed by the combination of the vertical discontinuities sets with the horizontal bedding creates potential instability conditions, which are mainly related to unstable blocks falling from the roof.

The main purpose, after determining any type of potential failure, was to propose the more appropriate stability methods. It is obvious that all the ordinary methods, used in underground construction, are not appropriate for use in caves. Supporting methods have to be adapted, taking into account the already existing natural stability conditions, the safety of visitors and the monumental character of the cave.

According to the stability analysis of the cave, the main failure mechanism is the falling of wedges from the roof. The sides of the cave seem to be stable. For the reinforcement support of the roof, an arrangement of stainless pre-tensioned self-drilling rockbolts is suggested ( $2 \times 2$  m and  $2 \times 2.5$  m, length 3 m and 5 m) as the optimum scenario of intervention, giving safety factors > 2 [2].

Section	Potential wedges	Arrangement and length of rockbolts	Safety factors after bolting
152-151	kl1-kl3-ss2	$2,0 \times 2,5 \text{ m} - \text{L} = 3 \text{ m}$	2,24
	kl1-kl2-ss2	$2,0 \times 2,5 \text{ m} - \text{L} = 3 \text{ m}$	2,04
154-153	kl1-kl2-ss2	$2,0 \times 2,0 \text{ m} - \text{L} = 3 \text{ m}$	3,32
	kl1-kl3-ss2	$2,0 \times 2,0 \text{ m} - \text{L} = 3 \text{ m}$	2,00
156-155	k11-k13-ss2	$2,0 \times 2,0 \text{ m} - \text{L} = 3 \text{ m}$	2,33
158-157	k11-k13-ss2	$2,0 \times 2,0 \text{ m} - \text{L} = 5 \text{ m}$	2,21
	k12-k13-ss2	$2,0 \times 2,0 \text{ m} - \text{L} = 5 \text{ m}$	2,51
160-159	k11-k13-ss2	$2,0 \times 2,0 \text{ m} - \text{L} = 5 \text{ m}$	2,31
	kl1-kl2-ss2	$2,0 \times 2,0 \text{ m} - \text{L} = 5 \text{ m}$	2,14
162-161	k11-k13-ss2	$2,0 \times 2,0 \text{ m} - \text{L} = 5 \text{ m}$	1,97
151-150	k11-k13-ss2	$2,0 \times 2,5 \text{ m} - \text{L} = 3 \text{ m}$	2,45

Table 1: Proposed support measures

#### Acknowledgement

The present research, for the development of Poliphimos Cave, is funded by the 3<sup>rd</sup> EU framework program and the District of Macedonia and Thrace.

#### References

- [1] Petrohilou, A. (1984). The caves of Greece. Ekdotiki Athinon Ltd.
- [2] Christaras, B., Chatzigogos, Th., Dimitriou, An., Chatzigogos, N., Makedon, Th., Filippides, S. (2004). Stability of Polifimos cave, in Maronia City of Thrace, N. Grrece, Bull. Geol. Soc. Gr., vol. XXXVI/4, Thessaloniki, pp. 1892-1901.

# OUTDOOR SCULPTURE CITIZENS

AIMING TO THE **PROTECTION OF** THE MONUMENTS THROUGH **EDUCATIONAL** ACTIONS

Municipality of Athens Department of Traditional buildings and monuments



#### Aim: to plan a strategy of approachd ir ected at the young students

#### through educational actions :

- Contacting sculptural art
   Enriching figurative education
   Signaling the historical value of each monument
- > Intimating the need of protection
- > Promoting students active attendance in the public affairs



#### Problem: Vandalism

Due to :

- > Shallow knowledge / ignorance of the history of our place > Indifference
- > Serious lack of figurative education
- Modern cultural heritage is not
- perceptible to the young people and
- therefore does not require their attention and respect



#### Results

- > Gain students' respect to the monuments
- >Activate their sensitization

> Incite their active reaction to the protection of the monuments









Program of sculpture adoption. High School students adopt the Aviator Memorial in the city of Algio





European Commission Safeguarded Cultural Heritage Understanding & Viability for the Enlarged Europe P r a g u e zech Republi 31"



Photo album diary focusing on Athens outdoor sculptures. Photographed and printed by the ORGANIZATION AGAINST DRUGS

## Outdoor sculpture & citizens Aiming to the protection of the monuments through educational actions

#### Zetta Antonopoulou

Department of Traditional Buildings and Monuments, Municipality of Athens, Greece

Key words: students, citizens, education, outdoor sculptures, monuments, protection

#### **Introduction and content**

The present study concerns the effort to counter vandalism cases in outdoor monuments of the city (statues) through the education of young people. Interviewing young students, aged from 6 to 15, we concluded to the serious lack of figurative education and to the fact that the majority of the students are not familiar with the modern cultural heritage. It is not perceptible to them and therefore does not require their attention and respect. It is necessary to plan a corresponding strategy of approach to the young citizens, aiming to gain their respects towards the monuments, to activate both their sensitization and reaction to the protection of our cultural heritage. Our effort has been concentrated to the creation of actions that bring the young citizen in touch with the outdoor sculpture. Most emphasis of those proposals, as one can understand, is given on the young, precisely because we feel that we should invest in the new generation, offering them all the stimuli we can, and helping them develop those in the best possible way. We do not however exclude other ages, as our experience has shown that there is a lot of interest in public art, we simply have to activate it. Most of this research has been firstly announced in the  $2^{nd}$  International Conference on "Vulnerability of  $20^{th}$  Century Cultural Heritage to Hazards and Prevention Measures" held in Kos island, Greece, 3-5/10/2005 [1].

#### **European Dimension**

The vandalism of monuments is definitely not an individual phenomenon. I am not in a position to know what exactly happens in other European cities but I have definitely faced graffiti or other forms of vandalism in statues, a fact that causes anxiety and concern with regard to its response. In every case, the management model that is suggested and finally works, as it can be seen through application examples, is simple: knowledge through the educational process leads to appraisal and thus to respect. Then the respect towards the monuments is just a little away from the awareness-raising and the awareness-raising in turn can, through mechanisms, to be developed into the active participation of citizens for the protection of monuments. A necessary requirement for the program's success is that the first contact of the young citizen with the monument is successful. The monument in our research is the statues of the city. It could be any other monument or group of monuments of our modern cultural heritage. At this point we should note that every educational action has impact on the general cultural level not only of the particular country but of the enlarged European Community as well. European Union has financed at the past a program for outdoor sculptures maintenance, in which Athens has also participated. Among the experience of implementing this particular program and the collaboration with scientists of other European countries, we had for the first time the opportunity to organize actions, such as lectures in schools or distribution of information leaflets in passengers, in order to raise the awareness of citizens with regard to the monuments' protection. We perceived that there can be an enormous interest of the public for our monuments. We just have to activate it.

#### **Innovation and originality**

Our thought is to reduce the distance monument – citizen. We do not wish fences and bans. On the contrary, we aim to integrate the monument at the daily life of the citizen. This, at least at a student level, is achieved through education. Our proposal is summarised in making outdoor sculptures enter all educational levels with educational action that achieve the connection to the historical past of each monument, but also promote the latter as an object of sculptural art and its place /role in the course of the Modern Greek sculpture. Beyond the obvious result, the public's attendance also contributes in protecting and enriching figurative education and promotes its active attendance in the public affairs. The educational actions to which we refer with many expectations are implemented for the first time.

The Municipality of Athens has planned an *educational program of outdoor sculpture for young* students in the National garden and in Zappio Garden. The particular program is conducted in open space, and much more so in an idyllic environment. National Garden is not only a historical place, full of memories from the Athenian's capital first years, but also a monument of nature. Located in the centre of city, it is a tourist sight, neighbouring on other monuments, and together with the garden of Zappio, they constitute a green oasis, up to Athens southwestern department. The choice of those two spaces forming one is also based on another reality: in this beautiful areas, there are important monuments of Modern Greek sculpture, statues, busts and decorative sculptures, full of history and symbolisms, a representative and educative variety. Students get in contact with sculptural art. They learn to recognize typology and materials. They try to discover the artistic and historical value of each sculpture. They observe each work's protection status. Reference to the damages caused by the environment and to the advised way of treatment aims to signalling the need of protection. Moreover through experiential painting, drawing, and sculpture laboratories, they update on the stages of sculptural work, on the carving of marble, for the cast in copper. At the end of the program we expect young students to be able to understand the value of each sculpture as an element of our cultural heritage. We lso expect them to understand the importance of its protection

Secondly, we propose a *program of sculpture "adoption"*. In the region around the Municipality of Athens there are many schools neighbouring on squares or spaces with sculptures. Therefore, within the scope of school work, students could verify the historical origins of the sculpture they choose to adopt, relate it to the respective class of history or history of art, and at the same time take it upon themselves to watch its maintenance status throughout the school year, or make their own suggestion to the competent agency for improving its look. The program's aim is to sensitise children and make them have a fruitful contact with art, since there is no equivalent provision in the curriculum. At the same time, students feel integrated and direct themselves to a more active attendance in the public affairs.

Finally, the Outdoor sculpture may become an object of educational school actions. On the initiative of the professors, the Environmental Education course is carried out in laboratories and out of the Municipal High schools timetable. The team, consisting of the students and their supervising professors, selects a subject of history – culture or environment, on which they have to prepare a project until the end of the school year. The product of this work is usually presented in congresses or publicised in the internet. The group quality of this effort, the challenge to acquire knowledge on the selected subject, the initiative students are called to take and the fact that it exceeds the limits of the school curriculum and school space make them respond with great zeal. Outdoor sculpture could be the subject of similar actions such as a painting or a photography competition.

#### Impacts

An indicative example of *the sculpture's adoption program has been materialised by the*  $1^{st}$  *and*  $2^{nd}$  *High schools of the city of Aegio*. The young men of the region were repeatedly vandalizing the monument of the Aviator Memorial, since it is very close to the school building. We proposed to the local authorities the solution of adoption, because, since the real cause of deterioration would continue to exist, any intervention made should be soon repeated. Soon after, the  $1^{st}$  and  $2^{nd}$  High schools of Aegio adopted the Aviator Memorial, in a marvellous ceremony, and the students recognized the monument's importance for the place, and their obligation to respect and protect historical monuments in general. After its restoration, in which students also assisted in order to experience the trouble required for the particular effort, the Aviator Memorial of Aegio was placed under the protection of the school community.

The Evening High school of Tripoli materialised the program: "Sculptures in the city of Tripoli" within the framework of the Information technology class. The choice of subject, as the professor responsible for the program told us, was based on the criteria that students should be able to correspond satisfactorily, keep their interest undiminished, make extent use of new technologies but also have an interdisciplinary approach on various subjects. The program included recording - photographing of work, brief historical documentation, recognition of materials and comment on the monument's status in terms of deterioration. Moreover students developed a statistical study through questionnaires addressing the general public, which resulted in a wider propagation of the work and the cognitive subject in the local society. The final product was the creation of a CD and its relative web site with which the Evening High school Tripoli participated in the 2<sup>nd</sup> Pan-Hellenic Competition of Multimedia and Internet. The way the students approached the cognitive subject and the way they combined art /culture with the new technologies led in the achievement of the educational objectives. Moreover, not only the students of program, but also the majority of local society had the occasion to be acquainted with the sculptures of the region, to approach their history and to be sensitised on issues of cultural heritage protection.

The students of the  $2^{nd}$  High School of the island of Chios created a diary referring to the sculptures of their island. Similar action took place from a group of former drug users who created a photographic timetable with the outdoor sculptures of Athens. Interviewing the photographers we found out that through this experience they got familiar with the presence of art in public spaces. They also made significant remarks concerning the protection of this kind of cultural heritage confronting vandalism. Actions like that prove that everybody can participate in knowledge and protection.

#### Acknowledgement

We should make special reference to the very important role of the teachers, as they open the horizons of the students, guide them, and mostly inspire them and award their efforts. We also thank Mr. V. Souvatzoglou, professor of Information and new technology in Tripoli, Mr. B. Christodoulou from the Greek Organization against drugs, and finally all the students and people who accepted to help our research.

#### References

- [1] Antonopoulou, Z., 'Outdoor sculpture and citizens, proposal for the participation of the public in knowledge and protection' in Proceedings of  $2^{nd}$  International Conference on Vulnerability of  $20^{th}$  Century Cultural Heritage to Hazards and Prevention Measures, to be published.
- [2] PRO. BO. MON., European Project http://www.kae.bronzemonuments.gr.

# **Tourism related Research and Stakeholder Participation**

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Tourism oriented research represents the complex nature of research into Cultural Heritage. Its impacts are projected into material degradation studies, structural changes, restoration of movable objects, monument maintanance, presentation and interpretation of CH values, management of objects, monuments, sites, development plans for settlements and cultural landscape. Tourism studies have cultural, social, economic and environmental applications. Research cooperation of international organizations, regional institutions, municipalities and local communities is seen as very needed. EC funded PICTURE Research Project Team is preparing a proposal for Cultural Tourism Impact Assessment (CTIA) procedure to be applied when new projects, plans or strategies for development of tourism on eather local or regional level are beeing prepared, submitted, discussed, evaluated, applied, monitored and modified.

#### **Cultural Tourism Impact Assessment (CTIA) procedure**

The CTIA relates to certain degree to collaborative policymaking in the (proposed) stages of Baseline Information (1), Preparation of assessment framework (Scoping)(4), in the stage of Consultation with Designated Authorities and the Public(6) and finally in the stage of Monitoring/Corrective Actions(10).





#### Participation techniques and tools for improvement of CTIA procedure

There is not a standard way or method in approaching or motivating stakeholders to be involved in planning cultural tourism related matters. Benefitial are already established networks, stakeholder groups and effective participatory experience. Awareness of local perspectives and best practices is seen as time, resource and costs optimizing, thus providing an effective impact assessment process, which augment the likelyhood of satisfactory results. It is important that the progression of involving the public and other stakeholders is cautiously planned, that all involved are being informed in an early stage of participation action, learning what is expected from them, what can be their possible input and so on. A professional skilled facilitator to pay attention to organizational matters and moderate the participatory stages of the CTIA procedure in a fair and impartial manner is considered a minimum standard.

#### A three step participatory loop relevant to the CTIA procedure

This cycle is a "CTIA adapted short version" based on the five-step scheme illustrating an escalating level of public impact (Inform, Consult, Involve, Collaborate, Empower) frequently used in participatory planning. The use of communication tools, (participatory techniques and visualization tools in combination) can be structured in a simple cycle configuration, including Informing, Consulting/Involving and Monitoring. This model can remain flexible and allowing for a process based on the character of the project, plan or programme, including an integration of the variable factors in each destination area. Both in terms of tools, techniques and previous and present stage of development related issues.





#### 1. INFORMING AND GETTING INFORMED

Information resources are useful (in destination areas) to gather and share important data and information. Generally speaking, they help to collect, store, update and disseminate the information in an effective and easily accessible way. Information resources may include all forms of media. There are several variables interacting where knowledge, transparency and educational aspects should be in focus.

#### 2. CONSULTING / INVOLVING

Getting input, comments and suggestions from (identified) stakeholders and possibly reaching consensus what has to be studied and evaluated in the CTIA procedure. Furthermore, agreeing on subject matter and generating ideas and plans for action, communicating and working with stakeholders to make vision, plan and decisions. When developing new plans, programmes or policies, visualizations illustrate and describe their outcomes, calculate expected effects and make the analyses understandable for the general public who can then recognize, compare and evaluate possible impacts. It is crucial to have a common understanding on presented matters so the addressed public can contribute in an effective and meaninqful way.

Most techniques and tools remain flexible over time and may well be a part of an ongoing participation practice. Tools, like Geographic Information Systems (GIS), can relatively easily be up-dated, reprogrammed and incorporate many layers of information. (E.g. argumentation or thematic maps, carrying capacity measurements or preference surveys, etc.) These planning related tools are being designed to facilitate participation and customized for local use, allowing greater numbers of people to be involved in a more effective decision making process, focusing on the specific circumstances and needs of the destination area.

#### 3. MONITORING AND EVALUATION

Enable action in mutual responsibility and cooperation. E.g. prearranged groups with opportunities to interfere and instigate corrective actions in relevant stages of CTIA procedure. Monitoring and continuous evaluation could be constituted by participatory appointment of or on behalf of concerned stakeholders, allowing the plan, programme or project to have certain degree of sustainability. By monitoring of state and present situation (or Baseline information) one could identify possible problems, lack of strategic arrangements, disproportion between the strategy and the development of the situation and come with the proposal of plan, programme, project.

Conclusion of the Case study work and combination of visualisation tools and participation techniques used in World Heritage City of Telč: on www.picture-project.com European Project Details: PICTURE, Contract no SSP1-CT-2003-502491, Coordinated by LEMA, University of Liége, Belgium, picture@lema.ulg.ac.be



# **Tourism related research and Stakeholder Participation**

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Key words: tourism, public participation, cultural tourism impact assessment, decision support tools, sustainability

#### Introduction and content

Poster presents the work under PICTURE Project, which examined different methods of communication between concerned actors. These methods intend to help creating a common culture and improve stakeholder mutual understanding in discussing new *Projects, Plans or Programmes* in tourism development with different groups of users. The work aimed to identify how public participation can be applied in the proposed stages of *Cultural Tourism Impact Assessment (CTIA)*. Stakeholder Participation in CTIA procedure namely in Preparation, Scoping, Evaluation, Implementation and Monitoring of Tourism Development Projects, Plans and Programmes is seen as a key issue. The CTIA relates to certain degree to collaborative policymaking in the proposed stages 1, 4, 6, 10 (green lines) when involvement of all stakeholders is needed-on the other side 'orange' ones, when the responsibility is on the local authorities (3, 8) solely.



Figure 1: Proposed scheme of the CTIA procedure, indicating the stages of public participation

When assessing and developing plans, programmes or policies, it is crucial to have a common understanding on presented matters so the addressed public can participate in an effective and meaningful way, as well in contributing to the very content of what is presented. The Decision support tools could be divided in categories of Information Resources, Community Processes, Visualization Tools, Impact Analyses and Monitoring Tools. All which can be implemented at various stages of the CTIA procedure nevertheless in practice a combination of the tools in categories is normally used, often overlapping and combined in several hybrid forms, differing in scale, duration and complexity. Detailed description of tools, is provided in Picture D 20 in Appendices I and II. Generally speaking, Information Resources Tools are useful both to collect, store, share and update and disseminate the information in an effective and accessible way. Community Process Tools are designed to facilitate public involvement in planning and decision making relating to issues concering the community. They allow if necessary a greater numbers of people to be involved in a more effective and efficient process. Visualisation tools enable people to be engaged and possibly understand more complex issues related to planning as well as providing some degree of interaction in the participatory planning process. Visualisation tools can be used through the community processes, impact analyses and as infomation resource tool and can vary from a simple illustration to a complex computer aided 3D model. Most of them remain flexible over time and may well be a part of an ongoing participation practice. Tools, such as Geographic Information Systems (GIS), can relatively easily be up-dated, reprogrammed and incorporate many layers of information and through process extended into Participatory GIS (PGIS) combining more technical aspects with community processes. Impact Analyses Tools may quantify and visualize the implications of various scenarios and make it more accessible for the general public to understand impacts and trade-offs between different choices. In tourism, impact analyses may relate to limits of acceptable change in the host destination, evaluation of carrying capacity, traffic, noise, environment, policy changes or other indicators. Monitoring and evaluating project developments helps to identify possible problems, lack of strategic arrangements or disproportion between initial strategies and the outcome or development of a certain project. The public participation in tourism development can create a continuous cycle, where Monitoring and Evaluation contributes both to the important preliminary step (1. Baseline Information) for future actions in tourism development and at the end, after the project is implemented (10. Monitoring, Corrective Actions). The appropriate use of Electronic based Media related to the CTIA procedure depends on the digital level and local access and use of new technologies in the destination area. Electronic versions of techniques and tools described above are often revitalized, more cost effective and easy facilitated using the internet or other new technology, such as the mobile phone. Electronic processes offer as well enrichment of the conventional tools for governing and practice citizenship. Establishing a stable degree of Informing, Consulting, Collaborating and Monitoring may enable the stakeholders to keep curiosity and interest over time.

Participatory Geographic Information Systems (PGIS) work as means for the inclusion of subjective non-expert and experience-based data alongside other forms of knowledge. This enhances effective communication and understanding and can facilitate greater stakeholder involvement in decision-making as well as assisting in monitoring the impacts of management policies. Trust in the benefits and success of participation in planning tourism is crucial to both the sustainability and quality aspects in new developments and regeneration of older decision making structures. It is crutial to educate the coming generations of developers, visitors and investors. The CTIA procedure propose participation in several stages of the assessment, including an early participation, early reaching consensus, while trying to generate a flexible model for stakeholder management, paying more attention to the process over time, setting up a participatory monitoring for further stages and development of the given plan, project or programme.

#### **European dimension**

Proposed Cultural Tourism Impact Assessment and the tools which support its procedure form the core of the research work done under the PICTURE Project with the view of developing widely aplicable Scenario for integration of Plans, Projects and Programmes in Tourism Development in small and medium sized European cities.

#### **Innovation and originality**

The research focused both on tools and methods for improving the management of public participation processes, while paying special attention to contextual aspects such as relationships among governance, stakeholders, citizens and the communities in general, with the intention to measure possibilities for an efficient and extended influence in public decision-making. Categories of *Decision Support Tools* organize methods of communication in the screening and scoping in the proposed stages in the CTIA procedure.

#### Impacts

Tourism oriented research represents the complex nature of research into Cultural Heritage. Its impacts are projected into material degradation studies, structural changes, restauration of movable objects, monument maintanance, presentation and interpretation of values, management of objects, monuments, sites, development plans for sites, settlements and cultural landscape. Tourism studies have cultural, social, economic and environmental applications. CTIA procedure will help to support the long term governance and management of tourism in urban areas.

#### Acknowledgement

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#### References

Drdácký, T., Teller, J., CTIA procedure, Deliverable D7, 2005.

Drdácký, T., Alvaer, J., PICTURE Project Deliverable D20, 2006 downloadable on www.pictureproject.com

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# INTERFACING RESEARCH AND RISK MANAGEMENT FOR A BETTER SAFEGUARDING OF CULTURAL HERITAGE

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**CULTURAL HERITAGE** 



Reference: Standards Australia and Standards New Zealand (2004) AS/NZS 4360:2004, Risk Management, Sydney, NSW. ISBN 0 7337 5904 1.

Research strategies, objectives and priorities are clearly determined and communicated through a risk management model for cultural heritage preservation (see extended abstract for details).

# Interfacing research and risk management for a better safeguarding of cultural heritage

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Key words: cultural heritage, risk management, research strategy, end-user integration

#### **Introduction and content**

The goal of heritage preservation is to convey heritage property from the present into the future with minimum expected losses in values. This means reducing the risks to cultural heritage. Risks can involve damage or loss and range from rare catastrophes to continuous processes. The identification of risks, the estimation of their magnitude, and their avoidance, transfer, mitigation or control are thus essential to ensure successful safeguarding policies. Risk management, an approach that informs and guides decision makers in many fields, e.g. engineered systems, health, environmental conservation, offers a sound methodology to carry out such a task. Introduced to the field of cultural heritage preservation over ten years ago [1, 2] and subsequently gaining a broad interest, risk management provides an integrated view of all expected damages and loss to cultural heritage. It supports more efficient resource allocation. Risk management depends on research contributions to every step in its process. In establishing the context for risk management of cultural property, research is required to ensure that all objectives and important issues are considered. Context research allows a better-focused and more in-depth risk identification by informing the construction of comprehensive sets of precise scenarios. Identification of risks strives to be as comprehensive as possible. This challenges us to create and fill frameworks such as agents of deterioration and types of risk with wellarticulated and plausible scenarios. Stakeholder research is needed to identify stakeholders' objectives and interests within the goal of heritage preservation. The development of value frameworks to characterize and quantify the different values attributed by the stakeholders to cultural property is a central aspect of that type of research. In analyzing risks, research contributes according to the type of risk. For rare catastrophic events, hazard information, often organized within geographic information systems, is required together with sensitivity analysis of the cultural property and its protective systems [3]. For sporadic events, those that occur every few years or decades, research based on sparse data sets is required to establish expected frequencies and related severities of events. For continuous processes, conservation and materials sciences are essential for providing information to enable reliable predictions of rate of damage over time. Least explored but perhaps most exciting is the possibility of merging experience-based evidence of changes in cultural property with research-based predictive models to further constrain uncertainties in both approaches [4]. Regarding evaluating of risks, research is required to determine best practices for communicating uncertain risks and to determine multi attribute utility theory based resource allocation strategies. Finally, establishing new and evaluating and refining existing risk treatment options is an ongoing research need. This must deal not only with the expected levels of residual risk but also with measures of efficacy and efficiency of treatment methods.

This poster aims at illustrating the interfacing of research and risk management in the cultural heritage field based on the risk management process set out in the Australian and New Zealand

Standard AS/NZS 4360 [5]. That standard is the most widely internationally accepted and expected to be the foundation document for a forthcoming ISO standard on risk management [6]. It involves a procedure of 5-steps and two ongoing processes. The steps encompass establishing the risk assessment context, then, in turn, identifying, analyzing, evaluating and treating risks (see poster). Those steps are embedded in processes to continuously monitor and review, and to communicate and consult with all stakeholders. Extending this communication and consultation to include the research community, and beyond individual process' cycles, provides a suitable interface for a fruitful exchange.

In one direction, cultural heritage professionals and institutions using risk management will be able to present relevant knowledge gaps and technology needs in the risk management process. Those may include, for instance, the scientific knowledge required for risk identification and risk analysis concerning events or damage processes and rates a cultural property will experience under specific environmental conditions (e.g. archaeological sites and buildings under global warming conditions, or optical media in ozone and nitrogen oxides-rich environments). Dedicated risk treatment methods, e.g. for fire, flood, and pollution control and mitigation in the cultural heritage context, are examples of new technology needs that may emerge from risk management. Such an end-user input is extremely valuable to inform key research strategy elements such as research needs, priorities, and strategic directions. Research proposals that are clearly linked to needs through the risk management interface are more likely to be accepted by policy makers and funding bodies, which will be better able to evaluate those proposals in terms of their expected impacts.

In the other direction, knowledge generated and risk treatment technologies developed by the research community will have clear application to the cultural heritage field when the research work is in response to risk management identified needs. Research also plays an important role in identifying unknown risks to cultural property and informing risk management users about those risks. Clear objectives facilitate cross-disciplinary research work beyond the "traditional" cultural heritage research boundaries. Benefiting from progress in other fields will boost generation of new knowledge and development of innovative approaches to risk treatment. The flow of communication between research and risk management creates extra value by allowing the identification of more efficient ways and formats to deliver research outputs to heritage professionals (e.g. structured workshops or dedicated databases in addition to specialized scientific journals). Often the scientific knowledge that can inform risk assessment and analysis already exists, but is unfamiliar or unavailable to heritage professionals. Scientists play an important role in reviewing and interpreting the scientific literature to cultural heritage risk managers. Risk managers can, in turn, encourage scientists to seek existing scientific data that will be useful to the risk management process.

The success of risk management for cultural heritage preservation depends on development of suitable policies and frameworks to support and guide its application, as well as increasing the level of awareness and training of professionals and within institutions. In order to promote the effective identification, prioritization and mitigation of risks threatening cultural heritage worldwide, the authors' institutions have been jointly designing and delivering international training courses on this specific subject [7]. A mid-term aim within this collaborative framework is the development and dissemination of web- or software-based, free-access, aids for user-friendly risk assessment and management. These aids will guide the user through the basic steps of risk assessment, providing a comprehensive database with existing research data to allow estimates of risks to different categories of heritage posed by different hazards in specific scenarios (e.g. statistical information on fire, theft and flood; rates of chemical decay, etc.).

#### **European dimension**

The application of risk management to cultural heritage and its interfacing with research will ultimately contribute to the European Research Area by increasing the impact of its research outputs to the safeguarding of Europe's rich and diverse cultural heritage. The risk management process provides a perspective for looking across the many research initiatives and projects Europe-wide to assess and to increase their level of relevance. Better-informed research strategies will be developed, allowing a more efficient allocation of resources by European funding bodies. Already one of the leading forces in the cultural heritage field, European institutions delivering research would reinforce and advance their position by interfacing with, and obtaining valuable input from, their clients through the risk management process.

#### **Innovation and originality**

The application of the risk management process to the cultural heritage preservation field is innovative per se. It looks ahead, e.g. one century from now, and tries to predict with the best possible accuracy the losses in value the heritage will have experienced due to the various hazards it is exposed to. This provides a comprehensive overview of threats and opportunities, allowing effective strategy identification and prioritization and resource allocation. This approach provides a new and powerful way to inform research strategies in the cultural heritage field.

#### Impacts

By supporting more effective cultural heritage preservation and research strategies, the use of risk management will impact socio-economically by increasing the long-term accessibility of cultural heritage to the public and therefore its socio-economical exploitation (e.g. cultural tourism), and by lowering the currently high costs of research and of conservation and restoration of cultural heritage. In the Netherlands, for instance, a model has been develop to evaluate and prioritize research into cultural heritage according to the expected level of risk reduction the research output may provide [8]. New technologies for risk treatment will be developed, which will certainly find application beyond cultural heritage preservation.

#### References

- [1] Waller, R., 'Conservation risk assessment: A strategy for managing resources for preventive conservation' in Preprints of the Contributions to the Ottawa Congress, 12-16 September 1994, *Preventive Conservation: Practice, Theory and Research*, A. Roy and P. Smith (Eds.), IIC, London, 1994, pp. 12-16.
- [2] Waller, R., *Cultural Property Risk Analysis Model: Development and Application to Preventive Conservation at the Canadian Museum of Nature*. Göteborg Studies in Conservation 13, ISSN 0284-6578; ISBN 91-7346-475-9, Göteborg Acta Universitatis Gothoburgensis; xvi + 189 pp., 2003.
- [3] Accardo, G., Altieri, A., Cacace, C., Giani, E., Giovagnoli, A., 'Risk map: a project to aid decisionmaking in the protection, preservation and conservation of Italian cultural heritage' in Papers from the *Conservation science 2002* conference, Townsend, J. H., Eremin, K., Adriaens, A. (eds.), Archetype Publications, London, 2003, pp. 44-49.
- [4] Tse, S., Waller, R., 'Proposed Risk Model and Survey Form for Iron Gall Ink Containing Paper Objects and Collection', Second Iron Gall Ink Meeting and Final Meeting for Metals in Paper European Thematic Network, January 24-27 2006, conference poster and pre-conference publication, New Castle upon Tyne, 2006, pp. 107-108.
- [5] Standards Australia and Standards New Zealand (2004) AS/NZS 4360:2004, Risk Management, Sydney, NSW. ISBN 0 7337 5904 1.
- [6] Paoli, G. M., personal communication, 2006.
- [7] Antomarchi, C., Brokerhof, A., Michalski, S., Verger, I., Waller, R., 'Teaching Risk Management of Collections Internationally', *Collections: A Journal for Museum and Archives Professionals*, 2, No. 2, August, 2005, pp. 117-140.
- [8] Frank Ligterink, Steph Scholten, Henk Porck and Gerrit de Bruin, 'Waarderingsmodel en onderzoeksagenda conserveringsonderzoek papier', Instituut Collectie Nederland, 14 pp., 2005.

# **TEREZÍN/THERESIENSTADT: A EUROPEAN MONUMENT**

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The topicality of the following reflections on Europe's cultural heritage and on a particular monument of European history, art and culture is a result of project planning for conversion and revitalization of Terezín/ Theresienstadt in the Czech Republic following the flood

catastrophe there in 2002. Terezín, resettled as a Czech city after the Second World War, ranks as a European cultural and historical monument, not only as one of the last pre-industrial examples of European fortress architecture in the tradition of Vauban (together with Josefov) and but also as a memorial to the Holocaust with unique

> traces of ghetto accommodations.

stake At are preservation the of a perspectives European Unionaided cultural and historical monument for which international appreciation is more perhaps extensive than nationalacceptance. In an exceptional manner Terezín demonstrates the

urgency of protecting the European heritage under constitutional law. Terezín needs legal and institutional anchoring as a European monument, so that preservation and protection of the authenticity of its physical fabric can also be carried out at the level of the European Union.

There is a need for remembrance of the common

roots of European history as part of the unification European process. Places which are predestined by their history to convev such messages should in the future be assigned a prominent role in remembrance in the European Union, in the spirit of European understanding and future planning.

A united Europe needs not only a common

market but also a cultural heritage and, as already said during European Architectural Heritage Year in 1975, a "future for our past." The search for a common culture of remembrance has begun. "The common future can only be prepared if one is sure of the common past," observed minister

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Dr. Christina Weiss, federal Commissioner for Culture and Media in her opening speech at the symposium "Common Cultural Heritage as Opportunity The Germans and their Neiahbors in Eastern Europe" in September 2004 in Berlin.

Thirty years after the European Charter for the Protection of Monuments was adopted in September 1975 by the Council of Europe in Strasbourg and the Declaration of Amsterdam was issued at the European Congress for the Protection of Monuments, there is

a need to reassess the definition of monument. The issue at stake at that time was Europe's architectural heritage: all the peoples of Europe were to bear mutual responsibility, but preservation policy was to remain under the authority of the individual nations. Now, fifteen years after the end of the east-west conflict in Europe, as the extension of the European

Union begins, our understanding of the continent's common heritage has changed and become more sensitized.

But the critical issue here is the urgency of also identifyingtheEuropeansignificanceofunlovedand uncomfortable nationally protected monuments and developing from this a European preservation policy. The common European heritage has a high priority for the identification process of a Europe that is growing together. It is a challenge for political decision-makers, cultural experts and members of ICOMOS to reflect on these "monument values for

the European heritage" as well and to incorporate them in future planning.

At the present time it is necessary for us to establish what we want to remember and what authentic evidence is needed in order to convey the multi-layered reception of European cultural heritage where events happened, and to make it comprehensible to future generations. Besides examples of

cultural cooperation and enrichment in European history, there are also material relics that manifest tyranny, violent destruction, ethnic persecution and racism. To have this conflict in the common historical and cultural heritage of Europe, which raises issues of responsibility on the part of the

If Terezín, as a site of Central European history, is to assume the task of a center for democracy and culture according to Margot Wallström's model, then it must be identified as a European monument and its preservation and development must be professionally supervised and institutionalized at the level of the European Union. Terezín/Theresienstadt can thus become precedent а

for a European preservation policy whose mission protect material evidence combined with the goal

conveying and keeping alive the knowledge of a site's conflicting history, as part of the process of international understanding.

(translated from the German by Margaret Will)



20 October 2005

Jan Polivka

Prof. Dr. Astrid Debod-Kritter

European heritage which is administratively and financially secure, in order to make it possible to preserve and protect monuments also at a supra-national level according to the international principles and standards that have been set up in the course of the last thirty years.

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### Terezín/Theresienstadt: a European monument

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Key words: European heritage monument, military town conversion and revitalisation

#### Introduction and content

The topicality of the following reflections on Europe's cultural heritage and on a particular monument of European history, art and culture is a result of project planning for conversion and revitalization of Terezín / Theresienstadt in the Czech Republic following the flood catastrophe there in 2002. Terezín, resettled as a Czech city after the Second World War, ranks as a European cultural and historical monument, not only as one of the last pre-industrial examples of European fortress architecture in the tradition of Vauban (the architecture of this garrison town represents the zenith of pre-industrial building construction and architecture at the end of the 18th century), but also as a memorial to the Holocaust with unique traces of ghetto accommodations. The fortress and the town of Terezín are both exceptionally well documented by large, very beautifully drawn and detailed urban and architectural plans dating from the time of foundation and initial construction. Investigations of some of these fascinating, wellcomposed plans, which have survived in Czech and Austrian archives but have hardly been published, have enabled us to identify, understand and describe the former function and present state of the military and civilian buildings. The unique qualities and significance of this ideal planned fortress town have been overlooked because of the inconceivably cruel historic circumstances during the Second World War, when the fortified garrison town of Terezín / Theresienstadt was abused as a ghetto for destruction of the Jewish population of Central Europe. Not until the end of military use of the town in 1996 could detailed on site research on Terezín's military and civilian buildings begin. This work encompassed documentation of the urban structure of the garrison town and of the buildings, both inside and outside. At the same time research on the wide range of archival materials was initiated. These investigations revealed that Terezín still comprises most of the significant elements of the Habsburg fortress and town foundation as well as important hidden traces of the ghetto town, the latter mostly in the interiors of the barracks and in some of the civilian buildings. The discoveries and documentation, partly undertaken with students from the Berlin university of Technology, date from studies and workshops in the years 1997 to 2000 and were introduced in several exhibitions and printed materials [1]. The idea was to widen the image of the town, which history perception was stressed mainly to the years of the Second World War and to show the extraordinary history from the town's foundation until today, in order to emphasize potentials for the future. Today's critical issue is the urgency of also identifying the European significance of unloved and uncomfortable nationally protected monuments and developing from this a European preservation policy. The common European heritage has a high priority for the identification process of a Europe that is growing together. It is a challenge for political decision-makers, cultural experts and members of ICOMOS to reflect on these "monument values for the European heritage" as well and to incorporate them in future planning.

#### **European dimension**

The conversion of a historical military town of previously European importance into a place of encounter and education means to materialize the European idea. There is a need for remembrance of the common roots of European history as part of the European unification

process. Places which are predestined by their history to convey such messages should in the future be assigned a prominent role in remembrance in the European Union, in the spirit of European understanding and future planning. A united Europe needs not only a common market but also a cultural heritage and, as already said during European Architectural Heritage Year in 1975, a "future for our past". The search for a common culture of remembrance has begun. "The common future can only be prepared if one is sure of the common past," observed minister Dr. Christina Weiss, federal Commissioner for Culture and Media in her opening speech at the symposium "Common Cultural Heritage as Opportunity – The Germans and their Neighbors in Eastern Europe" in September 2004 in Berlin. During her visit to Terezín on May 8, 2005 European Commission vice president Margot Wallström, Commissioner for Institutional Relations and Communications Strategy of the European Union, disclosed that a center for democracy and culture is to be established in Terezín. Meeting centers are to be developed in places such as Terezín where citizens from all 25 countries of the European Union can conduct dialogues and discussions, confronting the common past in order to shape a democratic future. At the present time it is necessary for us to establish what we want to remember and what authentic evidence is needed in order to convey the multi-layered reception of European cultural heritage where events happened, and to make it comprehensible to future generations. Besides examples of cultural cooperation and enrichment in European history, there are also material relics that manifest tyranny, violent destruction, ethnic persecution and racism. To have this conflict in the common historical and cultural heritage of Europe, which raises issues of responsibility on the part of the perpetrators' descendants and of respect for the victims, treated as a challenging element of heritage conservation is the goal of this appeal. The critical factor for the future will be provision of a legal status for the European heritage which is administratively and financially secure, in order to make it possible to preserve and protect monuments also at a supra-national level according to the international principles and standards that have been set up in the course of the last thirty years. If Terezín, as a site of Central European history, is to assume the task of a center for democracy and culture according to Margot Wallström's model, then it must be identified as a European monument and its preservation and development must be professionally supervised and institutionalized at the level of the European Union. Terezín / Theresienstadt can thus become a precedent for a European preservation policy whose mission to protect material evidence is combined with the goal of conveying and keeping alive the knowledge of a site's conflicting history, as part of the process of international understanding.

#### **Innovation and originality**

The idea of identifying monuments of European heritage in addition to national monuments originally goes back to a proposal by Krzysztof Pawlowski, former president of ICOMOS Poland. Several recent works in history and art history can be cited in support of this intention [2-4]. Both authors refer to topographical connections in art and to historical memory relationships that have relevance beyond national borders and are of European significance. DaCosta notes, "Only at the end of the 18<sup>th</sup> and the beginning of the 19<sup>th</sup> centuries were nationalistic, ethnic and racist definitions applied in the field of culture" [4, p. 19] - and also, one could perhaps add, in the field of monuments. Karl Schlögel has examined the contradictions of historic monument heritage in central and eastern Europe within the framework of a "topographically centered historiography", which "leaves nation-state historiography behind" in the 21<sup>st</sup> century and "considers Europe as a whole" [3, p. 14]. "There is a special genre of remembrance and conservation which transcends national borders..." [2, p. 243]. "If only we are sufficiently observant, we find that not one but at least two histories are to be seen almost everywhere. ... The layers that are revealed again make [these places] among the culturally richest reservoirs and depots that Europe possesses. Anyone who wants to move about in this terrain must learn to decipher the cultural codes. ... The problem is whether we are strong enough to hear and withstand these double and triple histories" [2002, p. 245]. Cultural and art monuments with European roots and memorial sites of European history with a double

cipher of historical remembrance (Schlögel) have in common that their significance extends beyond national borders, sometimes because of their construction history, other times because of the history of their use. Up until now, the international principles drawn up in charters and resolutions by the Council of Europe, ICOMOS and other groups have directed the practical treatment of these monuments, but the relevant nation has always been responsible for legalization and implementation of these guidelines. But the critical issue here is the urgency of also identifying the European significance of unloved and uncomfortable nationally protected monuments and developing from this a European preservation policy. The common European heritage has a high priority for the identification process of a Europe that is growing together. It is a challenge for political decision-makers and cultural experts to reflect on these "monument values for the European heritage" as well and to incorporate them in future planning. The task is to reveal parts of history which were hidden behind the historically changed perception of what was "forgotten" and to draw the attention also to what due to its connection to the forgotten history was abandoned. In this way, heritage sites such as Terezín demonstrate the path which the European Continent is going through in order to strengthen its identity and coherence.

#### Impacts

At stake are the preservation perspectives of a European Union-aided cultural and historical monument for which international appreciation is perhaps more extensive than national acceptance. In an exceptional manner Terezín demonstrates the urgency of protecting the European heritage under constitutional law. Defining the idea of European urban heritage, it was only possible to reveal Terezín's potential for its possible future role as a European monument and European centre for democracy and culture on behalf on revealing historical research and its intensive presentation on all academic, political and common levels, which contributed to the town's efforts to bring the name of Terezín back into the national and international discussion about its future, and may also help to make a contribution as an example of common European identity; the research shows and presents, that Terezín has an extraordinary advantageous condition to become an example par excellence of a European heritage site.

#### Acknowledgements

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#### References

- [1] Debold-Kritter, A. and Fliessbach, G. (Ed.) Terezín/Theresienstadt. Vergegenwärtigung von Stadtgeschichte. Festungs-, Stadt- und Baupläne der Planstadt des 18. Jahrhunderts, 2005.
- [2] Karl Schlögel, Die Mitte liegt ostwärts. Europa im Übergang, Berlin 2002.
- [3] Schlögel, Im Raume lesen wir die Zeit, 2003.
- [4] DaCosta Kaufmann, T, Court, Cloister and City. The Art and Culture of Central Europe 1450-1800, 1995, German translation 1998.
- [5] http://www.schinkelzentrum.tu-berlin.de/projekte/arch/s\_Terezín.html .







## MEDISTONE : A NEW RESEARCH PROGRAM ON THE PRESERVATION OF ANCIENT MEDITERRANEAN SITES IN TERMS OF THEIR ORNAMENTAL AND BUILDING STONE

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Conservation of archaeological sites around the Mediterranean basin constitutes a major challenge for the future. Hitherto, studies of archaeological sites have tended to lack sustained follow-up over time, and not interacted sufficiently with other similar sites to enhance the results of research. As a result investments and expertise have tended to disappear after completion. Due to the absence of durable conservation practices, increased exposure to semi-arid climatic conditions, increasing pollution, and to ever increasing pressure from tourism, many sites suffer from severe degradation. The MEDISTONE project (call FP6-2003-INCO-MPC-2 / Contract n° 015245) proposes to contribute to the knowledge and the conservation of three of the most important archaeological sites in North Africa.

#### The MEDISTONE approach :



- identifying stones used at the selected sites and determining their origins in terms of geographic areas and, if possible, the former quarry sites ; at the present time, the region of origin of numerous decorative stones used in constructions dating from antiquity, both in the west and the orient (and often reused in the Middle Ages) remains poorly defined or even unknown. (Workpackage WP1)
- 2. establishing diagnosis of the state of conservation of the stones at the sites ; whilst the causes and the mechanisms of the stone deterioration are relatively well known for temperate European climates, the effects of semi-arid continental climate of the selected sites, characterised by strong thermal amplitudes, high evaporation and strong wind action, require more thorough investigations. (Workpackage WP2)
- 3. providing answers to the main problems regarding stone conservation / restoration for the selected sites ; it involves developing techniques for reassembling fractured and fissured stones ; this phase will be based on European know-how and will take into account the climatic and environmental specificity, as well as the social-economic context in each Mediterranean partner country (Workpackage WP3)

#### The selected sites :

#### The partnership :

- Universities and Research Organisations : Università IUAV di Venezia (IUAV, Italy), Moulay Ismail University of Meknès (MIUM, Morocco), University of Boumerdes (UNIB, Algeria)
- 2. Technical Institutes : BRGM (France), CICRP (France), IGME (Greece), LRMH (France)
- 3. SMEs : LITHOS SNC (Italy), PONS-ASINI GmbH (Germany)



4. Governmental institutions in charge of Cultural Heritage : Patrimony agency (DPC, Morocco), National Agency for the Protection of Historical Sites and Monuments (ANAPSMH, Algeria), Supreme Council for Antiquities (CSA, Egypt)



Three archaeological sites (Volubilis in Morocco, Djemila in Algeria, the Alexandria Ligth House in Egypt), among which two are listed within UNESCO's World Heritage List, have been selected for this study. Site selection has been based on priorities for site preservation and tourism indicated by those non-European participating partner countries where demonstrable scientific challenges and possible breakthroughs for site preservation have been identified.

#### European Project Details :



 
 Acronym : MEDISTONE
 Contract n° : 015245

 Title : Preservation of ancient MEDIterranean sites in terms of their ornamental and building STONE : from determining stone provenance to proposing conservation/restoration techniques

 Co-ordinator : David DESSANDIER
 Co-ordinator affiliation : BRGM
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## Medistone: a new research program on the preservation of ancient Mediterranean sites in terms of ornamental and building stone

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Key words: Volubilis, Djemila, Alexandria light house, conservation, stone, archaeological site

#### Introduction and content

Conservation of archaeological sites around the Mediterranean basin constitutes a major challenge for the future and is a major responsibility for our current generation. Many studies of archaeological sites have hitherto tended to be limited to specific objectives but were not necessarily planned within a framework of sustainability. As a result investments and expertise fade away after completion of such studies. Due to the absence of durable conservation practices, increased exposure to semi-arid climatic conditions, increasing agricultural and industrial pollution, and to ever increasing pressure from tourism, many sites are suffering from intensified degradation with respect to the conditions of their original discovery and excavation. A new European project MEDISTONE started at the beginning of 2006 to contribute to the knowledge and the conservation of three prestigious archaeological sites in North Africa. This selection has been based on priorities for site preservation and tourism indicated by the participant non-European partner countries and on the presence of an emphasised scientific challenge and possible breakthroughs for site preservation technologies identified by the included EU partners. Two archaeological sites, flourished in ancient times between the 2<sup>nd</sup> and the 6<sup>th</sup> century AD were selected: Volubilis (Morocco) has been listed by the World Heritage Committee since 1997, and Djemila (Algeria) has been listed since 1982, both bearing testimonies to a civilisation which has disappeared and being outstanding examples of an architectural ensemble illustrating a significant stage in human history. The third site, the Alexandria lighthouse (Egypt), one of the Seven Wonders of the Ancient World was initiated around 290 BC and served Mediterranean navigation until AD1480, when a medieval fort was built using the original marble, illustrating the re-exploitation of these cultural monumental buildings.

#### The project is divided into three main objectives

Firstly it aims to identifying stones used at the selected sites and determining their origins. At the present time, the region of origin of numerous decorative stones used in constructions dating from antiquity, both in the west and the orient (and often reused in the Middle Ages) remains poorly defined or even unknown. The project proposes identifying stones used at the three selected sites and determining their origins in terms of geographic areas and, if possible, the former quarry sites. After a preliminary phase of information gathering on topography and architecture, every site will be subject to an inventory and sampled in order to acquire a representative collection of the principal stones. Mineralogical analyses, petrography, geochemistry, and of physical testing, will be undertaken and should enable a base to be drawn up for identification of every stone type. The application of documentary studies and field investigations will enable potential sampling zones of origin to be delimited. Every sample will be either totally or partially subject to the analysis procedures described above. The comparison of analysis results between samples from monuments or quarries, and their confrontation in the
specialised data-bases established in Europe, should enable absolute confirmation of area of origin and even the ancient quarry location of stones used at the selected antique sites.

As second objective, The MEDISTONE project proposes also establishing diagnosis of the state of conservation of the decorative stones and of the constructions. Whilst the causes and the mechanisms of the deterioration to stone are relatively well known for temperate European climates, the semi-arid continental climate of the selected sites, brings about specific weathering and alteration requiring more thorough investigations, concerning aeolian action, thermal and humidity variations on dilation and fracturing (thermoclasticity, materials fatigue), salt crystallisation, biologic activity, anthropic actions (pollution, agricultural and industrial practices and tourist activity), products and techniques used in former restoration works. The main weathering forms affecting the stone at each site will be described and indexed. This descriptive on-site inventory will be coupled with *in situ* measurements. To reinforce the conservation state diagnosis and to identify main internal and external factors of the stones alteration, in-laboratory measurements on decayed stones samples will be undertaken.

The Maghreb (Mediterranean Northwest Africa) with a humid climate at the beginning of the Holocene, was considered as the wheat granary during Roman times. This climate has since evolved modifying to a semiarid to arid climate. Burial, which over time, leads to the formation of a surface patina on the stones, also has non-negligible consequences on the material. The variations in environmental conditions to which the stones have been subjected, has thus led to a succession of alteration process responsible for the alteration feature currently visible. Bibliographic research on the archaeology of the remains and the work done at each site will, through archaeological dating, enable knowledge to be established concerning the environmental evolution of the sites. Historical research will be also undertaken on restoration and maintenance methods with regard to methods used, products employed.

As third objective, The MEDISTONE project proposes to develop techniques for reassembling fractured and fissured stones. This phase will be based on European know-how, and will take into account the climatic and environmental specificity (thermal amplitude related the semi-arid continental climate at the Mediterranean located sites), as well as the social-economic context in each Mediterranean partner country. Techniques currently used in Europe make use of either mineral-based sealants which show a chemical compatibility with the stone (ultrafine hydraulic paste), or, more generally, organic compounds developed form polymer chemistry (acrylic resins, polyurethanes, epoxies). These organic products show undeniable adhesive properties and mechanical resistance along with their ease of use related to rheological and hardening properties. The applicability and the transposition of these solutions need to be tested in the contrasted climatic conditions. In parallel, it is considered important to examine specific formulations which favour the use of cheaper local products like lime and are readily available in the market places.

The techniques for reassembling fractured and fissured stones will be based on a phase of laboratory testing, to define their limits of use and the optimal conditions. The behaviour of a variety of different stone / binder assemblages will be laboratory tested for temperature and humidity gradients exceeding those at the sites, in order to determine the theoretical performances and the degree of risks linked to their usage. The best performing compounds will be selected and their practical application conditions optimised for each site. In situ applications will be monitored at reference pre-selected test zones.

#### **European dimension**

The partnership gathers European research and technical Institutes: BRGM (France), CICRP (France), IGME (Greece), Università IUAV di Venezia (IUAV, Italy), LRMH (France) and 2 restoration workshops (SMEs): LITHOS SNC (Italy), PONS-ASINI GmbH (Germany).

These European institutions work with Universities Research Organisations: Moulay Ismail University of Meknès (MIUM, Morocco), University of Boumerdes (UNIB, Algeria) and Governmental institutions in charge of Cultural Heritage : Patrimony agency (DPC, Morocco), National Agency for the Protection of Historical Sites and Monuments (ANAPSMH, Algeria), Supreme Council for Antiquities (CSA, Egypt).

This program is an expression of the support to the conservation policy of emergent countries that European Community can offer.

#### **Innovation and originality**

The MEDISTONE approach will face the above two-fold problem characterised by the absence of sustainable studies combined with intensified site degradation, and will be based on three integrated following work axes (identification of stones and determination of their provenance, diagnosis of the conservation state of the stones, development of appropriate reassembling techniques). They will provide original and innovative deliverables for the three sites:

- atlas including data record of each ornamental and building stone inventoried
- collections of reference samples of the ornamental and building stones used
- location maps of ancient quarries with explanatory notes
- guide for stone conservation including guidelines of diagnosis and illustrated index of stone decays observed and recommendations for maintenance and conservation strategy
- technical procedures of reassembling of fractured and fissured stones combined with a long-term monitoring form of the in-situ test-zone. Virtually never treated in national valorisation projects of heritage sites, this problem involves both a scientific interest aspect, integrating completed restoration projects corresponding to the spirit of the Venice Charter (1964), and "training and technological transfer" by developing *in situ* solutions which are innovative and adapted to the characteristics of Mediterranean partner countries.

#### Impacts

Characterisation of the stone at the sites, used in ornamentation and building, and in particular its provenance, to further support / restore the sites and to durably preserve them whilst allowing exposure to tourism, is fundamental. Provenance studies will not only help to locate the best materials for restoration, but will also allow investigation into ancient trading / transport routes in the waning stages of the Roman Empire (e.g. some material at Volubilis may have been traded / transported over distances of two to three thousand kilometres).

Moreover, data management of the obtained results will include circulation of the information between the non-European Mediterranean countries, and dissemination of the obtained results to partners but also to the whole scientific and technical community through guidelines of best practice for conservation of stones in arid and semi-arid areas and organisation of two international workshops organised. The first one will be held in Morocco and deals with identification and origin determination of stones. The second and final workshop dedicated to "Diagnosis of the conservation state of the stones" and to "Development of appropriate conservation / restoration techniques" will be held at the end of the program in Egypt.

#### European project details

Acronym: MEDISTONE - Contract n° 015245 – Title: Preservation of ancient MEDIterranean sites in terms of their ornamental and building STONE: from determining stone provenance to proposing conservation / restoration techniques – Co-ordinator: David Dessandier – Co-ordinator affiliation: BRGM.

### IMAGE AND HERITAGE

HERITAGE POLICY AND ARTISTIC PRACTICE

Christine Estève

ÉCOLE NATIONALE SUPÉRIEURE D'ARCHITECTURE DE MONTPELLIER-FRANCE

#### HOW TO QUESTION HERITAGE POLICIES

Image and Hentage is a programme developed in the Department of Architecture and Hentage at ENSAM in France since 2004. This program intends to take part in the debate about heritage policies through an artistic practice. This programme wich involves the association of differents means artistic theoretical and geographical for a confrontation to different atthudes: has started by a study of the courtyard houses named havels in the Shiekhawell, Fogasthan

#### HAVELIS OF THE SHEKHAWATI RAJASTHAN, INDIA

The area chosen for the organisation of the study's first phase was the Shekhawati, a provincelocated in the north-east of Rejusthan in India. This area is mainly constituted of havelis, courtyard houses built by rich Marwaris merchants on the caravan road, entirely covered with thescoes and hudded together to the point of forming entire cities.

#### A PLURIDISCIPLINARY TOOL ESTABLISHED ON IMAGE AN OBSERVATORY OF THE CONTEMPORARY CAUSES OF DETERIORATION OF

ARCHITECTURAL HERITAGE From the iconographic database realised by students of the ENSAM during a workshop and the analysis of the documents, a progressive and pluridisciplinary grid of study has been established, the «sections» of wich represent the contemporary forms of deterioration. This grid of study, the tasss of a plundsciplinary debate, initiate an observatory of the contemporary causes of detenoration of the architectural hentage.

### APPROPRIATION







TIME EFFECTS OF SIGNS



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TO NEGLECT-TO FORSAKE

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CRUMBLING, MOULD



TO MODERNISE





TO FILL-TO OPEN



#### VANDALISM, DEMOLITION





PHOTOS and DESIGN OF Constrained Constraints and No. Designs of Statements of Statemen IN THIS IT IS SHOW CODYRIGH AIMAGE & PATRIMORIES ENSAM



## Image and heritage: heritage policy and artistic practice

#### Christine Estève

École Nationale Supérieure d'Architecture de Montpellier-France

Key words: image, heritage policies, contemporary causes of deteriorations, preservation

#### How to question heritage policies?

"Image and Heritage" is a program developed in the department of Architecture and Heritage at ENSAM, École Nationale Supérieure d'Architecture de Montpellier-France since 2004. This programme intends to take part in the debate about heritage policies through an artistic practice. The principal purpose of the project is to question heritage policies in order to be part of the emergence of a contemporary view relating to future policy. Whereas the question of patrimony and its preservation calls together numerous scholarly disciplines, the programme involves a changing attitude while associating different means through artistic, theoretecal and geographical contributions.

- Artistic means increase the value of a personal viewpoint using contemporary practices such as drawing, photography, video, digital pictures, etc.
- Theories relate to whatever associated disciplines,
- Geographical perspective accounts for a confrontation to different attitudes.
- Indeed, the unquestionable contribution of Art to Architecture, Urbanism and Landscape Design over the last thirty years encourages us to believe that the subjective point of view as well as creative writing associated to pictures, are tools likely to improve a reflection on heritage and its preservation.

Our methodology for observing cultural heritage leads to constitute an iconographic database related to the buildings that have been studied, that supports the analysis. The results are organised through appropriate "sections" wich represent the contemporary forms of deterioration. All together it gives a grid of study for observing the contemporary degradations of architectural heritage as an evolutive and pluridisciplinary tool.

#### The European dimension

Whereas in our country the word heritage is closely linked to the idea of preservation, such a connection is not always so obvious elsewhere in the world. Being aware that architectural heritage is vulnerable is largely beyond national and european borders. Selecting for doing fieldwork a less known patrimony, that is supposedly submitted to different conditions than the ones we experiment in Europe, gives us the opportunity to forget about our habits and prejudices thoughts and that helps us to think in a more appropriate fashion. This is how, we think, it is possible to share the most recent debate on European heritage such as what relates to the relation of patrimony to modern cities, the extension of towns, and the necessity to master urbanism and safeguard landscapes. The iconographic tool developed by the programme "Image and Heritage" composes the language that allows for debating and sharing experiences beyond geographical and disciplinary borders.

#### **Innovation and originality**

#### Fieldwork

The confrontation with different forms of heritage and other cultural attitudes, at the risk of being shocked or maybe seduced, together with the possibility to express and communicate our thoughts using the pictures, will culminate in an enriching and open debate on the subject of preservation. Each phase of the program is progressive, stemming from the workshops that are being done on selected heritage sites. If the debate involves necessarily the local partners, the

main activity does not depend on a specific region of the world since we are questioning the very idea of patrimony. The very perception of everyday environment is culturally constructed and codified. Once we are displaced, these cultural principles and understandings are not able to bring the same support, the foreign setting answers differently, our chain of thoughts can't rest on the same assuredness. The closer they are geographically and culturally the easier we analyse our surrounding landscapes. Moving away from a familiar territory, we see different knowledge and know-how, which have developed along with other habits and beliefs, therefore giving rise to new and unusual forms. Cultural differences regarding the notions of life, expertise or aesthetics leads to reformulate questions that laws, habits and respect for tradition prevent us from asking ourselves. What may seem to us important aspects of heritage are not necessarily, in another site, essential elements to be preserved. An ancient fresco for example, a particular place, a finely carved woodwork, depending on their location, are not equally taken into consideration and they are not submitted to the same laws. The reasons for differences of attitudes relating to cultural heritage in the countries are complex. The preservation of heritage and the expertise associated with it, together with laws and financial support depend on the importance given to them by each state. Finally, the choice of a geographical transfer with the advantages of discovery, exchange and sharing, allows us to interact with foreign students and specialists.

#### Image

Well known is the contribution of contemporary photography to the development of perception towards lanscape. Many artists and writers opened up a new way of thinking about sites. It seems that heritage and contemporary art, which have always concurred, may still have a prolific dialogue to offer. The aim of doing workshops abroad, of course, is to discover other cultures. It is equally about sharing. About approaching things differently, thinking together and comparing our various attitudes towards the question of preservation. The study does not depend on a restrictive type of architectural patrimony. Along with the tangible heritage (buildings, gardens and landscapes) the intangible heritage (expertise, images and sounds of the cities, knowledge systems) will be of our interest. The workshops are structured around the images and a writing practice to forge reflection on the notion of heritage. Encounters, discussions and group activities are planned with local students and specialists. After the scientific analysis is done the conclusions are presented to the various specialists associated with the study, and to the prospective authors of the publication that will be issued.

#### **Original outcomes**

Creation of a progressive and pluridisciplinary tool based on images: a grid of study, observatory of contemporary causes of the architectural heritage degradations. To this date, two experimental phases of the programme have been done: one on the "Havelis of Shekhawati", in Rajasthan, India, the other on the "Fondouks and the Ksour", South Tunisia. The subjective look at these two differents places allowed us to observe and update their living conditions today. The analysis of the iconographic database gave rise to formulating a grid of study of the different types of degradations. Such grid being submitted to several people during pluridisciplinary encounters, in France as well as the countries where the fieldwork is being done, led us to observe that a pure iconographic approach opens the debate through sensitive perceptions that permit the expression of different opinions from very distinct domains of thoughts and practices, which are all related to patrimonial issues. Presently, an interviewing activity is pursued with experts, academics, politicians, artists and users on the following topic: is it necessary to preserve?

#### Impacts

The following pictures are an illustration of the "sections" that emerged from the first experimental phase of the programme ("The Havelis of Shekhawati", India) on the contemporary causes of degradations.



Figure 1: Appropriation Figure 2: Comfort Figure 3: Time effect Figure 4: "Repair"

#### Socio-economic impacts

The production of an iconographic material that can be shown to very distinct actors of the patrimonial question, coming out of the restricted field of the experts to listen to other voices, accounts for enriching the debate, opening it through a larger argumentation. It would be fruitless to solely consider the economic weight that certainly is tourism to take whatever decision to safeguard. On the one hand, deep, complex and symbolic reasons have to be considered to base a preservation policy. The freedom that our approach gives, allows us to consider more carefully the necessary complexity on which appropriate heritage public policies can be built. On the other hand, the conservation of heritage depends on the protection of related know how. Knowledge and transmission are closely associated, so it is probably on this question that the future development of this work will cristallize.



Figure 5, 6, 7: Present day know how in the Shekhawati, Rajasthan, India

#### Acknowledgement

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#### References

Hans Silvester: Les cavaliers du Shekhawati - de La Martinière - France, 2001.

SHEKHAWATI Painted Townships "Text Kishore Singh, Photographs Pankaj Rakesh" Cross Section Publications Pvt.Ltd.. New Delhi 1995.

T.S. Randhawa, The Indian Courtyard House, Prakash Books, New Delhi, 1999.

Wacziarc Francis & Nath Aman: "Rajasthan, les peintures murales du Shekhawati" - Laffont, France.

Ilay Cooper: The painted towns of Shekhawati - Mapin Publishing Pvt. Ltd - India, 1994.

Pankaj Rakesh & Karoki Lewis: Shekhawati, Rajasthan's painted homes – Lustre Press Pvt Ltd. India, 1995.

#### The Revitalisation of the Monastery at Žiče

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Figure 1: The upper monastic complex with the partly renovated buildings (Photo: Bogdan Badovinac)

#### 2. The research work of the Monastery at Žiče

The research work of the Upper monastic complex has been going on for four decades (Figure 1, 2). The inn, a part of the monastery wall and the baroque house have been researched in detail. The gothic house, the western gothic outbuilding, the cemetary chapel, the small cloister, and St John the Baptist's church have been partly researched. The buildings which have been left uninvestigated are the ones which are linked to archeological excavations (monk's cells, the big cloister, the western demolished outbuilding) (Figure 3). The research work will be focused on St John the Baptist's church construction, the historical materials and the arch of the church (Figure 4, 5, 6, 7). The archeological probing of the interior and the exterior of the church will be carried out.



Figure 4: A view at the upper monastic complex inside the monastery wall (Photo: Bogdan Badovinac)



Figure 6: The construction of St John the Baptist's church will be investigated with destructive and non-destructive research methods (Photo: Bogdan Badovinac)



Figure 2: The upper monastic complex of the Monastery at Źiče in the first half of the 18th century (Author: Carl Haas)



Figure 3: The extent of researched buildings in the upper monastery complex at Žiče (Author: Ivo Gričar)



Figure 5: At St John the Baptist's church, stone, mortar, brick, metal and glass will be investigated (Photo: Bogdan Badovinac)



Figure 7: The big cloister and monk's cells are still under the grass (Photo: Bogdan Badovinac)

#### 1.Introduction

The Slovenian National Building and Civil Engineering Institute together with its project partners BAM, Berlin and the Pavia University has successfully taken part in the Culture 2000 concourse with its project The Revitalisation of the Monastery at Žiče.

On the level of the European Commission the programme Culture 2000 takes place through the General Secretary's Office for Education and Culture. It supports projects which contribute to the development and spreading of innovative concepts, methods and techniques from the field of preserving and renovation in Europe.

In the framework of the suggested project the interdisciplinary group of experts from the fields of sociology and natural and technical sciences will research historic materials, the construction of building tissue, archeology and the building development of the Upper Monastic Complex of the Žiče Monastery with the stress on St John the Baptist's church.

The purpose of the research is not restoration of the original state of the monastery. The purpose lies in stressing its exceptionality with new arguments, to bring its mysticism closer to the masses and to enable the local community to take an active part in the development of their town, especially through richer cultural and tourist activities in the area.



Figure 8: An interesting cultural programme draws many choir singing lovers to the Monastery at Žiče (Photo: Aleš Brglez)

#### 3. Cultural and tourist programme

The local community has been striving to make the Monastery at Žiče known to the broader public. The amazing ambiance where no noises of civilisation can be heard is especially suitable for the tuned voices of sacral music performers. The concert of Gregorian chants which is always visited by a number of people has become a tradition. The cultural and tourist programme of the monastic complex will gain new dimensions through renovation (Figure 8).

## European Project Details

Agreement no. 3005-0117/005-001 CLT CAM, The Revitalisation of the Messatury at 241 Slovenian National Building and Civil Tegeneuring Institute, Distillerus 12, 1000 Ljubljana (22/01 Ljubljanz), infiniting of



## The research work on the monastic complex at Žiče with the help of the means provided by the Culture 2000 programme

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Key words: monastery, research work, historic materials, constructions, archeology

#### Introduction

The monastic compleks at Žiče is clenched in a narrow valley on the confluence of two brooks which spring under the steep slopes of Konjiška gora (Figure 1). Because of its six-hundredyear building development, its position far away from the madding crowd and the unspoilt nature around it, the monastery presents a cultural, historical, aesthetic and landscape value of the place and time.

For the last three decades, conservators have been trying together with the local and national authorities to investigate, conserve and renovate the monastery and offer it to the public together with an interesting programme.



*Figure 1: A view of the monastic complex at Žiče from the south (Photo: Bogdan Badovinac)* 

#### The purpose of researching the monastic complex

Due to the two-hundred-year abandonment of the monastic complex, the building tissue is in bad static condition. Most of the historical materials are degraded and in need of strenghtening or replacement. The ruins of the small and the big cloister, the monk's cells and one of the outbuildings are under the grass.

The previous research work dealt mainly with the field of the history of art. The results met the needs of the renovation of the inn and the monastery wall with a part of the baroque

outbuilding. This research work alone cannot satisfy the needs for the renovation of St. John the Baptist's church which is in very bad condition. The church lacks the roof, all the wooden parts and many architectural details therefore its renovation presents a huge expert challenge [1].

The intended research work of the historical materials which will be carried out at the Pavija University and ZAG Ljubljana will attempt to answer questions regarding the structure and source of in-built materials and also offer suitable recipes and technologies of preparing substitute mixtures.

With the use of destructive and non-destructive research methods, an international group of experts for construction research from BAM, Berlin, and ZAG, Ljubljana, will try to establish the state of the building tissue. On the basis of measurements, a model of earthquake-safe renovation of St. John the Baptist's church will be made.

In the frame of the project, archeological research will only be used in the form of archeological probing and probe interpretation and it will be carried out by ZVKD RS experts. The preliminary archeological probing will serve as the basis for further extensive archeological excavations which will in expert opinion last for the next few years.

The results of the research work will influence the recognizing of the building development of the monastic complex from the beginning of construction in 1190 to the end of its use in 1782, the recognizing of historical materials, technologies of material preparation, building technology, static stability of the building, the archeology of the inner party of St. John the Baptist's church as well as its surroundings. They will be included in the preservation renovation project of the monastery which is the basis for its quick further revitalisation.

#### The contribution of the research results to European cultural heritage research

The Žiče monastery is the first monastery in the Midlle-European and Germanic area as well as 19th in the row since the founding of the Carthusian order. These are the reasons why the conservators reckon it among the cultural monuments of European extensiveness. The broad renovation problems call for an interdisciplinary approach of experts from the fields of natural, technical and social sciences as well as efficient financial support.

This is the first time that Slovenia has succeeded in the candidacy for such an interdisciplinary project of cultural heritage research and also the first time that so many financial means have been invested in such a purpose. Slovenian researchers, especially those from the field of natural sciences, have for the first time the opportunity to cooperate with an international group of experts who are experienced in cultural heritage research as a whole. The contents and the planned dynamics of the project interfere with the valid habits of cultural heritage renovation which in Slovenia is usually carried out too slowly and with not enough knowledge about the material substance of building tissue.

The research results are expected to contribute to identifying the now unique European space which in the time of the building of the monastery was divided into Roman, Germanic and Slavic parts. The influence of the Roman space would have to be seen through the nature of the building of the monastery complex and through the technology of building material preparation. The six-year development of recipes and technologies of building material preparation as well as the development of architectural laws of this area will in this way broaden and complete the data basis of the cultural heritage reserach of the whole European area.

Slovenia with its experts will in the future continue to strive to cooperate in similar European projects and to transfer the acquired knowledge to interested parties at home and abroad.

#### The innovation and originality of suggested research

The basic idea of carrying out research is interdisciplinarity of the expert project group and the use of all sciences and techniques which will contribute to the study and preserving of cultural heritage. It is crucial for the renovation of cultural monuments to achieve quality and applicable results in the shortest possible time with enough financial means.

With the new approach to the renovation of cultural heritage, shown on the example of the reserach of the monastic complex at Žiče, the foundations of the new methodology of cultural monument renovation in Slovenia will be laid, just as it is common elsewhere in Europe.

Data basis of the romance, gothic and baroque building materials will be built which can later on be used for the comparative study of building materials for the remaining two monasteries in Slovenia, Jurklošter and Pleterje, and also other building materials from different historical periods in general.

#### The influence of the quick renovation on the social and economical development

The research results will be seen in the quick renovation of the monastic complex and will consequently contribute to a better tourist offer of the town, the region and the country.

It is important that a tour around the monastery at Žiče be interesting and safe which is only partly true at the moment. After the static sanitation of the building tissue in St. John the Baptist's church, a roof will be placed which will prevent further wrecking of the church circumference and protect the interior and exterior of the church from roughcast and stone architecture decay. The proven source of stone and aggregate will be the basis of autochton acquisition of the building material used in the renovation. The revitalisation of the abandonned quarry will cause the revival of the stonecutting craft which once was a constituent part of the life in this town but is nowadays completely forgotten. The running and maintenance as well as cultural and tourist programme will contribute to the reduction of unemployment in the local community as well as the country and consequently Europe (Figure 2).



Figure 2: Periodical cultural performances in the Monastery at Žiče– a concert of St Petersburg boy choir (Photo: Aleš Brglez)

#### References

Bogdan Badovinac, 2003: Žička kartuzija – projektna naloga. Unpublished.

## TRADABLE RIGHTS TO CONTROL NEW DEVELOPMENT

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#### Possibility to control the amount of land being developed effectively at the national level



## Economic instruments in urban planning for urban and rural character protection

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Key words: urban planning, tradable rights, land development

#### Introduction

There is a permanent pressure on environment and open landscape from rush real estate development around European cities. This can lead to urban deconcentration (suburbanisation, sprawl). Cities lose compactness, their cultural uniqueness and atmosphere. Urban environment is being deteriorated and rural character of landscape suffers. Urban development is ruled by the process of urban planning, suburbanisation is still present however. Urban planning in Europe is based mainly on command and control instruments – prohibitions, limits, permits etc.

No real application of economic instruments has been implemented in urban planning in Europe, which would preserve open landscape around cities and prevent suburbanisation. Economic instruments for urban planning are only rarely discussed. Tradable development rights as one type of economic instruments seem as the most promising in the current research. There are many approaches, how to design the tradable development rights policy. This abstract and poster presented summarise results of research done in the area of tradable development rights for the use in the Czech Republic. It shows their applicability in the Czech urban planning, and shows consequences for urban and rural landscape character protection.

#### Lobbying opportunities of the current system

Urban planning determines the amount, type and spatial lay-out of new development. By these decisions, urban planning influences the market value of land to a great extent. Land devoted for development often has a several times higher value on the market in comparison with agricultural land or forests which are not included into developable zones in urban plans. Landowners of developable land gain a scarcity premium from the sale of their land. This situation leads to rent-seeking of different stakeholders and lobbying. Landowners lobby for being included in developable zones by municipalities; big investors (in housing, industrial or commercial sector) lobby for changes of urban plans in accordance with their intents. Lobbying may lead to bribing of municipal officers or elected councils. For a broader discussion about lobbying opportunities in urban planning see [3].

#### Insufficient control of quantity of land being developed

The design of local urban plans is in competence of municipalities (regional authorities are control bodies). This approach corresponds to support of autonomy of municipalities. It does not enable to control the total amount of new development at a regional or national scale however. The total amount of land specified for future development is not known. An excessive level of development in terms of amount of land could easily happen with negative impacts on landscape protection and level of urban deconcentration.

#### Tradable rights policy

Economic instruments based on tradable rights were first suggested in [1]. Different applications of tradable rights in urban planning have been discussed. Some real applications are locally limited – see e.g. [2]; other suggested policies assume trading with rights among municipalities – in [4]. For the Czech Republic, a policy at the national level is proposed. The rights are suggested to be traded on a stock exchange. A tradable rights policy includes specification of a quantitative performance target (number of issued tradable rights per a time period), a selection of agents who will participate on trading (provided, tradable rights are traded on a stock exchange, everybody may be included in trading), an initial allocation of rights (e.g. through an auction), zones for trade (municipalities would define zones of developable land in their urban plans), spatial flexibility of trade (regional aspects of trade defined by so called bubbles). Also the initial introduction of the policy has to be cautiously designed.

#### What are tradable rights in urban planning

Tradable rights are valuables (securities) which may be traded on a stock exchange. They represent a right for land development of a specific area (units may be square meters). Land could be developed under condition that the developer has bought tradable rights in a sufficient amount first and at the same time, land is devoted for development in the urban plan (devoted for housing, commercial or industrial use). Once tradable rights are used for development, they forfeit. The same tradable rights would be required in all types of land use, like housing, commercial or industrial use including road network.

#### Use of revenues from the sale of tradable rights

The market price of tradable rights would correspond to the total demand for development (market equilibrium is established by price changes). Revenues from the sale of tradable rights could form a special fund for landscape protection programmes. In the current system, municipalities are willing to improve territorial systems of ecological stability in the Czech Republic. They lack money to buy out land for ecological programmes. Obligations of landowners specified in urban plans (e.g. to afforest their land) don't work (landowners are not interested in it).

#### Tradable rights effects

Tradable rights policy enables to lower lobbying opportunities of landowners. Landowners selling their land for development would not receive scarcity premiums due to increase of competition among them. There would be more developable land in comparison with number of tradable rights. Tradable rights enable to set up a control of total quantity of land being developed at the national level (according to number of issued tradable rights). Adjacent effects include improvement of ecological performance of landscape (through the use of revenues from the sale of rights in landscape protection programmes), lower price of developable land (through increase of competition among landowners; this effect would be dependent on the number of issued tradable rights and on the amount of developable land in land-use plan; it may be reverse in the case of a substantial decrease of the land consumption rate).

#### Limitations of the suggested policy

There has to be a political will to control the amount of land development. Land development will be compact under the condition, that municipalities will not cover any investment costs of new development (road, electricity, water, or other network infrastructure support). The financial support of infrastructure leads to a scattered development without economic incentives for investors to invest at the boarders of current built-up areas.

#### **European dimension**

This work shows application of tradable rights for the Czech Republic. The same challenges in urban development are faced nowadays in a majority of European countries. The concept of tradable rights is applicable not only in countries which suffer from an excessive consumption of land for development, but also in countries which could face this problem in the future.

#### **Innovation and originality**

Several policies using tradable rights have already been applied or discussed. They are locally oriented or assume trading with rights among municipalities. The presented policy concentrates on the national level and on trading with rights on stock exchanges opened for any traders.

#### Impacts

The use of tradable rights in urban planning enables to control the amount of land being developed at the national level and to lower the speed of land consumption (under condition there is a political will for that). Rent-seeking and lobbying interests of landowners would be decreased. Adjacent effects include improvement of ecological performance of the landscape.

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#### References

- [1] Dales, J.H., 'Pollution Property, and Prices', University of Toronto Press, Toronto Ontario, 1968.
- [2] Johnston, R.A. and Madison, M.E., 'From Landmarks to Landscapes, A Review of Current Practices in the Transfer of Development Rights', *Journal of the American Planning Association*, 63, 3, 1997, pp. 365-378.
- [3] Pennington, M., '*Planning and the Political Market Public Choice and the Politics of Government Failure*', The Athlone Press, London, 2000.
- [4] Zollinger, F., 'Handelbare Flächenzertifikate und die Schweizer Raumplanung' (Tradable Development Rights and the Swiss Urban Planning), *Urban Sprawl*, 1, 2005, pp. 66-74.

## CONSERVATION OF GARDEN MONUMENTS IN AUSTRIA RECENT DEVELOPMENTS

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Due to an amendment to the *Historical Monument Conservation Act* in 1999 56 historic gardens and parks can be conserved as garden art per se. So far 15 of these sites have been listed and the owners of 12 more have already agreed to listing. This is a great achievement, although it covers only a small part of about 1,800 garden art sites in Austria, which are worth being conserved. Money for park management programs as well as for maintenance, conservation, and restoration is scarce in Austria. This means a new challenge to researchers, restorers, owners, and authorities gaining funds to explore and conserve Austrian garden art heritage.

#### BREGENZ, PALAIS THURN UND TAXIS, VORARLBERG

The villa garden was laid out between 1848 and 1887 in a scenic style with a notable arboretum. In 1924 the city council of Bregenz, as owner, wanted to use part of the site as cemetery. At the same time the Federal Heritage Department listed the park as cultural monument and forbade burials. The monumental status was approved in 2000 under the new law. The city council started the restoration in 2004/05 on the basis of a park management program. The program recommended cautious steps to reconcile the historical intentions of a villa garden and the contemporary use of a public park. The Federal Heritage Department and the State Vorarlberg funded part of the previous costs of about 84,000 €.



Figure 1: The ellipse renews the interrelation between villa and garden. Nov. 2004  $\circledcirc$  KoseLicka



Figure 2: According to the historical documents of 1899 and 1910 a lawn ellipse was restored in the centreline of the villa. Nov. 2004. © KoseLicka

#### BRUCK/LEITHA, SCHLOSS PRUGG, LOWER AUSTRIA

In 1789 Christoph Lübeck redesigned the former baroque garden of the Harrach palais in a landscape garden. Restoration started in the 1980s. Contrary to a park management program part of the site was allotted for a golf court in 1993, which has not been realised so far, but would destroy the park. The park is not listed as monument yet. The city council of Bruck, as leaseholder of the park, restarted restoration in 1999. The activities so far cost about 250,000 €. The state Lower Austria and ECO plus as well as numerous volunteers supported the project. The European Regional Development Fund EFRE funded half of the costs. Partner of the INTERREG project were two historic parks in Austria and the park Rusovce in Slovakia.



Figure 3: Volunteers cut down numerous trees marked by the city council of Bruck and the landscape architect. They cleared significant solitaire trees and important vistas. © Knoll Planning & Consulting



Figure 4: Professional arborists tended trees alongside the paths in order to guarantee safety for visitors. © Knoll Planning & Consulting

## **Conservation of garden monuments in Austria recent developments**

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Key words: garden, park, conservation, Austria

#### Introduction and content

Conserving historic gardens and parks in Austria is a question of classification and legislative competence. In 1964 the *Constitutional Court* declared gardens and parks as "designed nature" whereby the topic was removed from the responsibility of the *Federal Heritage Department* (*Bundesdenkmalamt*) [1]. Gardens and parks came under the *Nature Conservation Law* and with it on a state level. When the term "ensemble" was introduced into the *Historical Monument Conservation Act (Denkmalschutzgesetz)* in 1978, gardens or parks belonging to a building, castle, monastery, or private house, could be declared as historic ensembles [2]. In 1986 the *Center of Garden Art (Abteilung für historische Gartenanlagen)* at the *Federal Heritage Department* was founded, responsible for the conservation of garden art heritage and funding research projects on the topic [3]. In the following 20 years the importance and esteem of historic gardens and parks as cultural sites increased, a development which entered law restrictedly. Due to an amendment to the *Historical Monument Conservation Act* in 1999 56 historic gardens and parks can be conserved as garden art per se on the basis of a scientific survey [4]. This study discusses the effects on exploring and conserving garden art heritage in Austria due to the changes in the conservation regulations.

#### **European dimension**

Historical gardens and parks in Austria are important examples of historic eras and cultural developments, which have formed Europe. They are cultural monuments of the Austrian-Hungarian-Monarchy. These challenges require the international cooperation of conservators, historians, landscape architects, and owners of those sites. Cross border networking is valuable for historical research, exchange of experience in maintenance, conservation, and restoration, and it is often necessary for gaining funds and for implementing marketing activities.

#### **Innovation and originality**

20 years after the foundation of the *Center of Garden Art* and six years after the latest amendment major steps have been achieved in conserving garden art heritage in Austria. The list of the 56 potential heritage sites, dating from the 18<sup>th</sup> to the 20<sup>th</sup> century, has furthermore broadened the research spectrum. Whereas research about garden history in Austria was concentrated on feudal gardens of the 18<sup>th</sup> and 19<sup>th</sup> century before, the focus has now shifted to late 19<sup>th</sup> and 20<sup>th</sup> century projects as well. But the study showed that the upgrading of historic gardens and parks was accompanied by a serious restriction in research and conservation. During the last 20 years the *Centre of Garden Art* commissioned 150 park management programs. Only about a third of them dealt with one of the sites specified in the 1999 amendment's appendix [5]. But since the amendment *the Centre of Garden Art* has been restricted in commissioning park management programs, it can order comprehensive studies exclusively on one of the 56 objects specified. 15 out of the 56 specified gardens and parks have been listed since 2000 (see Table 1). And the owners of 12 more sites have already agreed to list their site, a step necessary for conservation. But so far nearly all sites which are listed or close to belong to public corporations or the church. As the owner's agreement is necessary it is almost impossible to conserve private sites. The results will be the basis for further research studies and programs on how to improve conditions for conserving garden art heritage in Austria.

Table 1: Historic Gardens and Parks specified in the Historical Monument Conservation Act, which are so far listed or close to (Feb.  $22^{nd}$ , 2006)

Historical Site	Location	Owner	Monumental Status
Kittsee	Burgenland	Public corporation	Listed
Damtschach	Carinthia	Private	Listed
Zwischenwässern	Carinthia	Church	Agreed
Laxenburg	Lower Austria	Public corporation	Listed
Obersiebenbrunn	Lower Austria	Public corporation	Listed
Schlosshof	Lower Austria	Public corporation	Listed
Seitenstetten	Lower Austria	Church	Agreed
Gmunden, Villa Toskana	Upper Austria	Public corporation	Listed
Linz Bauernberganlagen	Upper Austria	Public corporation	Listed
Salzburg, Mirabell	Salzburg	Public corporation	Close to listing
Graz, Eggenberg	Styria	Public corporation	Close to listing
Graz, Schlossberg and Stadtpark	Styria	Public corporation	Listed
Flaurling	Tyrol	Public corporation	Close to listing
Innsbruck, Schloss Ambras	Tyrol	Public corporation	Close to listing
Innsbruck, Hofgarten	Tyrol	Public corporation	Listed
Bregenz, Palais Thurn und Taxis	Vorarlberg	Public corporation	Listed
Bregenz, Kloster Marienberg	Vorarlberg	Church	Close to listing
Palais Augarten	Vienna	Public corporation	Listed
Schloss Belvedere	Vienna	Public corporation	Close to listing
Hofberg complex	Vienna	Public corporation	Listed
Neuwaldegg avenue	Vienna	Public corporation	Listed
Pötzleinsdorf Schlosspark	Vienna	Public corporation	Agreed
Rathauspark	Vienna	Public corporation	Agreed
Schloss Schönbrunn	Vienna	Public corporation	Agreed
Stadtpark	Vienna	Public corporation	Listed
Türkenschanzpark	Vienna	Public corporation	Close to listing

#### Impacts

The *Historical Monument Conservation Act* in its actual version covers only a small part of about 1,800 garden art sites in Austria, which are worth being conserved [6]. Therefore the restriction on 56 specified sites must be eliminated in order to guarantee an ample conservation. This affords a constitutional amendment by a majority of two thirds, in order to transfer the responsibility for gardens and parks from a state to a federal level. A political decision, which demands a lot more, affords to shape the public and political opinions. Following the Florence Charter adopted by ICOMOS in 1982 historic gardens and parks must be considered as "(...) an architectural and horticultural composition of interest to the public from the historical or artistic point of view. [And] as such (...) as a monument" [7].

Money for research in garden history in general and for park management programs in particular is scarce in Austria. This means a new challenge to researchers, restorers, owners, and authorities gaining funds to explore and conserve Austrian garden art heritage. The recent restoration of the Schlosspark Bruck / Leitha, Lower Austria, was partly funded by an INTERREG program [8]. The EC supported program *European Territorial Cooperation* offers new possibilities for networking, cooperation, and financial support. 17 castles in Austria,

Hungary, Slovakia, and in the Czech Republic are actually discussing a cross border project in order to promote a Castle-Route [9]. They should not forget the castles' gardens and parks, the essential and inseparable components of the cultural monuments.

#### Acknowledgement

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#### References

- [1] Hajós, G., "Der Stand der Dinge", Österreichische Gesellschaft für historische Gärten, (ed.), *Historische Gärten*, 12. Jg. Heft 1/2006, p. 3.
- [2] Verband österreichischer Kunsthistorikerinnen und Kunsthistoriker, "Quo Vadis Denkmalpflege?", Kunstgeschichte aktuell Jg. XXI, 2/04, Nov. 9<sup>th</sup>, 2005.

<a href="http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=235&menuid=5&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=2&rubrikid=1&pubid=29>">http://kunsthistoriker.at/artikel.php?itemid=2&rubrikid=2&rub

- [3] Hajós, G., "Kleiner Katechismus der Österreichischen Denkmalpflege", Reichelt, G., (ed.), *Historische Gärten: Schutz und Pflege als Rechtsfrage*, Wien, Manz, 2000, pp. 87-104, 99.
- [4] see Helfert, N., "Historische Gärten im Rahmen des novellierten österreichischen Denkmalschutzgesetzes", Reichelt, G., (ed.), *Historische Gärten: Schutz und Pflege als Rechtsfrage*, Wien, Manz, 2000, pp. 119-137.
- [5] Krippner, U., Interview with Géza Hajós, Head of the Centre of Garden Art, unpublished manuscript, 2006.
- [6] see Berger, E., *Historische Gärten Österreichs, vol. 1 Niederösterreich, Burgenland,* Wien, Böhlau, 2002, *vol. 2, Oberösterreich, Salzburg, Vorarlberg, Kärnten, Steiermark, Tirol,* Wien, Böhlau, 2003, *vol. 3 Wien,* Wien, Böhlau, 2004.
- [7] Historic Gardens (The Florence Charter 1982) Adopted by ICOMOS in December 1982 <a href="http://www.international.icomos.org/charters/gardens\_e.htm">http://www.international.icomos.org/charters/gardens\_e.htm</a>> Feb. 16<sup>th</sup>, 2006.
- [8] see poster "Conservation of Garden Art Monuments in Austria Recent Developments" by the same authors and Bódi, E. and Lehner, H., "Bruck a. d. Leitha", Österreichische Gesellschaft für historische Gärten, (ed.), Historische Gärten, 12. Jg. Heft 1/2006, p. 14-16.
- [9] Brickner, I., "Siebzehn Schlösser suchen eine Marke", Der Standard, 28./29. Jänner 2006, 23.

### FOGGARA **INVENTORY, ANALYSIS AND ENHANCEMENT ON TRADITIONAL WATER TECHNIQUES**

Author: IPOGEA

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Foggaras are traditional systems of water catchment and distribution typical of arid and semiarid areas. The general aim of the project is the better understanding of the characteristics and the functioning of foggaras within European and Maghrebian countries in order to enhance them both as World Heritage and as an efficient way of water production guaranteeing the proper management of water resources and the ecosystem preservation. In particular in Italy, Spain, Morocco, Algeria and Tunisia research relies on theoretical basis and on experimental surveys on field:



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Société Sud Timmi - Adrar

Morocco University Moulay Ismaïl - Meknes



**European Project Details** Foggara ICA3-CT2002-10029 Inventory, analysis and enhancement of traditional water techniques of European and Saharan drainage tunnels

Co-ordinator: Pietro Laureano Co-ordinator's affiliation:

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**EUROPEAN COMMISSION** 

5<sup>th</sup> FRAMEWORK PROGRAMME

inventory of existing drainage tunnels; analysis of their functioning and methods of realization; causes of persistence or abandonment; study on restoration and maintenance methods; potentialities for re-using and reintroducing foggaras.

The project provides an understanding of the link between traditional water management techniques and environmental/social issues: water is not a mere commodity. but a socially constructed concept of cultural significance. The local knowledge offer a wide range of solutions to be safeguarded and that can be reused, adjusted and renewed thanks to modern technology.

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### FOGGARA inventory, analysis and enhancement of traditional water techniques of European and Saharan

#### P. Laureano

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Key words: traditional water technology, best practices, sustainability, cultural heritage

## Introduction and content: cultural heritage, climatic changes and landscape safeguard

Peculiar characteristic of the Euro-Mediterranean cultural heritage is the extreme interaction between unique property and the territorial context, architecture and environment, art and society. Each unique property has its origin in this over long time choral work where monuments are emerging factors and part of a largest melody. Monuments have not only aesthetic values but they combine concrete practical utility and symbolic aspects. This relies on their capacity of not only determining imagine, economic attraction, social representation and cohesion but more precisely of contributing to set technical problems linked to urban life, agricultural production organization and environmental management. To cope with seasonal changes, climatic or catastrophic, humankind made works with monumental value and strong practical value. They were constructions related to water catchment and management, soil management and natural areas preservation. In the past, water shortage and environmental rudeness conditions imposed a not expensive and not damaging way of managing resources and the realization of adequate technologies and processes. Thus, in different climatic conditions and environments, cultures with an extraordinary tenacity could employ materials locally available and renewable resources. They exploit energy of the sun and the power of nature: the principles of thermal insulation to prevent from warm and cold; the dynamic of fluids to catch and share water; the laws of biology for combining and reusing elements necessary for producing humus and tillable lands. They were able to control the weak power of wind, shade and moisture for triggering interactive developing phenomena and amplifying positive dynamics. These rules are at the basis of the realization of ancient civilizations but, once lost human engagement, environment degradation started up and extraordinary techniques of subsistence were forgotten and lost. In particular, the drainage tunnels technique called foggara in Algeria allowed oasis settlements to be created and the old Sahara civilizations to develop. The foggaras are underground tunnels producing water for cultivation. The tunnel, which is dug parallel to the ground, does not go down as far as the water table, but it drains off the upper soils without causing the lowering of the aquifer. The foggaras catch the microflows seeping through the rocks and create surface water by tapping moisture from the soil, thus they act as production systems or water mines.

The technique which allows in the Sahara desert some hundreds of oases to live, is still used in European countries such as Spain, France and Italy. The general aim of the project is the better understanding of the characteristics and the functioning of foggaras within European and Maghrebian countries in order to enhance them both as World Heritage and as an efficient way of water production guaranteeing the proper management of water resources and the ecosystem upkeep. In particular, in Italy, Spain Morocco, Algeria and Tunisia research relies on theoretical basis and on on-site experimental surveys: inventory of existing drainage tunnels; analysis of their functioning and methods of realization; causes of persistence or abandonment; study on restoration and maintenance methods; potentialities for re-using and reintroducing foggaras.

#### European dimension: cultural heritage for protecting ecosystems

In European countries the drainage tunnels are regarded as amazing historical / cultural phenomena, to be safeguarded for their monumental value at the most. But this kind of approach neglects their importance as sustainable technique for supplying water. In southern Mediterranean countries it is the monumental aspect of drainage tunnels to be disregarded in comparison with their utility in catching and supplying water. This leads to works of maintenance that do not pay sufficient attention to the materials characteristics and aesthetical qualities, invalidating their primary function of supplying water too. The exchange of experience which is largely promoted by the project through the comparison of the realities has enable to make progress in definition of the most appropriate restoration practices of drainage tunnels. In the European countries the project has aroused a lively interest for the very possibility of re-proposing this techniques to solve problems of water supply. In some localities the experimental use of drainage tunnels have been proposed as a valid alternative for the practice of very deep wells that absorb not renewable water resources and exhaust water tables.

The great deal of articles on the European press due to the Foggara project has arisen such a great interest about drainage tunnels that information are currently requested from everywhere to replace the wells excavation that tap water from the deep aquifers, destroy resources, causes salinization and pollute the lower levels, with this traditional technique exploiting renewable resources. In the Saharan countries the project has allowed the setting up and experimentation of technologies for excavation, maintenance and restoration of Foggara, adapted and manageable locally. The procedures can be extended to other countries and have been presented in numerous international conferences and meeting.

#### Innovation and originality: an holistic approach

The project is an innovative integrated approach to the water resources issue over a selected area. Its taking into account archaic techniques both for their practical use as water supply and their aesthetic value denotes an holistic vision of the issues. As a matter of fact, every single technique is always studied in its relationship with the ecosystem, the possibility of extracting resources which can be locally produced and renewed in the environment and the socioeconomic situation. Thus, the resources shortage becomes not a natural problem but rather a cultural problem due to their inappropriate use. This holistic vision of the project has been passed on to experts, administrative officers and local stakeholders through the project meetings carried out in every country involved and during the field visits to the drainage tunnels. The study seminars realized and the visit of outstanding world experts to those water systems considered as scarcely important have signified in every occasion a cultural shock which has attracted both the press and the political and cultural world. Using and restoring foggara today means to re-interpret traditional knowledge as innovative advanced knowledge and to elaborate models of technological development based on the added values of tradition: the versatility and the interpenetration of technical, ethical and aesthetic values; the production not per se but for the good of the community and based on the principle according to which each activity has to start up another one without waste; energy use based on cycles in constant renewal; the protection of ecosystems and of cultural and biological diversity as the fundamental principle of the economic and productive processes. These values allowed societies, in the past, to manage ecosystems in balance, to carry out technical, artistic and architectonic works universally accepted.

#### Impacts: reuse against water emergency

The strongest impact of the project is its relationship with traditional knowledge and their integrated approach to the problems solution. The project take into account the whole aspects of technical use, ecosystem management, social organisation and economic development and of safeguard of the aesthetic and cultural values. The project develops new creative solutions to

problems of managing water resources and fighting against desertification and it helps to enhance world heritage and cultural identity with positive effects on local communities. The proposals have positively been accepted in every country involved. In each country, new skills about the study and the management of these water techniques are been experimented. In Spain, the drainage tunnels technique will be shown in Saragoza at the Universal Exhibition in 2008. In Italy, the region of Basilicata means to experiment with the excavation of drainage tunnels as an alternative to the wells. Diverse municipalities are referring to the project to notify the drainage tunnels existing over their area. In the Saharan countries (Morocco, Algeria and Tunisia), the attention to the appropriate management technologies is very high. In particular in Algeria the Sud Timmi Society, one of the partners of the project has elaborated appropriate techniques of work and is today invited in the Asiatic countries (Oman, Iran, etc.) to re-propose this experience. Starting from the project, a steady partnership of cooperation between European and Mediterranean countries has been created and new projects and cooperation experiences have been started up. In particular, the Shaduf project's partners have joined with the Foggara project's partners and the consortium is drawing the attention of the Asiatic countries and of the Latin America which are asking for participating to the activities. For this reason, UNESCO has promoted a more extensive activity on traditional knowledge which will lead to a Traditional Knowledge World Bank. The Italian Government will illustrate the proposal at the Nairobi 7<sup>th</sup> Session Conference of the Parties of the United Nations Convention to Combat Desertification (UNCCD). The Province and the Municipality of Florence have decided to support the initiative. The Legambiente Italian association will promote the proposal through its 150 national offices in Italy as well as the Federparchi association will introduce it in the 750 Italian protected areas.

#### References

- Beaumont, P., Bonine, M. and Mclachan, K. Qanat, Karez & Khattara: Middle East and North African Studies Press, UK (1989).
- Drusiani, R.: Evolution of pre-Roman and Roman aqueducts in Italy, an example in proceedings of the first Iranian-Italian conference on water and wastewater, Tehran, Iran (1999).
- English, P.W.: "The origin and spread of qanats in the Old World", Proceedings of the American Philosophical Society, .(1968) pp. 112, 170-181.
- Goblot, H.: Les Qanats, une technique d'acquisition de L'Eau, ecole des hautes etudes en sciences sociales centre de recherches historiques, ISBN 2-7132-0689-8, France (1979).
- Kobori, I.: Le Systeme d'irrigation dans le sahara Central-Tidikelt, Bulletin of the Department of Geography, University of Tokyo, no. 1, 1-32, Tokyo, Japan (1969).
- Kobori, I. et al.: Case studies of foggara oases in the Algerian Sahara and Syria, Tokyo University Scientific Mission for the Comparative Study of the Foggara Oasis in the Arid Zone of the Old Continent, Report no. 2, Japan (1982).
- Laureano P.: The Water Atlas. Traditional knowledge to combat desertification, Laia Libros, Barcellona (2005).
- Wessels, J.: Qanats in Syria, ease the water shortage, Waterlines 22(2):8-10, ITDG Publish., UK (2003).

#### **European project details**

Acronym: Foggara Contract number: ICA3-CT2002-10029 Title of the Project: Inventory, analysis and enhancement of traditional water techniques of European and Saharan drainage tunnels Co-ordinator: Pietro Laureano Co-ordinator's affiliation: IPOGEA Research Centre on Traditional and Local Knowledge – Vico Conservatorio s.n., Matera (ITALY) ipogea@ipogea.org.

#### Partnership

*Italy* IPOGEA – Matera; *Algeria* Société Sud Timmi –Adrar; *Morocco* University Moulay Ismaïl – Meknes; *Tunisia* Institut des Régions Arides – Medenine; *Spain* University of Valencia, Department of Geography – Valencia; Algeria Ecole Polytechnique d'Architecture et d'Urbanisme d'Alger – Algiers.

## Rescue of Russian estates of Kazan city region: problem and perspectives

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## **Rescue of Russian estates of Kazan city region: problem and perspectives**

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Key words: Russian estate, Kazan, rehabilitation, re-use

#### **Introduction and content**

Russian estates – country residences of Nobles played the leading role in Russian culture of 18<sup>th</sup>-19<sup>th</sup> centuries. In soviet times with a change of political regime Russian estates have lost their initial functions and till nowadays are not being used appropriately to their potential. By this cause they day by day lose consistency and are needed to be urgently saved.

Our investigation pursues the aim to reveal guidelines for rehabilitation of Russian estate and on this way have a scientific novelty. The following objectives were posed:

- to investigate the existing knowledge in history and modernity of Russian estates and to reveal potentials of their rehabilitation
- to characterize the situation with Russian estates of Kazan city region
- to develop the strategy of rehabilitation of the specific manor.

Investigation results succeeded all the posed objectives. The existing historical knowledge about Russian estates was investigated supplemented with the four main directions for further research. The modernity of Russian estate was seen in five potential ways. Seven manors of Kazan city region were surveyed personally by the author. Else thirteen manors were studied with a help of literary and archival documents.

The profound historical studies as well as socioeconomic overview were performed for the manor Khotnya. Results of these studies were used for the suggestions for rehabilitation and contemporary use of the manor.

Another merit of the research consists in a big amount of author's on-site and archival studies, accompanied with a number of author's sketches, water-colors and photos.

#### **European dimension**

Russian estates belong to unique cultural phenomenon. They are themselves a product of elaborate adaptation of European culture to Russian mentality and traditions. Our investigation concerns these questions partly and thus contributes to the promotion of Russian culture in Europe.

Another contribution to the European Research Area is done by the dissemination of new knowledge about the heritage of Kazan city region that belongs to remote East Europe. The unique architectural culture of our region is already known – several objects of Kazan city and of its region are included into the World Heritage List. Regarding this, our investigation contributes to the architectural portrait of Kazan city region.

On the hand our region possesses a unique experience of tolerant multicultural coexistence through the centuries. That was also reflected on the architecture of local Russian estates. That is why our research makes a certain contribution to the process of peaceful settlement of global misunderstanding between Christian and Islamic civilizations.

#### **Innovation and originality**

The main innovative treat of our research consists in the socioeconomic approach to the problem of architectural preservation. This approach is breakthrough to rigorous Russian heritage science.

On the other hand the profound layer of our research concerns the philosophical problem of Russian cultural route. The most original conclusion of the research reads that the future of Russia should be related with the more extensive attachment to land. For this purpose rehabilitated Russian estates can play the role of multifunctional cultural knots of innovative deurbanized system of settling. This system distinguishes from the cities network towards bigger relationship with nature and ecology. It also differs from farms towards greater cultural constituent.

#### Impacts

Our research poses the problem of rescue of Russian estates of Kazan city region, suggests and observes a certain number of principles of the problem solution. The novelty of the problem makes impossible any practical applications of the results but supposes a great amount of theoretical work.

First of all the overview of the theory and history of the whole phenomenon of Russian estates was carried out. It showed the state in science and indicated areas for further profound research. It was concluded that existing knowledge of the history of Russian estate is inapplicable and doesn't give guidelines for their rehabilitation. The solution was found in so called "permanent features" of Russian estates. Five such features we have already revealed in our research.

Another result was the illustration of the contemporary state and potential for rehabilitation of Russian estates. Five promising ways for their development highlighted by the present research draw the prospects for further research.

A basis for the strategy of rehabilitation of Russian estates was laid. It was also concluded that the strategy is individual to each specific manor and the main content of the strategy should consist of the detailed analysis of the manor. Its results should give usable data about the manor, its local and global context, including sociocultural potential and economical situation. With a view to improve the efficiency of rehabilitation the results of such work should be performed as recommendation and the decisive role in the rehabilitation process belongs to the design seminars with the participation of local community. Thus we conclude that the problem of the rehabilitation of Russian estates is equivalent to the problem of sociocultural and economic development of Russian countryside and should be regarded as such.

Rehabilitation of Russian estates by our opinion will have positive long-term and All-Russian consequences. By the help of Russian estates we have a chance to return to the efficient agricultural economics, reconstruct lost traditions in culture and find its right way to future.

## CONSERVATION OF BUILDINGS IN FINLAND. WITH OULU AS AN EXAMPLE

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> The Reinilä house was privately owned and civil servants' families inhabited it. The building was the

> residence of two governors, Alexander von Lavonius and Georg Alfthan, from 1850 to 1862. Social parties were held in the building, and one of its residents was singer Ida Basilier-Magelsen, who later became

> During the second world war, in February 1944, Oulu

was hit by several air raids. Several blocks were

demolished in the town centre. The storehouse of the Reinilä house also burned down. The town centre was rezoned, and multi-story apartment buildings were constructed in place of the wooden houses. According to the town plan of 1960, the Reinilä house could have been demolished and replaced by a three-story residential and commercial building.

The property was put up for sale in the beginning of the 2000s. Its fate was definitely on the balance, despite the fact that the rare wooden house with its

authentic courtyard in the centre of Oulu was unique. Petitions were signed in behalf of the building, appeals were sent to the town's decision-makers and dozens of newspaper articles were written. Finally, Svenska Kulturens Vänner r.f. bought the property for

An account of the building history of the Reinilä house was compiled and the building was protected with the town plan. The SR-2 marking prevents the demolition of old buildings and ensures the

preservation of cultural and historical values. The town plan also has two new markings, sr-10 and rei,

which specify building use and renovation in detail. It is possible to construct a new wooden building the same size as the original one on the site of the storehouse that was demolished in the war.

The log town house had suffered damage from moisture, which was repaired. The buildings were renovated with consideration given to their historical values. The kitchen and sanitary facilities of the main building were renewed for new use. The renovation was done carefully, preserving the old structures and

Traditionally, towns constructed in Finland have been wooden towns. The Empire style towns of the early 1800s were characterised by enclosed blocks and wide streets bordered by one-story wooden houses. High board fences separated the streets from the courtyards. The courtyards contained residential buildings as well as storehouses, barns, stables, brewery kitchens, saunas, woodsheds and outhouses.

The Reinilä house, constructed in the 1820s after Oulu's great fire, is a typical wealthy town house. The oldest parts of the courtyard consist of a residential building, comprising a vaulted cellar, servants' quarters, a drawing room and two bedrooms, and a long log outbuilding. The main building has been expanded several times. A fashionable glass veranda was constructed in the second half of the 1800s. A telephone, water and sewer lines and electricity were installed in the building before the second world war. The wood heating system was converted to central heating at the end of the 1930s.

internationally famous.

use as a day care centre.











FACADES OF THE COURTYARD BUILDING



AY CARE CENTRE PLAN, FLOOR PLAN, 1st FLO





















PHARES INC.









open attic.

### Conservation of buildings, with Oulu as an example

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Key words: building conservation, local knowledge, Oulu, town planning, wooden towns

#### Introduction and content

Finnish town houses have traditionally been constructed out of wood. Fires have repeatedly destroyed the wooden towns, which were always rebuilt according to the town ideals of the time. Wooden towns experienced a final turning point after the second world war, when town centres evolved into stone towns. Finland did not awaken to the need for building conservation until the 1960's, when a significant portion of the traditional wooden town structure was already destroyed. Oulu, established in 1605, was destroyed almost completely in a widespread town fire in 1822. The Empire style town constructed after the fire was characterised by enclosed blocks and wide streets bordered by one-story wooden houses. The 1882 fire and the bombings of the second world war destroyed several blocks in the centre of Oulu and disrupted the harmony characteristic of an Empire style town [1]. Oulu, with a population of 130,000, is the centre of northern Finland, a growing commercial, educational and administrative town currently known for its high technology. Preservation of its early building stock has continuously been at stake in the growth centre, and entire sections of the town have been rebuilt. Only a little over ten town houses typical of the early 19<sup>th</sup> century have remained in the centre of Oulu. Preservation of these buildings has required systematic civic activity: collecting names for petitions and voicing opinions in the media.

#### **European dimension**

The Reinilä house is an example of the preservation of a privately owned building in Oulu. Also other European growth centres have culturally and historically valuable sites that are taking second place to new construction. They represent the rich cultural heritage of their own area, which is important to preserve. The Reinilä house, constructed in the 1820's after Oulu's great fire, is a typical Finnish wealthy town house. The oldest parts of the courtyard consist of a residential building, comprising a vaulted cellar, servants' quarters, a drawing room and two bedrooms, and a long log outbuilding. The main building has been expanded several times: in 1842, 1847 and 1912. A fashionable glass veranda was constructed in the second half of the 1800s. A telephone, water and sewer lines and electricity were installed in the building before the second world war. The wood heating system was converted to central heating at the end of the 1930's [2]. The Reinilä house was privately owned and civil servants' families lived in it. The building was the residence of two governors, Alexander von Lavonius and Georg Alfthan, from 1850 to 1862. Social events were held in the building, and one of its residents was singer Ida Basilier-Magelsen, who later became internationally famous. In 1883 the property was acquired by bank cashier Edvard Rehnbäck. At that time the building was remodelled: the log building's plastered facades facing the street were given a board facing. The large drawing room was divided into two and the windows of the facade were changed. Later the building was extended, and a balcony was added to the roof of the extension [3]. The long log outbuilding consisted of two separate buildings in tandem. One of them included a residential room, a carriagehouse, a sauna and a brewery kitchen in the mid-1800's. The other building, which contained a woodshed, also had a granary and a barn added to it in 1877 [2]. In the 1800's Oulu

was a trading town where residents also engaged in farming. The town houses also had livestock. It was common to have 1-5 cows, sheep, chickens and a pig. The more wealthy town houses had 1-2 horses. Fields and pastures to which the livestock could be driven daily in the summertime were located outside the built-up town centre. The Reinilä house survived the bombings of the second world war. Only the storehouse, which comprised a stable and storerooms, and the outbuilding burned down. The air raids in February 1844 destroyed several blocks of buildings surrounding the Reinilä house. The area looked like a ghost town, where only the chimneys remained standing. The centre of Oulu was rezoned after the wars. Architects Otto-Iivari Meurman and Arne Ervi compiled "a revision of the town plan of the central sections" in 1947 [1]. The town plan made it possible to convert the centre of Oulu into a multistory apartment building area. This has also happened in many other European countries. After the wars, zoning, reconstruction, urban growth and rising plot prices caused an extreme change in the town structure. Large multi-story stone apartment buildings were erected in Oulu, and wooden houses that survived the fires and air raids were torn down to make room for new construction. Finland did not awaken to the need for building conservation until it was noticed that the old, valuable building stock was being destroyed in the fervour of reconstruction. The law protecting culturally and historically valuable buildings became effective in 1964. In Oulu an inventory committee began listing culturally and historically valuable buildings that were under the threat of demolition. It recommended "preserving them for the sake of the future". The committee completed its survey in 1966 [4]. The Reinilä house was not among the buildings marked for conservation. The town plan ratified in 1966 made it possible to demolish the Reinilä house and construct a three-story stone residential and commercial building on the plot. The prominent town house owned by Edvard Rehnbäck's son, legal mayor K. T. Reinilä and his heirs, remained unchanged for decades. The open attic and vaulted cellar retained their 1800's guise. It was rare that a 1280 m<sup>2</sup> plot with its town house and courtyard, typical of Oulu in the 1800's, was preserved in the centre of town. The elderly owner of the Reinilä house was no longer able to take care of the town property. The house was offered to the City of Oulu, which had alternative plans drawn up. Although the buildings were assessed as significant at the provincial level, one alternative was to demolish the outbuildings and replace them with a residential building [5]. When the City of Oulu decided not to purchase the Reinilä house, the fate of the house again hung in the balance. Uncertainty about the future of the Reinilä house sparked a civic movement, and a proposal to place the house under the protection of a building conservation law was made in November 2002.

#### **Innovation and originality**

An association in Oulu, Svenska Kulturens Vänner i Uleåborg r.f., which maintains a Swedish day care centre, purchased the property for the day care centre in January 2003. An account of the history of the Reinilä house was compiled and the building was renovated with consideration given to its cultural and historic values. The Reinilä house was not placed under the protection of the proposed building conservation law. Instead, contrary to prior practice, a conservation plan was compiled for the plot. The revision of the town plan includes a conservation marking, SR-2, according to which the buildings, fences and other structures in the area cannot be demolished or changed in a way that weakens their historic, cultural or architectural value. The use of the site must also be in line with its cultural and historic values. The town plan contains new types of markings that specify building use and renovation in detail. The protected building is marked "sr-10", which means the building must be renovated in a way that preserves its cultural, historic and architectural values. According to the "Rei" marking, the main building may contain a day care centre, apartments, workrooms or meeting rooms. The building must preserve the distinctive features of its main entrance and drawing rooms as well as its open attic and vaulted cellar. The outbuilding may contain residential, work, storage or meeting rooms. The cultural, historic and architectural values of the building must be conserved by preserving its significant authentic structures and components. It is also possible to construct an additional new wooden building on the plot the same size as the

storehouse that was destroyed in the bombing of the second world war. It may contain work, storage or meeting rooms. Renovation of the courtyard must preserve its distinctive features. It is also stated that the courtyard has significant archeological value [6].

#### Impacts

The use of the Reinilä house as a day care centre has proved to be a successful solution. The buildings have also been in active use in the evenings and on weekends. The main building with its drawing rooms has functioned as meeting and festive facilities. In the summer the open attic is used as an exhibition room and theatre presentations have been held in the courtyard. It is often difficult to find new use for an old building. The demands placed on a new building do not fit in with a culturally and historically valuable building. Nevertheless, the conversion of the Reinilä house into a functional day care centre indicates that difficulties can be overcome. The good end result was affected by the account of the building's history, compilation of a unique protective plan and compromising the technical demands placed on the building, such as making do with natural ventilation.

#### Acknowledgements

Co-operation with Architect office Karhula Ldt., which compiled the plans for the day care centre, has gone well. Svenska Kulturens Vänner i Uleåborg r. f. has understood the cultural and historic value of the Reinilä house and has wished to preserve them.

#### References

- [1] Niskala, K. and Okkonen. I., *Oulun graadi, 350 vuotta asemakaavoitusta*. Studio Ilpo Okkonen Oy, Oulu 2002.
- [2] Niskala, K. and Architect office Karhula Ltd, An account of the building history of the Reinilä house 17.11.2003.
- [3] Niskala, K., *Pitsiverhojen takaa, Rehnbäck-Reinilän talon vaiheita*, Svenska Kulturens Vänner i Uleåborg, Oulu 2004.
- [4] Manninen, T., Oulun kaupungin historia VI, 1945-1990, Oulun kaupunki, Jyväskylä 1995.
- [5] Deveplan Ky, Rakennusinsinööritoimisto Rimako Oy, Arkkitehtitoimisto J. Teppo, Toiminnallistaloudellinen selvitys, tiivistelmä 22.10.2001.
- [6] II / 3 / 20, Town plan revision 23.8.2004.

## **COORDINATING DIVERSITY:** LANDSCAPE AS COMMON AND MULTIFACETED CULTURAL HERITAGE (ACTION COST A27, LANDMARKS)

Almudena Orejas, María Ruiz del Árbol & F. Javier Sánchez-Palencia Institute of History of the Spanish National Council for the Scientific Research (CSIC), Spain Las Médulas Foundation, Spain

Pre-industrial structures mark many rural and mining European landscapes. The abandonment of traditional practices threatens these landscapes, in particular in depressed regions.

This process implies the quick destruction of landscape differences resulting from traditional activities and ways of life.



#### LANDMARKS



LANDMARKS aims to stimulate the European research on this topic, the production of high-level scientific results and of a consistent dissemination plan by: -The morphological analysis of relevant elements and models

-The research on historical techniques and technologies -The study of legal and

- administrative practices -The analysis of historical
- landscape perception



Identification and scientific evaluation are the common basis for the protection, the cultural valorisation and the social and economic vindication of these sensitive landscapes.

Diversification of cultural resources and enlargement of the protected Cultural Heritage are keys for the improvement of internal balance in many European regions.

LANDMARKS aims to built coherent bases for the valorisation of the results of research on landscapes for the setting of their Heritage value.





#### The dissemination plan envisages:

- Implication in sustainable tourism. Creation of a network of European landscapes
- Diffusion of scientific results: website, publications, multimedia, conferences, workshops
- Production and transfer of flexible tools for research, management and valorisation
- Training and formation programmes applicable locally as well as on an international scale

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LANDMARKS. COST Action A27. Understanding pre-industrial structures in rural and mining landscapes. Chair: Dr. Almudena Orejas, Institute of History, CSIC (Madrid, Spain), aorejas@ih.csic.es. Project's website: http://www.soc.staffs.ac.uk/jdw1/costa27home.html EST-AP. Instituto de Historia. CSIC. Madrid ISTA. Université du France

## **Coordinating diversity: landscape as common and multi-faced cultural heritage**

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Key words: cultural landscapes, cultural heritage management, European co-operation, COST

#### Introduction and content

During the last decades several factors, sometimes contradictory, have contributed to the qualitative changes of certain landscapes characterised by the development of traditional activities and rural occupation. The elements attached to pre-industrial activities are particularly sensitive. The Action COST A27 *Understanding pre-industrial structures in rural and mining landscapes* (LANDMARKS) [1], that we are presenting here, intends to approach the processes of change that these landscapes underwent – or that they are to undergo – and to evaluate the risks of loss in terms of social identity of the territories and of non-renewable Heritage resources. It also aims to envisage the possibilities of incorporation and improvement of the quality of life in these spaces, in the frame of the challenges that the European society of the 21<sup>st</sup> century must confront. It seems therefore essential to offer through research an added value, and new attractive potential to these landscapes. From there, new uses and socio-economic dimensions could be identified, in particular in depressed regions.

#### **European dimension**

20 countries have signed the Memorandum of Understanding for the Action: Austria, Belgium, Cyprus, Denmark, Estonia, France, Germany, Greece, Iceland, Ireland, Italy, Malta, The Netherlands, Portugal, Romania, Slovakia, Slovenia, Spain, Switzerland, United Kingdom. Some 70 research teams from scientific institutions with about 300 researchers (senior and young researchers) are involved. The important European participation in this project is a good example of the increasing interest and recovering of landscapes as an essential part of Cultural Heritage that marks, over the past several years, the new ways of valorisation, promotion and management of Cultural Heritage in the more general framework of territorial planning. This is also currently one of the priorities of European and international organisations. The Convention Concerning the Protection of the World Cultural and Natural Heritage includes, since 1992, Cultural Landscapes as a category for declaration (since 1992 more than 36 Cultural Landscapes have been declared). Moreover, the European Landscape Convention, promoted by the Council of Europe in 2000, considers landscape as a basic figure of Cultural Heritage and, as such, a key element of individual and social welfare.

#### **Innovation and originality**

The point of departure of the Action COST A27 is a wide perspective, an enlarged scope of the Cultural Heritage consideration, according to the present research trends. Historical research (including archaeological approaches) has assumed that context is not only a useful working instrument but also a key methodological linchpin in the research strategy. Historical discourse must be the basis of any intervention related to the Cultural (tangible or intangible) Heritage. That is the richness, and the necessary intellectual depth of the European Heritage: an integrative discourse in which common elements and particularities have their own meaning and

role. In this context, landscapes are a highly synthetic expression of human relationships through time: they are complex, rich, dynamic. Thus, the concept of landscape embraces a variety of values that have lead it to play a relevant role within Cultural Heritage. Its content is not exclusively environmental or aesthetic any more: its cultural relevance is an essential factor for its comprehension and valorisation.

#### Impacts

The work within the Action is envisaged to have three types of results, addressed to three different population segments: 1) The results of scientific co-operation for the scientific community (development of common working methodologies, production of databases and documentary *corpora*, implementation of co-operation networks [2]; 2) Conceptual tools and concrete models for protection and valorisation of European landscapes [3]; 3) Concrete programmes of valorisation within the development of a cultural tourism of quality.

	Tool production for research and for management			
DIRECT PROFITS OF THE ACTION	Publications			
	Information on Internet (for example of the European training / course sessions)			
	Improvement of tourist resources			
	Research			
	Training			
SOCIAL PROFITS	Information and awareness-raising			
	Improvement of the quality of life in the rural environment			
	Improvement of the quality of cultural/natural tourism			

Table 1: results and impacts of the Action COST A27

#### Acknowledgement

First, to all the researchers participating in the presentations and debates. Secondly, to COST-ESF, for their support and continuous interest on the development of the Action.

#### References

- [1] Project's website: http://www.soc.staffs.ac.uk/jdw1/costa27home.html .
- [2] Behrends, O, Clavel-Lévêque. M. and Peyras, J. (eds.), *Les controverses sur les terres. Agennius Urbicus*, Consorzio Interuniversitario Gérard Boulvert, Naples, 2005.
- [3] Ruiz del Árbol, M. and Orejas, A. (eds.), *Cultural landscapes in the European Research. Projects and networks*, CSIC, Madrid, 2005.

#### European project details

LANDMARKS, COST Action A27, Understanding pre-industrial structures in rural and mining landscapes, Almudena Orejas (Chair), Institute of History, CSIC

## MONASTERIES AS A PART OF CULTURAL HERITAGE IN RUSSIA AND EUROPE

#### Olga Sevan

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Monastic Routes, Cultural Heritage, OrthodoxMonasteries, Landscapes, Catholic Cloisters, Cultural Institute



Pskovo-Pecherskiy Monastery. Region North-West of Russia



Verkolskyl monastery: Archangelsk Region, Russian North Drawing O.Sevan

Nowadays, monasteries are an important part of Cultural Heritage and Monastic Influence Routes in Russia. Before October 1917 there were 1200 monasteries, mainly Orthodox. Practically all of them were closed during the Soviet time. Since 1990, over 500 monasteries have opened again. Monasteries form interesting elements in tourist routes not only in Russia, but also in other countries. Indeed, they are a special part of the Cultural Heritage and Routes of Europe. Examples from Russia and from Cyprus, France, Greece, Italy, Portugal, Slovenia and Switzerland were presented during the International Conference in Moscow 1996 in the framework of the Council of Europe's project "Cultural Routes" [2]. At that Conference, I presented results of study of these phenomena over recent decades.

Analysis of monasteries, and monastery settlements, is of evident interest in connection with attempts to restore their functions in the new contemporary social, cultural and economic conditions in Russia. The history of monasteries extends from the 11th century to the present day. They vary greatly in type, and in function. Some of their historic functions have vanished, while others have re-appeared. Some monasteries or their churches are on the World Heritage List, for example Solovki and Novo-Devichiy.

All monasteries started with a religious function. Later, many of them became a refuge for beggars or the homeless; a home for aged monks and village people; or "hospital cells", of particular significance in the countryside. Thus they began to perform social functions. Also, in certain periods of history, monasteries played a significant political role. Monasteries serving these social and political functions became widespread in Russia in the 16" and 17" centuries. In the period before Peter I, many monasteries were also significant economic and commercial institutions.



The Monastery on the Island Solovki, Archangelsk Region. Drawing O . Sevan

foreigners.



Goritskiy Monastery, Vologda Region, Russian North. Drawing O. Sevan

Many monasteries also had, and have today, a significant cultural and educational role. They are cultural institutions; places of ascetic and religious activity; centers of knowledge, writing and printing; libraries, and depositories of philosophical and theological works; schools for children; and centers of craftsmanship, such as iconpainting and decorative art. Each sacristy is a museum, preserving and demonstrating the cultural heritage, memorial objects and historical models. Each monastery is an open-air museum, displaying different architectural styles and qualities of craftsmanship, right up to the present day.

Monasteries also contribute much to the wealth of nature and of landscape. Their grounds include gardens, parks, lakes, memorial zones and places where people can rest and "admire the beauty". There are woodlands with coniferous and deciduous trees, fish-ponds, flower gardens, kitchen gardens where healing herbs and cultivated plants are grown.

In their architectural and spatial layout, monasteries and their settlements demonstrate a rejection of any axial or over-formal approach. Thus monasteries are examples of the artistic reflection of the relations between people and nature. In monasteries, the social and cultural division of spaces can be clearly seen. The characteristics described above should be taken into account in efforts to restore the modern functions of the monastery. This has particular importance in those monasteries which attract many tourists. Monastic Routes in Russia are of high interest for different groups of the Russian population, including pilgrims, and also for



Cloisters in Salzburg, Austria. Drawing O. Sevan



Stragov cloister. Prague, Czech Republic Drawing O.Sevan

In contrast to this experience in Russia, the monasteries of Western Europe are mainly Catholic and very varied. The different monastic orders - Cistercians, Cartesians, Dominicans and others created monastic complexes in both towns and countryside. Like their counterparts in Russia, they play an important part in culture, education and architecture: but their buildings are unlike those of Orthodox monasteries in Russia or the Balkan countries. It is of high interest to compare the experience between the two great parts of Europe, as was done through the Programme of Cultural tourism 'Monastic Routes'.

[2] Sevan, O. 'Monasteries and monasteries settlements in Russia and Europe' in Proceedings' Monasteries the Cultural and Spiritual Centers of Russia and Europe', Sevan, O. (ed.), RICR, ECOVAST, Moscow, 2003, pp. 5-16.

# Monasteries as a part of cultural heritage in Russia and Europe

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Key words: monastic routes, heritage, orthodox monasteries, catholic cloisters, cultural institutes

Nowadays the monasteries are important part of Cultural Heritage and Monastic Influence Routes in Russia [1]. Before the October 1917 there were 1200, mainly the Orthodox. Practically all of them were closed during the Soviet time. A number of monasteries, which opened again after 1990th, exceed 500. There are interesting elements in the tourist routes not only for Russian, but for other countries. Those monasteries are the unique part in the Cultural Heritage and Routes of Europe as well. There were presented from France, Portugal, Swiss, Slovenia, Italy, Greece, Cyprus and Russia during the International conference in Moscow 1996 in the frame work the project of Council of Europe "Cultural Routes: Monastic Routes". During the last decades we have the possibility to study these phenomena in Russia and presented in this conference [2].



Pskovo-Pecherskiy Monastery. Region North-West of Russia

The analysis of the monasteries in Russia is of evident interest in connection with the attempts to restore their functions in the new contemporary social, cultural and economic conditions. There types formed during the whole historical period of their existence – from the 11<sup>th</sup> century up to the present days. Some of those functions are vanished, while others have acquired. Some of monasteries: Solovki, Novo-Devichiy or there churches are in the Word Heritage List.
They were the social and political institution and became wide-spread in Russia in the 16-17 cc. They performed the religious functions, later they became a shelter for beggars, homeless, a home for the aged monks and village inhabitants; the "hospital cells" appeared. Mainly, the monasteries began to perform the social functions. It could be a movable property or real estate. In addition, the political role of the monastery was also important in the certain periods of the history: it was the consultative and the conciliatory structure in political disputes, performed its functions as a prison for the disagreeable state, political and religious figures.

The monastery is the economic and commercial institution, in the period before Peter I, was a big owner of the villages, lands, and trades. It turned into a landowning and industrial company, carrying on big operations by selling and purchasing the land, investing and mortgaging. The bank loan activity of the monasteries applied not only to the peasants and townsmen, but also to the government. The commercial functions of the monastery were interrelated with the fair settlements: they leased the premises, territories, etc., combining the divine services and holidays with fairs and markets. Thus, the monastery had a dual character, in which the ascetic ideals got on well with the economic and commercial activity.



The Monastery on the Island Solovki, Archangelsk Region. Drawing O. Sevan

The monastery is the cultural institution, the place of the ascetic and religious feat, the depository of the philosophical and theological works, book knowledge, writing and printing; the library and the centre of the workmanship: icon-painting, decorative art and school for children. The sacristy is the museum, which functions are to preserve and demonstrate the cultural heritage, memorial objects and historical models; the monastery is the open air museum, different styles and work qualities of the architecture, affecting the surrounding settlements and we could see it today.

The monastery is the natural and landscape complex, the place of pilgrimage, recreation and relaxation, to a certain extent, the tourist and cultural centre with hotels, dining- rooms, etc. as well as various view sites and walk paths. There are gardens, parks with lakes for the rest and "admiring the beauty". The memorial zones were established. Also, there are the kitchen gardens, ponds for fishing. The healing herbs and the cultivated plants were grown; the experimental kitchen gardens were made (watermelons and melons – on Solovki, Russian North). The monasteries' surrounding landscapes depend on the peculiarities of the region and the economic structure: with the purpose to protect the grounds against the collapse the bearing walls are being erected. The engineering and technical landscapes are inside and outside the monasteries' walls: the channels between islands (Solovki), roads, alleys, etc. The industrial and economic activity of the monasteries (mining of the lime-stone, granite, etc.) affected the

landscapes, and the fishery caused the construction of dams and dikes. There are also the memorial and symbolic landscapes.

The architectural and spatial characteristics of the monastery and settlements demonstrate the non-acceptance of the geometric schemes of the environment layout. Two major principles can be mentioned: the architecture (churches, houses, walls and towers of the monastery) blending with the nature ("the natural garden"), and architecture dominating in the landscape ("the architectural garden"). This serves as an example of the artistic reflection of the human and nature interrelations. In the monastery the social and cultural division of the spatial environment can be clearly seen.

Thus, when restoring the modern functions of the monastery the above listed characteristics it should be taken into account in the historical retrospective and today's realities. Particularly it is important when a lot of tourists investigate and admire these historical monuments. Monastic Routes in Russia is very interesting for different groups of the Russian population, including pilgrims, so as the foreigners.

European Catholic cloisters are quite different and have a lot of types and images. There are Cistercians, Cartesians, and Dominicans etc., which were building as in the towns so as in the countryside and play the important part in the culture, education and architecture. There are quite different for compeer to the Russian Orthodox monasteries or to Balkan countries. Nowadays is very actual to bring such bough knowledge as to Russia, so as to the other European countries throw the Program of Cultural tourism 'Monastic Routes' [2].



Goritskiy Monastery, Vologda Region, Russian North. Drawing O. Sevan

#### References

- [1] Participation of Dr. Olga Sevan to the conference in Czech Republic was supported by Russian Humanitarian Scientific Found RGNF, 2006.
- [2] Sevan, O. 'Monasteries and monasteries settlements in Russia and Europe' in Proceedings '*Monasteries the Cultural and Spiritual Centers of Russia and Europe'*, Sevan, O. (ed.), RICR, ECOVAST, Moscow, 2003, pp. 5-16.

#### European project details

Council of Europe "Cultural Routes: Monastic Routes". Coordinators: Domenico Ronconi, Michel Penet etc., O. Sevan from Russia, 1994-1996.

## MATERIAL, SCALE AND DENSITY - GROUNDS OF GOOD NEIGHBOURHOOD IN FINNISH WOODEN TOWNS

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#### Research method

- Coded ten-sheet inquiry blanket: structured questions, open-ended questions, drawing tasks (mental maps). - Quantitative and qualitative analysis: SPSS -statistical program (e.g. frequencies, correlation tables, cross tabulation, factor analysis), NVIVO software package. Study of spatial structure: drawings, maps, photographic material.

#### Case data

Ċ,	TAMMISAARI, old town. The whole town part is considered
•	important for local identity. Also the
	church, town hall and squares are
1	typically mentioned in old towns.



#### Results and conclusions

#### Factor analysis

By factor analyses, a bounce of variables acting same kind of way could be found from multiple-choice questions. When analyzing the question concerning the qualities of environment, three major factors were found: - First factor: group of people to whom the meaning of courtyard and close environment is meaningful. Age increases the factor. Factor has less meaning when living in multi storey houses. This factor was almost four times more powerful

(eigenvalue) than other two. Second factor: highlights the qualities of the neighbourhood, such as safety, trespassing traffic, general cosiness of the area. Factor is more meaningful in Forssa.

- Third factor: more importance is put into social aspects of the neighbourhood.

By analyzing the material aspects and scale of the environment, five major factors were found:

- First factor: the most powerful factor emphasizes material aspects. The dwelling form has no meaning in this. This fac-tor is five to six times more powerful than the others.

Second factor: emphasizes the meaning of scale. The dwelling form has no meaning in this.

Third factor: reflects the meaning of safety. The factor increases with the age

- Fourth factor: highlights the quality of the apartment.

- Fifth factor: highlights the meaning of local history and general appreciation. Factor is more meaningful in Forssa compared to Raahe in spite of Raahes longer history.

Factor analysis emphasizes in general the factors which can be affected by means of town planning

#### Material, scale and density

Preserved old town centres or town-parts are in general considered as safe, cosy and good neighbourhoods. Wooden town areas match the aesthetical demands regardless of their age. Wood as façade material was liked in all of the target areas. On the other hand, concrete was disliked. Also the Great bulk of the inhabitants were satisfied with the dense physical scale of old town structure even if the side streets were as narrow as 3 to 5 m. In so called modern wooden town areas, people who had lived before in modern multi-storey concrete buildings, needed adaptation to new physically denser environment. Especially parking was considered problematic. Still, study encourages the idea that features from preserved old Finnish town environments could still be utilized in modern town planning.

Social and material aspects are connected in the use of courtyard and in the feeling of density. According to research, people who use the courtyard more often in SuHiTo target towns:

- are living in lower floors and the courtyard is easy to access
- are often middle aged but still employed
  have some functions in the courtyard supporting the use of it
- are more pleased with their environment
- know their neighbours better

Dwelling density in the housing block seems to be important indicator of feeling of excessive density. Dwelling density (apartments / hectare) correlates stronger with the experienced qualities of environment than plot ratio in favour of lower

#### Mental maps, commitment and local identity

Mental maps (drawing tasks) implement the expressions of local identity and local knowledge which some times can be hidden from town planning professionals. During the research, importance of social aspects became more evident. Strong social networks are typical to old dwelling areas. During the long housing time people have learnt to live with the neighbourhood, accept the conditions and limitations of the area and share same unwritten rules and evaluations. They are committed to the area but Genius Loci take it time to form. Modern housing trends emphasize privacy and quality inside apartment instead of quality of the whole environment which include the social entity. In saving cultural heritage of European towns it is essential to support their vitality as dwelling area. If local people feel the dwelling area cosy and vital, they are more committed to save the historical value of the area. This includes understanding the local history and building tradition. It is important to understand that old and cosy neighbourhood is also part of cultural heritage - common good which should be preserved for later generations

People actually living in the area should be taken into consideration as a part of inventory of the area in addition to property, structure, buildings and spaces. This view is also in balance with the modern European trend of increasing democracy in town planning and heritage protection processes.

European Project Details SuHiTo, Baltic Sea Region INTERREG III B Contract No 36, Sustain-able Historic Towns - Urban Heritage as an Asset of Development, Co-ordinator: Marianne Lehtimäki, National Board of Antiquities, Fin-land, email: Marianne.lehtimäki@nba.fi







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SuHiTo -project. The whole town part is also considered important for local identity, but the new commercial center is identified outside

Beautiful views Border of target area





local identity equally with

OULU.

FORSSA, Kalliomäki. Pilot town of SuHiTo -project. The whole town part is considered important for local identity.



Puu-Linnanmaa National Modern wooden town pilot project. The whole

area is noticed important for





density.

# Materials, scale and density – the grounds of good neighbourhood in finnish wooden towns

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Key words: conservation, density, local knowledge, neighbourhood, plot ratio, town planning.

#### Introduction and content

Interactive planning established itself in Finland when the newly reformed *Land Use and Building Act* came into force in 2000 [1]. Planning, however, still follows highly different approaches, and the meaning of openness, listening to the inhabitants or interaction is not indisputably recognised. Expert knowledge must meet local knowledge in an interactive discussion dealing with environmental values and the goals for protection planning. The study shows that local knowledge can highlight some environmental values that may be hidden from the town planning and conservation professionals.

In the project entitled Grounds of Good Neighbourhood - Structured Inquiry and Research in Finnish Wooden Towns a research method utilising inhabitant inquiry is developed to be used as a tool for the evaluation of the environmental values of neighbourhoods in Finnish historical wooden towns and town environments based on the wooden town tradition. The aim of the project was to shed light on the importance of scale, materials and local history in experiencing the area as a *good neighbourhood* and to identify the developing factors based on the local identity. The research was launched in the summer of 2002 by starting a structured inhabitant inquiry in six Finnish dwelling areas based on wood architecture from different periods and in two modern dwelling areas with similar density but based on stone architecture. In the next phase two historical town parts were subjected to a closer examination as part of the EU Interreg III B project Sustainable Historic Towns - Urban Heritage as an Asset of Development (SuHiTo). The structured inquiry was launched in the summer of 2003 in the Kalliomäki area of Forssa - former workers' neighbourhood constructed at the turn of the 19<sup>th</sup> and 20<sup>th</sup> century. The second target was the historical centre of Raahe – an old coast town in Northern Ostrobothnia, which was rebuilt after the great fire of 1810 and is nowadays suffering from a crisis in relation to development and protection plans. Results from earlier studies were used for comparison.

#### **European dimension**

Although this approach is related to the Finnish cultural context, the results can clarify universal problems and give some answers to common conservation problems. The method itself can be adapted in other European countries as well. The SuHiTo project included several local and international seminars. In national meetings research parties were given feedback and orientation towards topical local problems. In international seminars methods and preliminary results of research carried out in other partner countries were presented and discussed. The Norwegian and Swedish colleagues were excited by the mind maps produced as a result of the Finnish inhabitant inquiry. The method was applied in the inquiries made in Mosjöen, Norway and in Ystad, Sweden.

#### **Innovation and originality**

The study emphasises the connections between the social and the material. The sense of wellbeing and social networks are immaterial, but influence can be exerted on them through the planning of physical structures. When protecting old areas it is essential to cherish the social entity of the area instead of only preserving individual buildings. On the other hand, we can utilise some of the features and experiences from the old wooden towns when planning new areas based on the long tradition of wood construction. Old or new – it is essential to put an emphasis on the social functionality of the area, i.e. the meaning of outside enjoyment – cosiness of the area. It is thus not enough just to design apartments for inside enjoyment (standard of equipment, location etc.).

#### Impacts

Table 1: Beauty of materials. The inhabitants' views of the beauty of facade materials in Forssa and Raahe. Opinions in the eight comparative towns showed similar attitudes [2]. Traditional use of wood has a strong positive aesthetic influence regardless of the age or location of the area. A positive attitude towards wood materials can be seen as a wider cultural phenomenon.



In all, wood was quite unanimously considered a beautiful facade material in all of the target areas (Table 1). Most of the inhabitants were also satisfied with the physical scale of the old town structure where they were living. In the old towns the sense of well-being was very high – higher than in recently built areas. The physical structure in old towns is quite dense, but not even the very narrow streets were considered a problem for everyday life. On the contrary, narrow streets enclosed by preserved old buildings were usually aesthetically highly appreciated and regarded as beautiful views or the most beautiful streets in the neighbourhood. Table 2 highlights the importance of social factors such as dwelling density instead of physical scale. During the analysis, it was noticed that plot ratio – the most commonly used indicator for effectiveness and built density in town planning – only correlated to a very low degree with the experienced comfort / discomfort (cosiness) of the housing areas. Meanwhile the indicator of dwelling density (apartments / hectare in a plot) responded more intensively. It seems that the feeling of excessive density is very much related to the intersecting territories of families [3, 4]. A low dwelling density (dwellings / hectare) combined with a relatively dense physical structure (human scale) is an important quality of the environment in old town centres. In this sense the feeling of proper or excessive density is also related to the built scale and characteristics of the area. The materials, scale and density emerge as the key components of a good neighbourhood. Highlighting the meaning of these components helps to focus on the goals for town planning and to strengthen the conservation policy in old areas.

Table 2: Correlations between feeling of excessive density and cosiness of the area (all target towns). Darkest figures show the traditional factor of built density used in town planning (plot ratio). Medium grey show factors which can be indirectly affected by town planning. Light grey indicates factors which affect but are difficult to approach by means of town planning.

FEELING OF DENSITY	Cosiness in Summer	Cosiness in Winter	Plot ratio (e)	Dwelling Density (apart./ha)	Courtyard /Apartment (size)
Cosiness in Summer	1	.596**	.134**	.338**	.266**
Cosiness in Winter	.596**	1	.112**	.,297**	.200**
Plot ratio (e)	.134**	.112**	1	.762**	.688**
Dwelling Density (apart./ha)	.338**	.297**	.762**	1	.715**
Courtyard/Apartment (size)	.266**	.200**	.688**	715**	1
Age of inhabitant	.245**	.232**	.242**	.293**	.345**
Age of building	.310**	.263**	.264**	.519**	.454**
Number of floors	.139**	.101**	.513**	.488**	.410**
Location of apart. (in floors)	.170**	.132**	.424**	.450**	.363**
Housing time	.245**	.193**	.208**	.369**	.423**
** Correlation is significant at the 0.01 level (2-tailed)					

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Commitment to the neighbourhood plays an important role. In old areas people are more committed and their sense of local identity is strong (e.g. expressions in drawing tasks – mind maps). Newcomers often want to change the area according to their personal expectations. Modern housing trends also emphasise privacy and qualities inside the apartment rather than the qualities of the housing area. The goal should be not just to fulfil urgent housing needs but to achieve a socially and physically sustainable environment. At its best local people share the opinions of conservation authorities about the most important features of their close environment. Still, it is obvious that more interaction is needed between town planning professionals and local people – between expert knowledge and local knowledge.

#### Acknowledgements

Special thanks to the people in the target areas who dutifully filled in the heavy 10 sheet questionnaire (in total 780 returned answers).

#### References

- [1] Land Use and Building Act (132/1999).
- [2] Suikkari, R. and Reinikainen, K., 'Seeking Common Values: Grounds of Good Neighbourhood Research in Finnish Wooden Towns' in Proceedings of *The Venice Charter 1964-2004-2044?, the* 14<sup>th</sup> Anniversary Conference in Hungary May 22-27 2004, Kovács, E. (edit.), ICOMOS Monuments and Sites XI, Budapest, 2005, p. 177-183.
- [3] Suikkari, R. and Reinikainen, K., 'Local knowledge', in *Project Report, Sustainable Historic Towns*  – *Urban Heritage as an Asset of Development*, Lehtimäki M. (edit.), National Board of Antiquities & SuHiTo project, Helsinki, 2006, pp. 79-84.
- [4] Suikkari, R. and Reinikainen, K., 'Hyvän asuinympäristön perusteet asukaskysely ja laatutekijätutkimus Forssan Kalliomäessä ja vanhassa Raahessa', in National SuHiTo – project report, *Kestävän kehityksen historialliset kaupungit alueellisena voimavarana*, Lehtimäki M. (edit.), Museovirasto (National Board of Antiquities), Rakennushistorian raportteja 17, Vantaa, 2006, pp. 31-56.

#### European project details

SuHiTo, Baltic Sea Region INTERREG III B Contract No 36, Sustainable Historic Towns – Urban Heritage as an Asset of Development, Co-ordinator: Marianne Lehtimäki, National Board of Antiquities, Finland.

## HERITAGE LED REGENERATION: SAFEGUARDING THROUGH INVESTMENT

Margaret Sutherland & Ian Walters

Queens University Belfast, United Kingdom & European Association of Historic Towns and Regions (EAHTR), United Kingdom

#### Introduction

This display highlights ongoing research into the economic, social and environmental benefits of heritage led regeneration. It highlights examples of good practice within European cities who have sought to safeguard their physical heritage through emphasising these assets as the key focus of their urban regeneration strategies. The aim is to help cities identify targets for heritage led regeneration to help gain political and public support.

#### Grainger Town, Newcastle – Upon – Tyne, UK



The award winning Grainger Town project in the UK is internationally regarded as good practice in the field of heritage led regeneration. The research has sought to investigate the transferable lessons and quantifiable benefits from this project so that other European cities can learn from the experience. The key issues identified include:

• Presence of a clear civic vision Audit performed of heritage

assets Funding package secured of private and public sector investment Project management structure

place Quantifiable Targets and Outputs identified

Quantifiable Benefits based upon the project's "Regeneration Themes": Environmental-

over

new

many

within





numerous events organised to bring residents and visitors to the area



Access to Opportunity - over 2000 jobs created locally

Management, marketing and promotion including production of leaflets and brochures for residents and investors



The research has taken its lead from the EC funded INTERREG IIIC project "INHERIT" (Investing in Heritage to Regenerate Historic Towns) Contract Number: 4W0142N, co-ordinator: Brian Smith, Secretary General, the European Association of Historic Towns and Regions

The project involves partnership working and the exchange of ideas, experiences and best practice between the cities of Newcastle and Belfast (UK), Gdańsk (Poland), Verona (Italy), Göteborg (Sweden) and Úbeda (Spain) together with Queens University Belfast.





Newcastle











#### Gdańsk, Poland

The city of Gdańsk and its residents are proud of their rich heritage of civic protest and struggle for freedom and justice - a struggle that reverberated around the world in the early 1980's, resulting eventually in the transformed and enlarged EU we experience today.

Solidarity

The city's desire is to ensure that the physical reminders of this relatively recent heritage central are to urban regeneration plans, in order to build upon and embody the strong sense of identity and pride pervading the city. Today, the Solidarity monument (pictured right) and the "Roads



to Freedom" museum (featuring boards from the solidarity era which have been entered on the UNESCO "World Memory List") provide the gateway and inspiration to the huge proposed regeneration area of the former Shipyard.



#### Training in Traditional Skills

An important component of the socio economic regeneration strategy is the Escuela Taller initiative - training young people in traditional skills and employing them on the building refurbishment projects.

#### Haga, Göteborg, Sweden



This 17th century working class residential area, features wooden houses that are unique both within Göteborg and The former subject of a comprehensive Sweden. redevelopment plan, following resident protest the City Council approving, guidelines for the preservation and future of Haga 1976. These guidelines sought to retain the area's residential status, the old street plan and the height of the buildings and to ensure that new build should respect the existing characteristics of the area.

Haga is a good example of how an old residential area has been safeguarded as a result of sympathetic restoration - retaining the old character of the streetscape, but incorporating new features, such as children's play areas within the inner courtyard areas, to attract young families. A key feature has been the degree of community involvement in both project implementation and techniques used.



A programme of investment in historic spaces includes removing car parking to create vibrant places for people to meet and celebrate. The spaces have been refurbished using modern and traditional materials - sympathetic to the beautiful physical legacy of the city yet also bringing innovative solutions to modern business dilemmas (see public waste collection areas pictured left).



the strong commitment of its residents and politicians to investing in their built heritage as a key means of ensuring that it is not only safeguarded, but also that it is central to the physical and socio

Úbeda

in

improvements to public spaces, public art strategy, creative lighting Business Development 300 new businesses Commercial property development within former "buildings at risk" generated €278 million private investment



# Heritage led regeneration: safeguarding through investment

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Key words: built heritage, regeneration, benefits, INHERIT project, sustainable development

#### **Introduction and content**

This research considers some of the implications of safeguarding Europe's urban built heritage through ensuring that it becomes the central focus of a city's physical, social and economic regeneration plans. Much of Europe's most important physical cultural heritage is often experienced in the context of towns and cities, which are also important generators and contributors to the social and economic well being of their regions. With the prospect of increasing economic growth and greater public and private sector investment facing many of the cities in the newly expanded EU, the issue of physical regeneration is central to the thinking of many urban decision makers. In the race to compete, car unfriendly historic spaces and derelict old town houses lacking high speed digital connections can be viewed not only as a barrier to economic and social regeneration, but also as a symbol of past poverty and repression. A recently published report [1] refers to many occasions where comprehensive redevelopment schemes have swept away heritage assets in the name of efficiency, cost, viability and meeting occupier requirements. However it is these very same heritage assets that are believed to hold vital importance to communities and individuals - representing and symbolising their own stories, identity and past achievements. This presentation seeks to look at examples of how physical cultural heritage can be used as the key driver to achieving physical, social and economic regeneration of cities. Due to a lack of existing evidence about the benefits of heritage led regeneration, the research takes it lead from a European funded INTERREG IIIC project which is investigating examples of good practice in this field. From this work, a methodology known as the Gateway Methodological analysis has been developed; firstly as a means of establishing the key benefits of heritage led regeneration and secondly; to allow other cities to learn from these experiences and translate successes to their own urban and regional context. The poster which accompanies this abstract considers several case study examples of heritage led regeneration across a range of European cities; Gdansk in Poland, Newcastle upon Tyne in the United Kingdom, Gothenburg in Sweden and Úbeda in Spain. All of these cities have their own distinct cultural and socio economic heritage and are also at various stages of physical, social and economic regeneration. The poster in particular concentrates on the two examples of Gdansk and Newcastle upon Tyne. Both northern industrial cities that have suffered socio economic down turns with the decline and loss of their industrial base. The example of the award winning Grainger Town Project in Newcastle upon Tyne has been widely recognised as one of the best examples of good practice in heritage led regeneration in Europe - gaining political and public support and demonstrating quantifiable benefits. Gdansk wishes to achieve comparable successful urban regeneration, but by ensuring that any plans are rooted in, and takes its lead from the city's proud and unique recent heritage of civic protest and "Solidarity". While Gdansk is looking towards Newcastle upon Tyne and other cities for lessons, Gdansk believes that as a central city within the newly expanded EU, it is important to achieve high

standards to demonstrate that such an approach to regeneration, set entirely within its own urban and regional identity can translate to other cities across central and Eastern Europe.

#### European dimension

The research has developed from a European wide project investigating good practice in the field of Investing in Heritage within Heritage Cities (INHERIT). This project, co-ordinated by the European Association of Historic Towns and Regions, involves partnership working and exchange of ideas and experiences between the cities of Newcastle upon Tyne (UK), Gdansk (Poland), Verona (Italy), Belfast (UK), Gothenburg (Sweden) and Ubeda (Spain) and assisted by the specialist expertise of Queens University Belfast. Central to the investigation are two of the research priorities for the European Research Area - namely Sustainable Development and Citizens and Governance. The aims of sustainable development are central to heritage led regeneration – in seeking to safeguard the heritage through finding new uses for historic buildings and ensuring the continued viability of the heritage stock of Europe's cities. The conservation, reuse and adaptation of heritage not only lessens the amount of energy expended on new development, but can also boost local economies, attract investment, highlight local distinctiveness and add value to other local property [1]. The UK government reported recently [2] that approximately 24% of all waste generated in the UK came from the construction and demolition of buildings. Heritage led regeneration can therefore not only contribute to sustainable development targets for the reduction of green house gasses through the conservation of existing built fabric, but also its key principles of reusing buildings and investing in historic spaces, can help to ensure that the legacy of Europe's rich cultural heritage is safeguarded for future generations. The investigations have discovered that the most successful schemes, such as Grainger Town in Newcastle upon Tyne, and Úbeda in Spain have placed citizen involvement in terms of consultation and access to decision making, at the heart of their regeneration strategies. These cities also highlight that successful regeneration only happens where there is political support, strong partnerships and where plans form part of a local and regional policy framework.

#### **Innovation and originality**

This research in seeking to provide evidence and quantifiable socio-economic and environmental benefits of using heritage to lead regeneration is unique. By applying the Gateway Methodology (first developed by Newcastle City Council and EAHTR) as a means of considering these issues, on a step by step basis, the investigations have taken an original approach to addressing the complex issues. The benefits of the approach are that it can be applied to cities across Europe as it looks at the case studies within their own individual city and regional context and seeks to look at the processes and structures which have to led to success. Using this technique other cities can identify transferable lessons appropriate to their own city and cultural context.

#### Impacts

This research is still ongoing but has already made demonstrable progress in defining quantifiable benefits; social (for example, population and age change etc), economic (for example, trends and changes in jobs, businesses, premises and workforce skills etc) and environmental (for example, numbers of historic buildings brought back into use, increases in public spaces etc). The research is also seeking to quantify qualitative impacts of heritage led regeneration – social (levels of civic pride), economic (attitudes and perception of business community), environmental (overall perceptions of improvements). The aim is to help cities identify targets for heritage led regeneration to help gain public and political support. In Grainger Town in Newcastle upon Tyne a  $\in$ 172 million six-year urban regeneration programme, made up of public and private investment, was implemented. Using the programme's "Regeneration Themes", the principal benefits realised were identified as the following:

- (a) Quality of Environment a major investment programme of phased public realm improvements costing €9.3 million completed and complemented by a €1.7million Public Art Strategy and creative lighting schemes.
- (b) Business Development and Enterprise 300 new businesses set up in the area and 29 traditional shop fronts restored or improved.
- (c) Housing over 500 apartments created, many located within former "buildings at risk" including several "living over the shop" schemes. This succeeded in bringing many more residents back into this part of the city to create vibrancy and life.
- (d) Non-Housing Property Development initiatives to restore significant amounts of commercial floorspace within "buildings at risk", brought business confidence to the area and assisted in generating a total of €278 million private investment into the area.
- (e) Access to Opportunity over 2000 jobs created locally together with training. Significant socio-economic benefits from the reduction in unemployment.
- (f) Arts, Culture and Tourism organisation of numerous events brought people into this part of the city to add to vibrancy.
- (g) Management, Marketing and Promotion information and promotional material was produced for existing and prospective owners, occupiers and investors to help create confidence and educate people about the benefits of the initiative and create local pride in the achievements.

The research hopes that through identifying quantifiable benefits such as those outlined above, the message about the benefits of heritage led regeneration will spread to other cities and their politicians, investors, owners and businesses. The aim is to create the case for cities across Europe to value and invest in their physical cultural heritage as a key asset, which can form the focus for social and economic regeneration, bringing vibrancy and prosperity, as opposed to an obstacle needing to be cleared in order to make way for new construction.

#### Acknowledgements

The authors would like to acknowledge the contribution of all the city partners of the INHERIT project and particularly to thank Fiona Cullen of Newcastle City Council and Malgorzata Ratkowska of Gdansk City Council for their valuable input.

#### References

- [1] English Heritage, Royal Institute of Chartered Surveyors, British Property Federation, "Heritage Works: The use of historic buildings in regeneration", Driver Jonas, London, 2006.
- [2] Office of Deputy Prime Minister, Housing Planning, Local Government and the regions committee, *"The Role of Historic buildings in Urban Regeneration"*, House of Commons, London 2004.

#### European project details

This research takes its lead from the INTERREG IIIC EU funded project INHERIT (Contract Number: 4W0142N) "Investing in Heritage to Regenerate Heritage Cities". Co-ordinator -Brian Smith, Secretary General, The European Association of Historic Towns and Regions (EAHTR).

## Developing a folksonomy of cultural heritage attractions

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#### The need for classification of cultural tourism attractors

A classification scheme, or taxonomy, can be used to structure the great, diverse range of cultural tourism attractors. This structure can then help to connect the interests of potential visitors to instances of types of attractor. This should help to spread the load from tourism more evenly across Europe by alerting tourists to other sites and attractions that previously they may have missed.



## Instances of a type of cultural attraction

Classification it makes it easier to identify instances of cultural tourism attractors by type. Thus, potential tourists could quickly find examples (say) of other churches that were of interest to them.

#### Existing approaches to classfication

There are many existing classification schemes for cultural tourism attractions. All have been developed to assist with particular problems. Hence the taxonomy developed by the National Trust for Scotland looks very different to the one developed by English Heritage to classify buildings and monuments. All of these systems suffer the same problem of updating and high maintenance.

The common approach is for experts in the domain of cultural tourism to collaborate with classification experts to devise a taxonomy in a top-down manner.

#### Bottom-up taxonomies in Web 2.0

An alternative approach is to develop a bottom-up taxonomy based on keywords (or tags) provided by users. This is widely used in Web 2.0 applications on the Internet

del.lclo.us / tag / culturalheritage
Al faits legal advertisings - new parts parts
need of Data A
tags/keywords user other users

Two of the most popular social networking sites on the Internet are *del.icio.us* and *flickr. del.icio.us* allows users to bookmark other web sites and 'tag' those bookmarks with their own words and phrases. Similarly, *flickr* allows users to tag their own photographs. The resulting collection of tagged objects represents a form of *folksonomy*.

Domain experts Classification experts Construction of the second secon

Conventional taxonomy design

# 

Images retrieved from flickr tagged as 'culturalheritage'

## A basic taxonomy for cultural tourism attractors

A basic taxonomy, using conventional approaches, could take the form shown below, in which there is a hierarchical structure for objects and events that are considered to be cultural attractors.



#### From tags to taxonomies

The development of bottom-up taxonomies through the tagging activities of large numbers of Web users suggests a new way to classify cultural tourism attractions. In this project we are developing a Web-based exit survey that will allow visitors to tag the attraction. However, unlike *del.icio.us* this scheme will partition the tag space by asking visitors to add keywords (or tags) under three main headings: affective, evaluative and descriptive.

The resulting collection of tagged attractions represents a loosely classified information space, which is structured by the lexical proximity of keywords applied by different visitors. There are drawbacks to this approach, such as the ambiguous use of the same tags, but on balance this democratisation of the classification process is probably the only way to ensure that visitors' perceptions of cultural attractions are included in the taxonomy.

#### A folksonomy of cultural attractions: creating tag clusters

A folksonomy can only emerge after a large number of visitors has tagged a large number of cultural attractions. The strength of all social networking software systems lies in the sheer volume of data that are entered by many contributors. These systems require such large numbers because of the redundancy of data.

It remains to be seen if enough visitors can be persuaded to spend time describing their experiences at different cultural sites. The incentive for doing so is that they should then be able to identify other cultural attractors that share the same characteristics, as classified by others.

#### **European Project Details**

Project acronym:	PICTURE
Project name:	Pro-active management of the
	Impact of Cultural Tourism upon
	Urban Resources and Economies
Contract no .:	SSPA-CT-2003-502491
Coordinator:	Professor Albert Dupagne, LEMA-
	Université de Liège, Belgium





### Developing a folksonomy of cultural heritage attractions

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Key words: taxonomy, classification, attraction, web-based social bookmarking, tags

#### Introduction and content

As the number of cultural tourism attractions increases so the need to provide effective methods of indexing and classifying these also increases. Without an adequate informational infrastructure, visitors are likely to focus on established attractions and perhaps fail to discover new offers that may be equally or even more appealing. Taxonomies, or classification schemes, help to structure and organise domains, and have been used to help with the management and marketing of cultural attractions in the past. However, the traditional top-down approaches to classifying these attractions have been driven largely by the concerns of those charged with managing individual sites or formulating policy on a broader scale, rather than the tourists who wish to discover and visit them. The purpose of this research, therefore, is to consider how to develop a taxonomy that will explicitly relate cultural tourism attractions to the different interests of contemporary cultural tourists. The emergence of so-called Web 2.0 applications creates new opportunities for harnessing the knowledge and experience of a large audience to assist in classifying any entity that can be represented on the World Wide Web, including cultural tourism attractions. In other domains, websites such as the social book-marking site *del.icio.us* [1] and the photography site *flickr* [2] demonstrate the power of *tagging* as a method of classifying web content leading to the creation of 'folksonomies.' Individual users are able to add 'tags' keywords or phrases) to represented entities usually without restriction, though with suggestions based on what others have done. A similar approach seems viable for a bottom-up classification of cultural heritage attractions and, with the addition of mapping services such as Google Maps [3] and Wayfaring [4], could support rich datasets describing cultural heritage assets linked to end-user interests and evaluations. The work presented here is an early exploration of the potential of how these methods for developing Web-based folksonomies might be applied to cultural tourism attractions in an effort to generate user-centred classifications. A prototype Web page for recording experiences has been developed and this will be tested in two tourist sites as part of this project. The resulting data will be analysed for clustering to determine if this approach is viable in the long term.

#### **European dimension**

There is an urgent need to balance the load imposed by visitors to cultural tourism attractions across the wide range of attractions in Europe to create a more sustainable form of tourism that will enable small and medium-sized towns and cities share in the benefits from the growing tourism market in Europe. A major part of the problem is that long established sites and attractions tend to monopolise the market. One possible explanation for this is that potential visitors are often unaware of the existence of less well known attractions or, if they are aware, do not realise that the attractions may coincide with their own interests. This is particularly true for small to medium-sized towns and cities. There is evidence to suggest that visitors can be attracted to sites outside the traditional 'hot spots' in large cities such Rome, Paris, and London. The development of a socially constructed network of information about cultural heritage

attractions across Europe can potentially lead to a wider spread of knowledge about what is available and how it relates to individuals' particular interests.

#### **Innovation andoriginality**

Existing methods of classifying cultural attractions have been driven by the concerns of those responsible for managing sites rather than by those who might wish to visit. The resulting taxonomies reflect these interests and are therefore of limited use in matching the interests of potential tourists to available attractions. This research is innovative and original because it proposes to apply the emerging techniques of social networking made possible by the development of Web 2.0 tools and techniques to developing 'folksonomies' of cultural attractions. A folksonomy refers to a loosely classified network generated by visitors' labelling ('tagging') of cultural attractions on a dedicated Web page. The large volume of data produced by this method are amenable to cluster analysis which should provide a dynamic picture of where people are visiting, what their perceptions of sites are, and how these are influencing movement patterns.

#### Impacts

This research is one task within the PICTURE project and is in its early stages. It will require further effort to realise its potential beyond the life of the project. However, there is every reason to believe this can be achieved since the project includes non-academic partners whose day-to-day business is the promotion of cultural tourism and who will continue to do so long after the project has finished. If the folksonomy approach is successful it could provide a unique way to record and disseminate visitors' perceptions and assessments of the attractions at different sites. This would overcome the difficulties associated with traditional taxonomies because the folksonomy of attractors should reflect popular opinion and more or less be selfupdating.

#### Acknowledgements

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#### References

- [1] URL: http://del.icio.us/.
- [2] URL: http://www.flickr.com/ .
- [3] URL: http://www.google.com/.
- [4] URL: http://www.wayfaring.com/ .

#### European project details

PICTURE, SSPA-CT-2003-502491, Pro-active management of the Impact of Cultural Tourism upon Urban Resources and Economies, Professor Albert Dupagne, LEMA – Université de Liège, Belgique.



VARIOUS TOOLS FOR THEIR CONSERVATION

Jean-Marc Vallet **Philippe Bromblet** CICRP, Marseille, France

Said Kamel Rachida Mahjoubi Rabha Ajakane

Scafolding

Holes (put logs)

Rendering in

Fish scale

Coarse

Fragment (shingle)

pattern 0.9 r

Jean-Dominique Meunier Yves Noack **Daniel Borschnek** CEREGE, Aix en Provence, France

Wood keys

between piers

Rendering (brownish lime wash above two layers

of render)

Rammed

material

earth mixed

with carbonate

**Rachid Bouabib** ENA, Meknes, Morocco

Moulay Ismail University, Meknes, Morocco

The city of Meknes was protected in 1995 by UNESCO as World Heritage. The state of conservation of its monuments have progressively worsened n spite of restoration campaigns. A research program has started in 2003 for 4 years within the frame of a French- Moroccan cooperation agreement for the preservation of the architectural heritage. It aims to study (i) the nature and properties of building materials and more particularly the ramparts of the city (over 40 km length), (ii) their degradation mechanisms taking into account the environmental factors (pollution, climate, geology and hydrogeology, human activities...). In a second step, we will have to propose compatible and durable materials, methods for restoration works and conservation tools.

#### The MEDINA of Meknes: studied site

#### Different objectives are assigned to the program:

- Study of the natural and human factors which cause the degradation
- Physical and chemical characterization of building materials

Architecture of a rampart

- Selection of restoration products and methods

ç

Creation of a database and a GIS (geographical informative system) on monuments, typology and composition which will also be a tool to manage a natural risk

Length : 13 to 28 m/amara

Thickness : 1.5 to 3 m



Analyses of the rammed earth and the rendering using on site and on

- samples: - Karsten pipe
- Moisture content
- Petrographical examination on
  - thin sections and polished sections - Calcimetry, soluble salt content
- Total chemical analysis
- XRD. FTIR. SEM-EDX

### Alteration features



- 5 publications in different congresses on building techniques, alterations and conservation topics

- 1 PhD in progress and 2 finished Professional Masters
- Strengthening of a scientific collaboration

- An International conference on the conservation of the Mediterranean architectural heritage (RIPAM, Meknes, 26-28th of 2005 September)

- A GIS (under construction) which gathers at present time information of the 19 remaining gates ; the ramparts and the Medina will be treated in a second step
- Development of a Meknessi competent pool to the conservation of cultural heritage
- Development of the collaboration between European and Moroccan ('MEDISTONE' INCO Project, Sardinian-Moroccan project etc.)
- A Moroccan Master training on conservation topics is now setting up

H EUROPEAN COMMISSION CONFERENCE 'SAUVEUR' SAFEGUARDED CULTURAL HERITAGE UNDERSTANDING & VIABILITY FOR THE ENLARGED EUROPE PRAGUE JIST MAY - JRD JUNE 2006

Soluble salts content of the rammed earth

Corresponding Author : Jean-Marc VALLET CICRP t :+ 33 616 55 1940 Email : jean-marc.vallet@cicrp.fr

Earth material supposingly from the surrounding soil

## Study of the historical buildings of Meknes (Morocco) and their alterations – proposal of various tools for their conservation

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<sup>2</sup> Moulay Ismail University, Morocco

<sup>3</sup> CNRS-CEREGE, France

<sup>4</sup> National School of Agriculture, Morocco

Key words: French-Moroccan collaboration, ramparts, alteration, rammed earth, rendering, training, GIS

#### Introduction and content

The city of Meknes is rich of various cultural heritages built between the XVI<sup>th</sup> and the XIX<sup>th</sup> centuries and notably its most important ramparts (more than 40 km length). It was protected in 1995 by UNESCO as World Heritage. In spite of restoration campaigns – the most recent being the several and Moroccan restoration of the gate Bab Mansour with European funding, the state of conservation of the monuments have progressively worsened.

The research program started in 2003 for 4 years within the frame of a cooperation agreement (agreement CNRPRST – Morocco / CNRS – France n° SDU 08/03 and Moroccan financing in the Theme Program for the support of Scientific Research (PROTARS III)) for the preservation of the architectural heritage of the city of Meknes. It aims to study the nature and properties of building materials and their degradation mechanisms taking into account the environmental factors (pollution, climate, geology and hydrogeology, human activities...). In a second step, we will have to propose compatible and durable materials and methods for restoration works.

From the beginning of the project, different objectives were assigned to the program:

- Study of the natural and human factors which cause the degradation
- Physical and chemical characterization of building materials
- Selection of restoration products and methods
- Creation of a database and a GIS (geographical informative system) on monuments, typology and composition which will also be a tool to manage a natural risk.

The high ramparts are usually constituted of inner (1.2 to 2.4 m large and 7 to 10 m high) and outer walls (1.5 to 3 m large and 7 to 12 m high) ([1]). The high walls have monumental gates and also square-based towers of about 5 m side which support and reinforce the high walls. Some of the towers disappeared, but their original location is still visible. The ramparts have been constructed in rammed earth ("pisé") according to a traditional Moroccan method which has been using for centuries. A brownish to white rendering of around 1 cm thickness in two layers and a fine grained texture cover the walls. The structure of the ramparts is erected in successive piers or "amaras" (daily work for a team) of 13 to 14 m long for the shortest and 25 to 28 meters long for the longest. One amara is constituted by six wooden casings. A regular network of holes with a horizontal interval of 1.2 m and a vertical interval of 0.6 m, for the casing keys or for the scaffolding are frequently observed. The cross section of the holes is generally  $0.15 \times 0.1$  m. The depth of the holes is variable and usually crosses the entire wall. Pieces of wood are still remaining inside some of the scaffolding holes, and are attributed to the original supporting keys for the casings or for scaffolding, the latter being more recently used with maintenance practices.

The material used to build the ramparts is made out of rammed earth which is a mixture of finegrained and coarse-grained earth carbonaceous materials and lime [2]. Earth comes from nearby soils which contain carbonates. Lime was added to increase cohesiveness [3]. Some other building materials had been also added like stone blocks and pebbles at the bottom of the walls. A lime rendering or ceramics cover the rammed earth. When the rendering is in a good state of conservation, it protects the ramparts from weathering [4].

The atmospheric pollution, earthquakes, microbiological activity have weak degradation role on studied parts of the ramparts in comparison with other factors like rain water impact, lack of maintenance, human activities. Alteration features and their identified causes mainly result from the surrender of the ramparts. We noted that some building characteristics had produced some alteration features like structural fissures and a more important detachment of the rendering where the piers of the ramparts are [1]. Some restitution and restoration phases like some repairs using concrete or bricks increase the degradation degree of these monuments. Wood polychromy which is notably present on pillars and ceilings of a pavilion was also studied in order to understand the origin of the chromatic degradation of lead pigments [5].

#### **European dimension**

This kind of program is an expression of the support to the conservation policy of emergent countries that European Community can offer. European teams also discovered in Morocco unusual building techniques, unusual artefact materials and their ageing in unusual general environment. Then this work gives us better knowledge and expertise capacities to cultural heritage.

In another way, while we are going to continue with the research program on the conservation of ramparts, this collaboration has also led us to develop broadened projects like a European INCO draft on the conservation of North African antique archaeological sites ("MEDISTONE") which began in January 2006 with France, Italy, Germany, Greece, Morocco, Algeria and Egypt. Within the frame of this collaboration, we also expect to establish permanent and durable links between Moroccan and French laboratories in order to allow the constitution of a Moroccan pole for research works and expertises in the field of the conservation of building heritage.

#### **Innovation and originality**

The results showed the importance of maintenance for the ramparts conservation. The study of the lime rendering also shows that it can efficiently protect rammed earth from weathering [4]. These conclusions and the use of appropriate restoration materials are the key factors for improving the quality of the restoration acts of the ramparts.

The study of the origins of the alterations shows that they mainly depend on the environment, the building techniques and the nature of the close soil. These parameters are quite variable in intensity and importance and are function of time, of the location etc. Therefore, the size of the ramparts (40 km linear length) shows the importance of developing a GIS in order to point out the main causes of the ramparts degradation.

The French-Moroccan collaboration on the conservation of the Meknessi Patrimony also leads to organize a conference in order to bring together scientists working on Mediterranean cultural heritage safeguard (RIPAM, 26-28 of 2005 September). Around one hundred Scientists coming from North and South Mediterranean were present. This congress offered to Moroccan historians, archaeologists, geologists and physicians the possibility to gather and to discuss on conservation encountered problems. Some local administrators and students also attended this meeting.

#### Impacts

The project development, the results publication and the organization of a Meknessi seminar and an international meeting manifested themselves in different socio- economic consequences. A Moroccan Master training on conservation topics is now setting up. It gathers scientific teams from the Universities of Meknes and Fes which asked to CICRP and other European teams to take part in it. Moroccan partners have also started another research and education project with the specialists of the Cagliari region (Sardinia) on restoration of earth constructions. One of our deliverables was to constitute a database and a GIS which both will be helpful management tools for the restoration of Moroccan historical buildings. In 2005, students worked on the information of the 19 remaining gates of the ramparts [6]. The ramparts themselves and the Medina will be treated in a second step. Our works have already been acknowledged by the City of Meknes who invites some of our Moroccan colleagues involved in the project to participate in commissions in order to refer to their work when problems of conservation are addressed.

Last, the important degradation state of the Meknessi cultural heritage is now taken into account the town authorities' policy even if it is not one of the present priorities which concern environment, social development and very low level of life [7]. Nevertheless, town authorities and representatives of the Moroccan State underlined that a good conservation state of monuments would be useful in order to promote the suitable development of cultural tourism and to create a valuable tourism economy.

#### Acknowledgement

The Moroccan regional agency "Inspection des monuments historiques", the French Ministry of Culture, the "Association française d'action artistique" (AFAA), the CNRST Morocco and the CNRS France are acknowledged for their financial support and help.

#### References

- [1] Guillaud, H., Meknès, Maroc, report of a scientific expedition, CRATerre- EAG, 17/10-21/10/2003.
- [2] Ajakane, R., Kamel, S., Mahjoubi, R., Vallet, J.M., Bromblet, P., Bouabib, R., Meunier, J.D., Noack, Y., Borschnek, D., Guillaud, H., 'Preliminary studies on the degradations of the Medina's ramparts of Meknes (Morocco)' in Proceedings of "Stone 2004", 10<sup>th</sup> International congress on the deterioration and conservation of stones, Kwiatkwoski, D. and Löfvendahl, R., (eds.), Icomos publisher, Stockholm (Sweden) 27/06-2/07/2004, pp. 809-815.
- [3] Ajakane, R., Kamel, S., Mahjoubi, R., Vallet, J.M., Bromblet, P., Bouabib, R., Meunier, J.D., Noack, Y., Borschnek, D., 'Caractérisation des matériaux de construction des remparts de la Medina de Meknès (Maroc)', in Proceedings of "Deuxièmes échanges transdisciplinaires sur les constructions en terre crue – Les techniques monolithiques, Pisé et bauge", Grands Ateliers publisher, Villefontaine (France), 28-29/05/2005. In press.
- [4] Bromblet, P., Vallet, J.M., Ajakane, R., Kamel, S., Mahjoubi, R., Meunier, J.D., 'Caractérisation des enduits dégradés des remparts de la Medina de Meknès (Maroc)', in Proceedings of the "*Rencontre internationale sur le Patrimoine architectural méditerranéen*", Kamel, S. and Haddad, M., (eds.), Moulay Ismail University press, Meknès (Maroc), 26-28/09/2005. In press.
- [5] Aze, S., Vallet, J.M., Baronnet, A., Grauby, O., 'Bungalow of the Moulay Imail's Berber favourite (Meknes, Morocco): study of the polychromy on wooden pillars', in Proceedings of the "*Rencontre internationale sur le Patrimoine architectural méditerranéen*", Kamel, S. and Haddad, M., (eds.), Moulay Ismail University press, Meknès (Maroc), 26-28/09/2005. In press.
- [6] El Khanchoufi, S., and Khadira, S., 'Etat des lieux des portails historiques de la Médina de Meknès', Diplôme des Etudes Supérieures Spécialisées (DESS) de l'Université Sidi Mohamed Ben Abdellah de Fès, faculté des Sciences Dhar El Mehraz, Département de Géologie, UFR "Environnement, Aménagement du Territoire et Société", 2005, 74 pages.
- [7] Abdouh, M., El Atrouz, A., Mechkouri, A., 'Profil environnemental de Meknès', Agendas 21 locaux pour la promotion de l'environnement et du développement durable en milieu urbain, report, UN-HABITAT, PNUD Maroc, Ed. Ministère de l'Aménagement du Territoire, de l'Eau et de l'Environnement du Royaume du Maroc, April 2004.





## Traditional Water Techniques: Cultural Heritage for a Sustainable Future

Specific Measures in Support of International Co-operation - Mediterranean Partner Countries (MPC)

## The project

Ancient practices of water harvesting, catchment and distribution had guaranteed for years water supplying to the countries and the towns all over the Mediterranean area. An articulated variety of water systems, such as the foggaras, the qanats, the khattaras (drainage tunnels), the shadufs - wells with a balance bar, the filter cisterns, the terracing, the drainages, the stone barrows, the harvesting soils and the diversion dikes, shaped in time the Mediterranean landscape, thus acting on its functionality and on its beauty as well.



Nowadays, the risk of water shortage, desertification and degradation of soils depending on global warming climate heating, the increase of urbanization and the agricultural industrialization is high.

As consequence of this, the reuse of the traditional water systems is both a fundamental contribution to the water resource management based on the local sustainability and the recovery of aesthetical values of the monuments which are a further resource for people. Case studies the Consortium focused on are the leading examples for a methodology which could be suitable also in other environments.



GREECE, Crete. Ancient water caption stone basin palatial period



ALGERIA, Adrar. Seguia: open-air cha which flow through the tilled areas and follow the paths marked by earth walls.



EGYPT, Siwa. Water cistern fed by subterranean gr



EGYPT, Marsa Matruh, Med Coast. Aqueduct: beach



# JORDAN, Petra. Water channels uncovered during the excavation of the Siq as part of rehabilitation of the Siq to its original Nabatean status.

ALGERIA	SUDTIMMI Société Sud Timmi
ALGERIA	USTO Université des Sciences et de la Technologie d'Oran
BELGIUM	EJTN-GEIE
EGYPT	CULTNAT National Centre for Documentation of Cultural
	and Natural Heritage
GREECE	NAGREF National Agricultural Research Foundation
ITALY	IPOGEA
JORDAN	PNT Petra National Trust
MOROCCO	UMI Université Moulay Ismail
PALESTINE	SIDATA Information & Communication Systems
PALESTINE	VIA MARIS







Siège Social: 124, Rue du Commerce B-1000 Bruxelles, Belgium

## Objectives

The project aims to contribute to the development of a bank of information on traditional and indigenous technologies and to focus on the rich and diverse water saving, water irrigation and wastewater-related heritage in the Mediterranean. This region provides a clear example of how water management has been inexorably linked with social, economic and local political history. Shaduf main objectives are:

- Developing a database of information on key water management practices in ancient times using archaeological, historical and environmental information and field work
- Carrying out an inventory of water catchment techniques still existing • in the Mediterranean tradition
- Evaluating the monumental character and the cultural significance of the considered techniques and proposing appropriate strategies of restoration and conservation
- Evaluating the sustainability of current water management activities and proposed activities in terms of the long-time perspective of the project

Partners

#### Project Co-ordinator Maria Luisa Vitobello

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# SHADUF – Traditional water techniques: cultural heritage for a sustainable future

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#### Introduction and content

The Project is coordinated by Maria Luisa VITOBELLO (ETJN GEIE, ejtn@ieni.cnr.it). The scientific management is under the direction of Pietro Laureano (IPOGEA, Italy) and Fekri A. Hassan (CULTNAT, Egypt/UCL, UK). Partnership includes: CULTNAT-National Center For Documentation Of Cultural And Natural Heritage, Egypt; IPOGEA, Italy; NAGREF-National Agricultural Research Foundation, Greece; PNT-Petra National Trust, Jordan; Sarl Societe Sud Timmi, Algeria; SIDATA-Information & Communication, Systems Ltd., Palestine; Université Moulay Ismail De Meknes, Morocco; USTO-Université des Sciences et de la Technologie D'Oran -Mohamed Boudiaf, Algeria; VIA MARIS, Palestine.

The project officially started on July 1, 2004. The kick-off meeting was held in Brussels, Belgium on July 9, 2004. Three following meetings were held in Adrar (February 2005), Algeria, Valencia (July 2005), Spain, and Brussels, (March 2006) Belgium.

The project aims to contribute to the development of a bank of information on traditional and indigenous technologies and to focus attention on the rich and diverse water saving, water irrigation and wastewater-related heritage in the Mediterranean region. It also aims to provide a model of how archaeological data integrated with historical information and traditional knowledge could create a new sense of awareness of the role of water and wastewater in society and nature, and to integrate a long-term understanding of water management with efforts to develop sustainable development strategies.

At a time when water scarcity and poor management of the environment threaten human lives and the integrity of ecosystems, the SHADUF project is a very important step toward a better future. Contributions from this project after 1 ½ years have already revealed the potential not only for the means by which people can live in harmony with their environment, but also how traditional water technologies and managerial skills can improve the living conditions in arid areas.

The specific objectives of SHADUF project are as follows:

- 1. The preparation of a *DATABASE* of all case studies with entries related to archaeological, historical, technical, hydrological, ecological and socioeconomic parameters.
- 2. Characterization of *THE ARCHAEOLOGICAL AND HISTORICAL MONUMENTAL* value, character and cultural significance of water heritage sites.
- 3. Proposals for a strategy for *RESTORATION*.
- 4. Evaluation of the SUSTAINABILITY of current water management activities.
- 5. Recommendations for the *VALORISATION* of water heritage, increasing public awareness, and promoting cultural and eco-tourism.

Case studies from different countries have been selected to highlight the range of the spectrum of water harvesting systems in the Mediterranean region.

- a. Drainage, tanks, terracing systems in selected area in *Italy*
- b. Shaduf and Seguia irrigation in Saoura and Gourara (Sahara region) in Algeria
- c. Khattaras (foggaras) in Morocco
- d. Ancient Nabatean harvesting and delivery systems in Petra in Jordan
- e. Underground tunnels and aqueducts in Jerusalem & historical uses and modifications, *Palestine*
- f. Flood water harvesting in the Faiyum Oasis (figure 1), Egypt
- g. Drainage and wastewater management in Greece
- h. Rainwater harvesting techniques in Syria



#### **European dimension**

project engages The three European Institutions, ETJN GEIE, IPOGEA and NAGREF who are engaged both in the demonstration of the project and the project scientific management as well as responsibility for work in Italy, Greece, and Syria. Professor Fekri Hassan, University College London, is also involved in the scientific management of the project.

Figure 1: Siwa Oasis, Egypt

#### Innovation and originality

The project has already made numerous innovative approaches and original discoveries in the domain of traditional water management. It has initiated the development of the first comprehensive data base structure of water harvesting systems. The data base will provide the basis for a bank of information using icons for a user friendly approach for the Public and for Educational purposes.

The project has already brought into recognition ancient water works that have been long ignored such as the Oldest high Dam in the world in Wadi Garawi, *Egypt*, as well as the oldest national waterworks in the Faiyum Oasis, Egypt. In *Morocco*, the SHADUF project is pioneering the use of GIS-based modeling of Khattara water management systems on a regional scale. In *Algeria*, the SHADUF project is pioneering a model of public participation in the rehabilitation of Shaduf around Talmine (Adrar, Algeria). Another team carried out a detailed investigation of the declining use of the Shaduf along the Western Sahara erg in the Saoura region, in the area between Karzaz and Beni Abbes, and around Talmine, Adrar, Algeria, (Figure 2).

The results reveal that the SHADUF is still of significant symbolic value and that it continues to be used in specific situation as a back- up system.

In *Jordan*, the Nabatean water harvesting system has been mapped providing an outstanding panorama of a complex and diverse water management techniques in an urban context. In Greece, water management technologies have been identified and dated. Construction of dams, excavation of wells and cisterns, reuse of rainwater are found to date back to ca. 2500 C. Gravity drains and pipes and long distance aqueducts date to 2000 BC. Domestic water

management dates back to 1500 BC. Pipes and siphons were used as early as 1000 BC. In *Italy*, survey has been carried out over the area of Matera, a troglodyte town whose urban layout is necessary for rainwater catchment and management. Research has demonstrated that this accurate ability of resources water management had origins dating back to prehistory. The vestiges of the Neolithic villages in Matera are surrounded by deep ditches which had been intended as defensive structures. The photogrammetric survey has proved their water use and their function as water drainage systems and water harvesting devices.



Figure 2: Shaduf, Talmine, Algeria

#### Impacts

The project is already having a significant impact in different arenas; it has attracted the attention of EUWI, The EU water commission, and its results have been included in the World Water Day, Mexico. Several contributions have appeared in professional journals. In addition, articles in newspapers and magazines are providing the general public with a fresh outlook on traditional water management systems.

The project uses as a communication tool among partners its own website and offers an electronic portal to support information and international dissemination to the public at present in English: at project completion contents will be offered in French and Arabic as well. Portal website: www.shaduf-eu.org

#### Aknowledgements

The extended abstract was prepared based on contributions by Prof. Fekri Hassan, C ULTNAT, Egypt / University College London, UK. Authorship of this document refers to project coordinator's capacity.

#### European project details

SHADUF, Contract number: INCO-CT2004-509110 Title: Traditional Water Techniques: Cultural Heritage for a Sustainable Future Coordinator: Maria Luisa Vitobello van der Schoot, EJTN GEIE, Belgium

## CONTRIBUTION OF EU CULTURE 2000 PROGRAMME PROJECTS FOCUSED ON INNOVATIVE TECHNOLOGIES AND HISTORICAL HANDICRAFTS TO THE CULTURAL HERITAGE SECTOR

#### Eva Lukášová

Section for Cultural Heritage of the Cultural Contact Point Czech Republic National Institute for the Protection and Conservation of Monuments and Sites Czech Republic

#### Culture 2000 Programme and International Projects of European Dimension

The European Union Culture 2000 Programme contributes to the promotion of cultural area common to the European peoples. International projects in cultural heritage sector are focused on priorities of the programme as: addressing the citizens, the applied and creative use of new technology and tradition and innovation.

#### Cultural Heritage and projects focused on innovative technologies and historical handicrafts

Projects devoted to innovative technologies in conservation and documentation are supported as well as projects concerning studying, learning and using of historical handicrafts. A special Call of proposals "European Heritage Laboratories" is open for proposals of projects in conservation, restoration and enhancement of cultural heritage of the European dimension supporting the development and dissemination of innovative method and techniques on European scale every year. Dissemination of knowledge, good practice among the specialists and the information concerning the topic and its contribution to the preservation of cultural heritage and European cooperation provided towards the public are essential parts of projects.

#### **Examples of Projects**







#### Renaissance of the Historical Handicrafts and Synthesis of the Modern Technologies in Conservation of the 15<sup>th</sup> century Bauska Castle Ruin (2001)

Project leader – The Museum Bauska Castle /Pilskans, Bauska, LV 3901, Latvia/, coorganizers – Atelier Milos Gavenda – restoration /Czech Republic/, Atelier AT Girsa – architecture /Czech Republic/, Atelier AARE – renovation design (Spain) and associated partners.

Conservation of the castle ruin emphasizing its authentic preserved parts and safeguarding the monument in connection with the influence of its environment, climate and access of visitors.Community grant: 83 383 EUR

Bauska Old Castle, views at yard space, at stonework and brickwork relicts. Photo D.Michoinová

#### Stonemarks (2004)

Project leader - Dom & Metropolitankirche St.Stephan /Dombausekretariat, St.Stephansplatz 3, 1010 Wien, Austria/, coorganizers - Miedzyuczelniany Instytut Konserwacji i Restauracji Dziel Sztuki (Interacademic Institute for Conservation & Restoration) /Poland/, Staatliches Hochbauamt Bayern /Germany/, Správa Pražského hradu (Administration of Prague Castle) / Czech Republic/ and associated partners.

Through development and dissemination of the stonemarks information system to contribute to the preservation of immovable cultural heritage, develop and distribute digital mapping technology and continue the research started in the EU Culture 2000 Project " Cathedral II" in 2001.(www.stonema rks.org) Community grant: 150 000 EUR

Prague St.Vitus Cathedral, views at details of stonework with stonemarks preserved. Photo L.Bezděk, P.Chotěbor and P.Měchura









#### The message of colours, shapes and thoughts (2004)

Project leader - Moravská Galerie v Brně (Moravian Gallery in Brno) / Husova 186, 602 26 Brno, Czech Republic/, coorganizers - Bundesdenkmalamt Wien /Austria/, Hungarian National Gallery /Hungary/ and associated partners

Rescue and conservation of the Baroque Church in Dyje decorated with mural paintings by F.A.Maulbertsch and his disciples through the research of Maulbertsch works and technologies and the support of the access of public to the better knowledge and preserved heritage of this period.Community grant: 99 542,20 EUR

Pilgrim's Church in Dyje, views at Maulbertsch mural paintings-vaulting of presbytery, painting of Christ among High Priest and Roman Soldier. Photo J.Krejča



## Contribution of EU Cultural 2000 Programme projects focused on innovative technologies and historical handicrafts to the cultural heritage sector

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Key words: EU Culture 2000 programme, international projects in cultural heritage, technologies and handicrafts

#### Culture 2000 Programme and international projects of European dimension

The European Union Culture 2000 Programme (for the years 2000-2006) contributes to the promotion of cultural area common to the European peoples and supports cooperation between creative artists, cultural operators, both private and public, the activities of cultural networks, and other partners as well as cultural institutions.

International projects concerning visual arts, performing arts, books & reading and translation, and *cultural heritage* in several priorities of the programme as: addressing the citizens, the applied and creative use of new technology and tradition and innovation – linking the past and future, create international teams for realizations of common tasks and ideas.

## Cultural heritage and projects focused on innovative technologies and historical handicrafts

In the cultural heritage sector a considerable number of projects focused on using of the innovative technologies in conservation and documentation of historic monuments and movable heritage were supported within the main Culture 2000 Call of Proposals as well as projects concerning studying, learning and using of historical handicrafts. A special Call of proposals "European Heritage Laboratories" is open for proposals of projects in conservation, restoration and enhancement of cultural heritage of the European dimension supporting the development and dissemination of innovative methods and techniques on European scale every year.

#### Dissemination of knowledge, good practice and information

Both dissemination of knowledge and of a good practice among the specialists and the information concerning the topic and its contribution to the preservation of cultural heritage and European cooperation provided towards the public are essential parts of projects. Young people and students are encouraged to take part in presentation of the projects' results, in some of the projects the students are involved in realization.

#### **Examples of projects**

Renaissance of the historical handicrafts and synthesis of the modern technologies in conservation of the 15<sup>th</sup> century Bauska castle ruin

#### Project of the Culture 2000 programme in 2001

Project Leader – The Museum Bauska Castle /Latvia/ Coorganizer – Atelier Milos Gavenda – restoration /Czech Republic/ Coorganizer – Atelier AT Girsa – architecture /Czech Republic/ Coorganizer – Atelier AARE – renovation design /Spain/

#### Associated Partners

Inspection of the Cultural Monument Protection of Latvia State Institute for the Preservation of Cultural Heritage /Czech Republic/ Architectural Faculty of the Prague Technical University /Czech Republic/

#### Thema

Conservation of the castle ruin emphasizing its authentic preserved parts and safeguarding the monument in connection with the influence of its environment, climate and access of visitors.

#### Results

The systematic research on the traditional handicrafts, ancient tools and materials started in international dimension • The comparison in situ and synthesis of the experience was done not only among the coorganizers (Latvia, Czech Republic, Spain) but also among other interested countries (Lithuania, Estonia, Denmark) • A considerable part of the Castle Bauska was restored • Training in traditional mansonry and plaster restoration was developed • Unemployed people from this remote region were involved in works • During their practice in situ students of the Prague Technical University designed two options of the visit tour in Bauska Castle for people using wheelchairs • Replicas of ancient relicts were created for the haptic exhibition with comments in Braille • An international conference took part at several places and the publications "The Problems of Historical Ruins Conservation" and "Basics of Mansonry and Plaster Maintenance of Historical Buildings" were issued • International network of the specialists was developed and continues working.

Community grant: 83 383 EUR

#### Stonemarks

#### Project of the Culture 2000 Programme in 2004

Project Leader – Dom & Metropolitankirche St. Stephan /Austria/ Coorganizer – Miedzyuczelniany Instytut Konserwacji i Restauracji Dziel Sztuki (Interacademic Institute for Conservation & Restoration) /Poland/ Coorganizer – Staatliches Hochbauamt Bayern /Germany/ Coorganizer – Správa Pražského hradu (Administration of Prague Castle) /Czech Republic/

Associated Partners Technical School in Schlanders /Italy/ Schmidinger Systems /Austria/ Universität Bamberg /Germany/ Universität Passau /Germany/

#### Thema

Through the main aim of the development and dissemination of the stonemarks information system to contribute to the preservation of immovable cultural heritage, develop and distribute digital mapping technology and continue the research started in the EU Culture 2000 Project "Cathedral II" in 2001.

#### Results

Mapping of historical monuments and of the ancient stonemarks preserved in cathedrals in Vienna, Passau and Prague, in the Royal Castle Wilanów and in the Romanesque church in Tum • Development of mapping software, visualization of the mapping results through 3D model and recording of stonemasons' marks. Recording of the traces of activity of stonemasons, their wandering and works. Recording the information concerning stoneworks in Europe • Development of publicly accesible database and setting up the webside pages for stonemarks

searching and identification • Creating free exhibition in Prague's St. Vitus Cathedral, supporting mobility of qualified specialists in this field • Through dissemination of information and promotion concerning this topic to support increasing of public awarness of preservation of cultural heritage • www.stonemarks.org

Community grant: 150 000 EUR

#### The message of colours, shapes and thoughts

#### **Project of the Culture 2000 Programme in 2004**

Project Leader – Moravská Galerie v Brně ( Moravian Gallery in Brno) /Czech Republic/ Coorganizer – Bundesdenkmalamt Wien /Austria/ Coorganizer – Hungarian National Gallery /Hungary/

#### Associated Partners

Obec Dyje ( Dyje Municipality) /Czech Republic/ Masarykova Universita Brno (Masaryk University Brno) /Czech Republic/ Ministry of Culture /Czech Republic/ National Institute for the Preservation of Cultural Heritage – Regional Unit Brno /Czech Republic/ Secondary School of Applied Arts Brno /Czech Republic/ Technical University of Brno /Czech Republic/ The Roman Catholic Church – Bishopric Brno /Czech Republic/ The Royal Premonstratensian Canonry at Strahov /Czech Republic/ Town Council of Znojmo /Czech Republic/

#### Thema

To contribute to the rescue and conservation of the Baroque Church in Dyje decorated with mural paintings by F.A. Maulbertsch and his disciples through the research of Maulbertsch works and technologies and to support the access of public to the better knowledge and preserved heritage of this period.

#### Results

Research on the documentation and selected works of F.A.Maulbertsch by the international team of specialists exchanging their experience of the topic connecting the regions involved • Conservation works in situ in the space of the pilgrim's church in Dyje based on experts' research results • Series of lectures, travelling exhibition, excursion for specialists, summer course for young people and symposium for disabled people • Dissemination of knowledge connected with research as an impulse for contemporary art creation.

Community grant: 99 542,20 EUR

## A FRAMEWORK FOR DOCUMENTATION OF CONSERVATION PROJECTS

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"precise documentation in the form of analytical and critical reports, illustrated with drawings and photographs" Venice Charter (1964) Article 16

Project

There is a requirement for a robust practical framework for documentation of conservation projects that meets the standards set down by the international conservation charters and conventions. This research project had four components:

- 1. Investigation of standards and of criteria adopted for conservation documentation in selected countries, consultation
- 2. Development of criteria and a draft documentation framework for conservation projects in Ireland
- 3. Testing of the draft framework against existing documentation/records of two major conservation projects
- 4. Refinement of the criteria and framework and publication of the outcomes



Findings	International consensus on the need for documentation of every stage of work/ documentation should be archived and available to research workers Guidance and practice vary widely/ practical difficulties in adequately recording each phase and accessing information Principles and methods of documentation often not developed or disseminated in conservation organisations/ lack of clarity about purpose, timing and methodology Deficiencies more acute in multi-phase projects Strong desire for international standards
The framework	A draft framework was devised based on international charters, examples and experience
Case studies	Case study documentation of multi-phase conservation projects provided a means of interrogating the draft framework The emerging framework provided insight into how the records could inform future conservation management and serve as an educational tool in teaching conservation practice
Outcomes	Documentation criteria: a set of questions for the conservation team that establish the requirements Generic framework aligned to the project process; guidance on recording levels and a series of indices for types of documentation records Generic framework aligned to the conservation management process

This research project was a collaboration between the Office of Public Works and University College Dublin Ireland

## A framework for documentation of conservation projects

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Key words: documentation, conservation practice, conservation philosophy, conservation policy

#### Introduction and content

Conservation projects involving historic buildings often involve a complex decision-making and information-sharing process that evolves as the project develops. Although international charters and conventions are unanimous on the need for comprehensive documentation, given the competing priorities within projects, practices vary widely. Investigation shows that there is little published material derived from conservation principles that addresses the practicalities of providing "future-proofed" documentation in a way that can guide the practicioner, assist the supervising authority and form an adequate resource for future works.

This research project examined the documentation requirements of conservation projects from the perspective of the requirements of international charters and conventions. The project was a collaboration between an Irish State organisation, the Office of Public Works (OPW) and University College Dublin. The research was geared towards the development of a robust practical framework for documentation of major conservation projects. OPW has national responsibility for the care of historic buildings in state ownership and sought to establish international best practice in relation to its portfolio of conservation projects, in the belief that this would have wider benefits in education and practice.

The research programme had four components:

- 1. Investigation of international standards and of criteria adopted for conservation documentation in selected countries. This included consultation with a range of public conservation bodies.
- 2. Development of draft criteria and a draft documentation framework for conservation projects in Ireland.
- 3. Testing of the draft framework against existing documentation / records of selected major and minor conservation projects.
- 4. Refinement of the framework and publication of the outcomes.

These studies have established that, at international level, theoretical guidance and practice vary greatly. The imperative for documentation of conservation works derives from The Venice Charter (1964) Article 16, which sets down the requirements for "precise documentation in the form of analytical and critical reports, illustrated with drawings and photographs" [1]. The Charter requires that every stage of work should be recorded, and that the record should be archived and available to research workers. The study found a consensus among charters and conventions that recording before, during and after intervention constituted best practice. However, while this imperative was universally recognised it was not universally realised. There are real practical difficulties in ensuring that each phase of work is adequately recorded, that the information is readily available within the project, and that it is accessible when required subsequently. Deficiencies become more acute in multi-phase projects. At the same time, documentation principles and procedures are rarely explicitly developed or disseminated within the majority of conservation organisations. The lack of an international standard on

conservation documentation featured frequently in consultations with public conservation bodies in the UK and the US, as did a general lack of clarity in regard to the purpose, timing and methodology of documentation. A key element of the research was the testing of a proposed framwork against the documentation records of two multi-phase conservation projects. Case study properties were selected from the portfolio of those in state care to ensure maximum access to all available records and to the personnel involved at every level. Two important country houses were selected:

- Castletown House (1720's), designed by Alessandro Galalei and Edward Lovett Pearce, is the largest and most significant Palladian style country house in Ireland. It was built for William Conolly (1662-1729), the Speaker of the Irish House of Commons;
- Fota House was designed by the renowned Irish architect Richard Morrison and his son William, for John Smith Barry. The house dates from 1825 though it incorporates an earlier hunting lodge.

Conservation of both houses required close observation, analysis, and recording, extended over time. Following works to make the buildings structurally sound, necessary research, recording, analysis and conservation works were conducted. Thus the documentation resource of these works provided a means of interrogating the draft framework, while the emerging framework provided insight into how the records could inform future conservation management and serve as an educational tool in teaching conservation practice. The research outcomes are structured as follows:

- Documentation criteria: a set of questions for the conservation team that establish the documentation requirements
- Generic framework aligned to the project process; guidance on recording levels and a series of indices for types of documentation records
- Generic framework aligned to the conservation management process

#### **European dimension**

In accordance with the principles of Article 16 of The Venice Charter (1964), there is international agreement on the importance of conservation documentation and it is a responsibility of each country to plan this within the framework of their own culture and traditions. The methodology used to develop this guidance could stimulate and guide documentation planning at national, regional and European level. There is potential to extend the criteria and framework devised by this project to inform conservation documentation at European level. Its implementation will facilitate understanding and sharing of knowledge with other European countries when needed, in a systematic manner and in a format that is flexible in the European context. It will assist in establishing a clear and coherent rationale and methodology for undertaking documentation which aims to avoid resources being wasted, inappropriate information being collected, or key issues neglected.

#### **Innovation and originality**

As well as providing a practical framework for documentation, this project presents a set of criteria and guidelines on principles, practices and procedures concerning documentation of conservation works. These are based on the general principle that documentation plays a key role in the conservation process, at all levels of intervention from maintenance through to repair and alteration, refurbishment or development. The key contribution of this research lies in relating the general principles to the active process of conservation, thereby enabling the documentation process to become a central element of the conservation action, rather than merely a postmortem record of *what was lost* or *what was done*. The guidance provides advice on criteria, recording levels and indexing to help decide the type of information and a scale that is appropriate [2]. The model documentation framework defines clear stages in the documentation process and explains how to shape such information to a specific project.

The framework provides guidance on principles, practices and procedures. It also highlights key elements of conservation charters and recommendations that provide a fundamental basis for documentation best practice. The case studies themselves illustrate the wide range of documentation material a conservation project may produce, also the difficult decisions to be taken about the scale of the documentation, the amount of information to be collected and managed, and the importance of compiling a documentation priority list and indexing system. The challenge of translating international policy into local practices is also considered and will be the focus of further investigation [3].

#### Impacts

It is anticipated that the documentation framework that is the outcome of this research, will be put into practice in the conservation projects conducted by OPW. When adopted they will result in a systematic approach to recording the resource and the interventions carried out, and will provide a structure for archiving into the future. If adopted more widely, they will reduce one of the basic risks in the conservation of historic buildings: that decisions made on poor information results in the loss of culturally significant fabric. Dissemination of the findings will help develop awareness that systematic and rigorous documentation practices are necessary and that they are achievable. Such documentation enhances understanding of a building or site, and advances the conservation process. It also improves management and access to current records and archive material. It will encourage self-critical conservation practice based on accurate information about conservation works, and transparency concerning the cultural and other values underlying conservation decisions.

#### Acknowledgements

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#### References

- ICOMOS. International Charter for the Conservation and Restoration of Monuments and Sites. The Venice Charter. Article 16. II<sup>nd</sup> International Congress of Architects and Technicians of Historic Monuments, Venice, (1964).
- [2] A broad range of documents was examined in this regard. In particular the following proved useful in reaching working definitions and establishing parameters:
  a. ICOMOS Canada. *Guidelines for the Recording of Heritage Buildings*. (DRAFT), (1990).
  b. ICOMOS Australia. *The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance. The Burra Charter*. Article 1. (1990).
- [3] This matter is receiving increasing international attention reference inter alia to:
  a. Ogleby, C.L. *Heritage Documentation The Next 20 Years*. Geo-Imagery Bridging Continents XX<sup>th</sup> ISPRS Congress, 12-23 July 2004 Istanbul, Turkey. Department of Geomatics, The University of Melbourne, Victoria 3010. <a href="http://www.isprs.org/istanbul2004/comm5/papers/668.pdf">http://www.isprs.org/istanbul2004/comm5/papers/668.pdf</a>>
  b. LeBlanc, François. *Principles & Guidelines For Recording, Documentation And Information Management Of The Built Cultural Heritage*. The Getty Conservation Institute.
  <a href="http://www.icomos.org/~fleblanc/publications/publication

## **3D+COLOUR DIGITISING TECHNIQUES APPLIED TO ROMANESQUE CHURCHES**

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**Digitising Process** 



Image of "Santiago Apóstol" Church (Cezura, Spain)



Detail of the scanning process



Registered 3D+Colour Point Clouds







Texture superposition



Mesh of the Church's facade



Mesh with colour information







## **3D** + colour digitising techniques applied to Romanesque churches

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Key words: laser scanning, colour measurement, digital model, texture mapping, feature extraction

#### **Introduction and content**

The present work implies the obtaining of ultra-realistic and very precise three-dimensional models of Romanesque churches located in the north of Spain. The objective is both to document them and to plan their integral restoration. Therefore, the 3D geometric measurement by means of a TOF laser scanner is required, that gives rise to a model in the computer to which digital pictures are superimposed afterwards. These pictures are taken by means of a hi-resolution camera in parallel to the scanning process. This way, a real-coloured virtual model is obtained.

It supposes a step forward, regarding accuracy and time, over the conventional methodologies on the matter [1]. In addition, once obtained the digital model of a church, the displacement to the place where it is becomes unnecessary (except rescanning for deterioration monitoring, or works evolution checking), leading the operator to be able to make new calculations or to extract new characteristics just at office because the church is conceptualised in a PC. The complete process to create a 3D+Color virtual model can be outlined in three steps:

(1) Work in Field (taking of data): in order to achieve a reliable virtual reproduction of the scanned monument by means of the laser technology. Since it is not possible to acquire all this data from a unique perspective, it is necessary to place the scanner at different positions to obtain point clouds corresponding to each partial view (inside and outside). An overlapping of a 10% between partial views is highly recommended to facilitate the later alignment process. A typical Romanesque church can originate 12 million points, with resolutions between 0.4 and 2 cm. Parallelly, pictures of the scanned zones are taken (around 300, 7 Mpx each). These must be, as humanly possible, frontal takings to avoid perspective effects. Their correspondence does not have to be exact with the scanned areas [2].

(2) Creation of the Geometrical Model: obtained point clouds are imported and refined (cleaning, filtrating, reduction, etc.) in a reverse engineering software. Next it is come to the alignment process, which consists of their referencing with respect to a common Cartesian system. This process requires of an initial solution by matching at least three pairs of analogous points in two clouds, that later is optimised in an iterative way (mostly through ICP algorithm). Because polygonal meshes are needed for representing and rendering 3D objects, a high quality mesh model is generated straight on from 3D laser scanning point clouds through a laborious job [3]. Finally, the obtained mesh must be published: filling of holes, correction of topological errors, smoothing, and generation of hidden surfaces that have not been possible to scan.

(3) Colour Addition (photographic superposition): current scanners in the market does not go further than offer the colour by point of the digitised objects (vertex colour). This is limited by

the geometric resolution and varies throughout the scanning process depending on the environmental luminosity. The superposition of digital photographic images on the resulting mesh from the previous step, allows to avoid these serious disadvantages [4]. For such operation, a specific software has been developed which implicitly makes a calibration between the mesh (3D) and the picture (2D), based on the Tsai method [5]. Thus, homologous points in both are marked, and the required 3D+Color model (photo realistic appearance) for the indicated applications is finally obtained.

#### **European dimension**

According to Digicult Report [6], improving 3D acquisition systems would be achieved 10 years hence in the following features: (a) on-line scanning; (b) fully automatic registration; (c) integrated shape and surface reflectance modelling; and (d) an automatic methodology for adapting the modelling strategy to all types of shapes and surfaces. Moreover, using the same kind of metadata standards, to describe 3D+Colour objects homogeneously, have to be agreed upon guidelines that help to operate according to a commonly shared pattern. In order to leverage the full potential of 3D digital resources regarding to cultural heritage, Europe is called for the better coordination and support of the fore R&D activities and their convergence with innovation, promoting the European Research Area.

The geographical region in which the target churches are located (northern Spain) shapes the major concentration of Romanesque monuments all over Europe. A major importance contract was signed in 2004 between CARTIF and the Santa Maria La Real Foundation, to apply them 3D+Color digitising techniques as future World Heritage area by UNESCO.

#### **Innovation and originality**

Cultural Heritage is still following a process in which preservation and access have been mainly applied to individual singular elements (monuments and objects). Building 3D digital models comprising real colour to support a new approach to Cultural Heritage preservation, sustainability and dissemination, is a novel way to store knowledge embedded in the contextual reality through enriched conceptual representations, and advanced access methods.

Laser scanning and colour acquisition technologies are very innovative in the Cultural Heritage field. These are quicker, more safety and more accurate measurement NDT than conventional ones, bringing new solutions to the following fields: cataloguing and documentation (mainly drafts, elevations and feature extraction, even georreferenced through GIS); monitoring (decay assessment, planning of preventive strategies, and intervention or restoration aiding); low cost duplication for exhibition, or to replace the original in the short term or definitively (because irreversible damages by accidents, vandalism or natural causes); and disclosure (oriented to specialized staff or public in general). Likewise, they allow practitioners to map and browse physicochemical information on 3D scanned elements through termographical superposition.

#### Impacts

The study, protection and promotion of the heritage presents a double slope: academic and business. Focusing on the latter, the dissemination of that mobilizes both the conventional publishing sector (facsimiles, encyclopaedias, specialized books, etc.), and ICTs: popularisation on the web, education, multimedia, etc. The increasing demand of virtual contents creates a push in the offer. This fact sits the bases for the establishment of a business structure of high technical qualification that allows to incorporate the rural nuclei into the Economy of Knowledge of our century.

Moreover, a direct consequence of the Heritage management is the consolidation and development of School-Factories to train young people dedicated to its exploitation: crafts, rural

tourism, restoration and social activities. Currently exists a SME dedicated to the reproduction in scale model of Romanesque buildings as derived cultural product. It requires of young people coming from those School-Factories. The use of the described techniques, allows the creation in the computer of moulds to any scale automatically and accurately, which allows a greater production of more detailed pieces, that does not lose its artisan character. It leads to the expansion of the SME by the national territory, and opening the market to the international.

In addition, the digital disclosure of Heritage involves to make it accessible to the greatest amount of public, specially to people not able to make a real visit. However, the wide spreading that allows the ICTs stimulates the tourism. This fortifies and expand the chain of small catering establishments in diverse localities of the surroundings of Aguilar de Campoo (Palencia). In this context, another parallel activities grow up: the recovery of the civil architecture in rural environments; training activities for unemployed within the framework of corresponding rehabilitation; and the insertion of low qualified young people in the labour market.

Also, the socioeconomic dimension of the Heritage is governed by the sustainable development. Thus, the actions for their integral management, favour human teams formed by qualified technicians in so distant disciplines such as architecture, engineering and art, ready to solve the intrinsic problematic of the Heritage with a renewed criterion (ahead of solely restoration).

The business activities previously described could give rise to a common monetary fund that allows to pay integral welfare attention, as well as to facilitate programs of leisure and sociocultural animation to a region marked by the aging of their inhabitants, the increasing depopulation and the lack of infrastructures and social services. Old age people, also, accumulate beliefs, customs, crafts and traditions that do not have to be lost, and comprise of the culture of the promoted Heritage, favouring their integration.

#### Acknowledgement

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#### References

- [1] Gaiani, M., Translating the Architecture of the Real Into the Virtual: Seven years of experimentation with "Conservation and Representation" at OFF, Officina Infográfica, Facoltà di Architettura di Ferrara (Italy), 1999.
- [2] El-Hakim, S.F., Fryer, J., Picard, M. and Whiting, E., 'Digital recording of aboriginal rock art' in Proceedings of the 10<sup>th</sup> International Conference on Virtual Systems and Multimedia (VSMM), Ogaki City, Gifu (Japan), Nov 17-19, 2004, pp. 344-353.
- [3] Beraldin, J.-A., Picard, M., El-Hakim, S.F., Godin, G., Borgeat, L., Blais, F., Paquet, E., Rioux, M., Valzano, V. and Bandiera, A., 'Virtual Reconstruction of Heritage Sites: Opportunities and Challenges Created by 3D Technologies' in Proceedings of the International Workshop on Recording, Modeling and Visualization of Cultural Heritage, Ascona (Switzerland), May 22-27, 2005.
- [4] Grammatikopoulos, L., Kalisperakis, I., Karras, G., Kokkinos, T. and Petsa, E., 'Automatic multiimage photo-texturing of 3d surface models obtained with laser scanning' in Proceedings of the CIPA International Workshop on Vision Techniques Applied to the Rehabilitation of City Centres, Lisbon (Portugal), Oct 25-27, 2004.
- [5] Tsai, R.Y., 'A Versatile Camera Calibration Technique for High-Accuracy 3D Machine Vision Metrology Using Off-the-Shelf TV Cameras and Lenses', IEEE Journal of Robotics and Automation, Vol. RA-3, No. 4, Aug 1987, pp. 323-344.
- [6] DigiCULT, Technological landscapes for tomorrow's cultural economy. Unlocking the value of cultural heritage, European Commission - Directorate General for the Information Society, Brussels (Belgium), 2002.

#### EBIDAT - BURGENDATENBANK DES EUROPÄISCHEN BURGENINSTITUTES

#### BURGEN AN RHEIN UND DONAU

International Inventory on Medieval Castles in the UNESCO World Heritage Areas Upper Middle Rhine Valley and Danube – EBIDAT Dr. Reinhard Friedrich, Head of European Castles Institution, Philippsburg, D-56338 Braubach, Germany





Aggstein, Austria

#### Homepage EBIDAT

www.ebidat.de



#### Hillside Castles in the Upper Middle Rhine Valley

#### Marksburg

#### Besitzgeschichte:

Rheinland-Pfals

Es ist zu vernuten, dass die Edelherren von Braubach, die 1117-71 genannt werden, vielleicht bereits über eine Burganlage, zumindest über einen repräsentativen Sitz im Ort verfügen, dessen Lage aber nicht genau bekannt ist. Seit 1219 sind hier die Herren von Eppstein nachweisbar, in deren Verfügungsgewalt sich Braubach und seine einträglichen Silberminen als pfalzgräfliches Lehen nun befinden. Unter ihnen ist die Kernanlage der heutigen Burg in der ersten Hälfte des 13. Jh.s entstanden. Erste Hinweise auf die Existenz einer Burg datieren in das Jahr 1231, als sog. "Castellani" was wohl mit Burgleute zu übersetzen ist, urkundliche Erwähnung finden. Konkret fassbar wird die Burg nach neuesten Erkenntnissen im Jahr 1239, da dieses Jahr als Fälldatum von im Unterteil des Bergfrieds verbauten Hölzern verifiziert wurde. Ob die gesamte Burg in dieser Zeit erbaut oder der Bergfried in eine bereits bestehende Anlage gesetzt wurde, ist nicht sicher zu entscheiden. Immerhin kamen Ende 2004 bei einer kleinen Untersuchung mehrere Scherben im Innenhof zu Tage, die eine Nutzung des Burgplatzes "um 1200" nahe legen. 1260 wird sie jedenfalls als Zollburg genannt, 1276 erhält der Ort Stadtrechte. 1283 kommt Braubach mitsamt seiner Burg an die Grafen von Katzenelnbogen, die ihr Territorium konsequent ausbauen. Sie dient nun - wahrscheinlich wechselweise mit Burg Hohenstein im Taunus - als Residenz der jüngeren Katzenelnbogener Linie, 1293 wird sie als Pfalzgräfliches Lehen in deren Besitz bestätigt. Mit dem Aussterben der Grafen von Katzenelnbogen im Jahre 1479 fällt sie an die Landgrafen von Hessen, aber von besonderer Bedeutung ist nur noch die Zeit unter Landgraf Philipp II. von Hessen-Rheinfels. Dieser gibt die Marksburg, deren Name nun vom Markus-Patrozinium der 1437 bezeugten Burgkapelle hergeleitet wird, als Residenz







Description of History and Building History of Marksburg Castle

## International inventory on medieval castles in the UNESCO world heritage areas upper Middle Rhine Valley and Danube – EBIDAT

#### **Reinhard Friedrich**

Head of the European Castles Institution, Philippsburg, Schloss-Straße 5, D-56338 Braubach, Germany

EBIDAT is an abbreviation for Europäisches Burgeninstitut and Datenbank. It stands for a database on castles, which is domiciled at the European Castles Institute. It is still unknown till this day, how many castles once existed. At the most various federal states might have data collections at their disposal, which are structured according to various preserving faculties. What is missing, is a coordination. This is, where the European Castles Institute comes in.

As a nationwide organisation, the German Castles Association (DBV) has good preconditions for a continuous, supra-regional and non personal compilation of castles.

A task force first worked out an IT-based database (MS ACCESS). In various partitions we collect the most important data on castles. We do not only want to cover the still existing and visible castles, but as far as possible all once existing castle places which are either mentioned in historical sources or have been spotted with new techniques of archaeology.

#### Marksburg

#### Besitzgeschichte: Besistzu vermuten, dass die Edelherren von Braubach, die 1117-71 genannt werden, vielleicht bereits über eine Burganlage, zumindest über einen repräsentativen Sitz im Ort verfügen, dessen Lage aber nicht genau bekannt ist. Seit 1219 sind hier die Herren von Eppstein nachweisbar, in deren Verfügungsgewalt sich Braubach und seine einträglichen Silberminen als pfalzgräfliches Lehen nun befinden. Unter ihnen ist die Kernanlage der heutigen Burg in der ersten Hälfte des 13. Jh.s entstanden. Erste Hinweise auf die Existenz eine Burg datieren in das Jahr 1231, als sog. "Castellani", was wohl mit Burgleute zu übersetzen ist, urkundliche Erwähnung finden. Konkret fassbar wird die Burg nach neuesten Erkenntnissen im Jahr 1239, da dieses Jahr als Fälldatum von im Unterteil des Bergfrieds verbauten Hölzern verifiziert wurde. Ob die gesamte Burg in dieser Zeit erbaut oder der Bergfried in eine bereits bestehende Anlage gesetzt wurde, ist nicht sicher zu entscheiden. Immerhin kamen Ende 2004 bei einer kleinen Untersuchung mehrere Scherben im Innenhof zu Tage, die eine Nutzung des Burgplatzes "um 1200" nahe legen. 1260 wird sie jedenfalls als Zollburg genannt, 1276 erhält der Ort Stadtrechte. 1283 kommt Braubach mitsamt seiner Burg an die Grafen von Katzenelnbogen, die ihr Territorium konseguent ausbauen. Sie dient nun - wahrscheinlich wechselweise mit Burg Hohenstein im Taunus - als Residenz der jüngeren Katzenelnbogener Linie. 1293 wird sie als Pfalzgräfliches Lehen in deren Besitz bestätigt. Mit dem Aussterben der Grafen von Katzenelnbogen im Jahre 1479 fällt sie an die Landgrafen von Hessen, aber von besonderer Bedeutung ist nur noch die Zeit unter Landgraf Philipp II. von Hessen-Rheinfels. Dieser gibt die Marksburg, deren Name nun vom Markus-Patrozinium der 1437 bezeugten Burgkapelle hergeleitet wird, als Residenz



The actual database, which is the basis of our present internet version, is resident in the European Castles Institute. For our internet version the most important data of our database (ACCESS) have been clearly laid out and combined. Moreover the dry facts are - as far as possible - complemented through topical photos, historical views and ground plans.
This database is only a first step of information when you are interested in a certain castle. Such a database has two important advantages over conventional publications:

- It is possible to resume, pool and group data according to various questions and problems.
- It is fairly easy to update information.

After the realisation of the first stage, the castle database will be continuously filled and extended with new data.

### Inventory of castles along the Rhine and Danube River

An important European project, which is carried out and coordinated by the European Castles institute, is the compilation of data on castles along the Rhine and Danube rivers.

Not only since the Middle Ages the Rhine-Danube Region has been one of the central European routes for cultural transfer between the Eastern Mediterranean and Western Europe. This cultural exchange is reflected in the construction of numerous castles along this route. Not surprisingly, a large number of important UNESCO World Heritage is located in this area, e.g. the Upper Middle Rhine Valley, Wachau Cultural Landscape, Historic Centre of Vienna (A), Neusiedler See Cultural Landscape, Castle of Buda, including the banks of the Danube in Budapest. The castles give true witness regarding past cultural exchange in this central European cultural landscape. Last but not least the ruination and decay of castles has lead to a decline of vital cultural heritage and there is growing threat that it will be lost in future.

The overall objective of the project is to protect and to revitalise this unique cultural heritage by a thorough cross-border analysis of castles in selected European target regions.

The task force is headed by three different experts from the countries taking part:

- Dr. Reinhard Friedrich, Head of the European Castles Institute
- Mag. Thomas Kühtreiber, Institut für Realienkunde des Mittelalters und der Frühen Neuzeit, Körnermarkt 13 A, A – 3500 Krems/ Austria
- Prof. Dr. Istvan Feld, University of Budapest, Eötvös Loránd University, Faculty of Humanities, Tudomanyetyetem, Szerb u. 21-23, HU 1056 Budapest, Hungary

Million and Andrews	EBIDAT - Burgendatenbank i Burgen an Rhein und Donau		
	Herzlich Willkommen a Hier finden Sie alle Bur Das Europäische Burgee das Institut für Realienk allen Interessierten viel Fro	uf den Seiten des Europäischen Burgeninstituts! gen an Rhein und Domau! institut bzw. die Deutsche Burgenvereinigung e.V., unde Lreens und die Universität Budapest wunschen unde auf "burgen an Rhein und Donau".	B EBIDAT Hilfe Literatur Nitarbeiter
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Without additional financial support it is not possible to realise such a project. We are therefore very appreciative, that this project, i.e. the compilation of data on castles along the Rhine and Danube river has been financially promoted out of funds of the EU Project: Culture 2000.

Due to this promotion it was possible to present important parts of our database in the internet.

### The European Castles Institute (EBI)

The European Castles Institute as a subsidiary of the German Castles Association was opened in 1999 in Philippsburg Castle on the banks of the river Rhine and just below Marksburg Castle (www.deutsche-burgen.org).

The Institute's activities are focused on castles as a feature of mediaeval history – a phenomenon so complex that only an interdisciplinary and international approach can do it justice. The EBI does not have the financial or human resources to conduct independent research work, but sees its task as networking between specialists in the field and exchanging research findings.

Philippsburg Castle houses a specialist library on castle research (currently 30.000 books) with subscriptions to 125 periodicals as well as a comprehensive documentation and a collection of plans and maps, pictures and photographs.

The institute is supported by an advisory board of thirty European professionals in castle research from various disciplines, such as history, archaeology, building research, preservation etc.

Through the establishment of the institute, foundations have been laid, to work on an important desiderate of Castle Research: The inventory of mediaeval castles. You will find further information under www.ebidat.de .

# "P.I.C.A. PROJECT": AN OPEN SOURCE SYSTEM FOR DIFFUSION AND VALORIZATION OF CULTURAL HERITAGE

D. Demarchi\*, G. Di Gangi\*\*, C.Bouliou\*\*\*, C.M. Lebole\*\*

\* I.S.I.Line srl, Politecnico di Torino, Italy - \*\* CeST-Marcovaldo, Università di Torino, Italy - \*\*\* Conseil General de Alpes de Haute Provence, France

### THE PROJECT AND ITS PARTNERS

P.I.C.A. project is a cooperation between Italy and France that is integrated in a wider strategy of valorisation of the transalpine area. Its aim is to preserve and to valorise the cultural heritage through informatics and Web applications. The territories involved are the Italian area of the Province of Cuneo (Marchesato of Saluzzo) and the departments of France: Alpes de Haute Provence (chef of French partners); lsére (Conservation Departementale de l'Isère); Hautes Alpes.





### SYSTEM ARCHITECTURE

DIDACTICAL ASPECTS

allowing users to have also clear and simple informations.

The system architecture is based on dynamical Websites technologies and integrates public accesses for users Web pages navigation and protected access to allow administrators and operators to manage the data contained in the system. A Java Engine is shared by different accesses and is the interface with the DataBase. From DataBase, the data are extracted to be showed in the two main methods: the cartographic visualization and the card describing the entity selected, as for example an historic monument.

The management of data on the dynamic map are passed through MapServer system and then elaborated by Java Engine to be prepared for Web visualization as HTML page. Descriptive cards are generated by Java Engine also, but the repository of reference is based on SDX system, that is connected to Postgres DataBase. From SDX are then directly generated the pages that are result of searches introduced in Web site. In this case the functionality is similar to a classical textual search engine.





In the Website are implemented didactical explanations of concepts and terms used in the descriptions of monuments. These didactical cards are present at different levels,

### **PROJECT AIMS**

P.I.C.A. goals are different and complex:

 to develop new computer based solutions using all the opportunities achieved by Internet network and OpenSource technologies, with integration between DataBases and cartography;

 to value and to disclose, as final result of a correct scientific research, to produce an easy access to cultural routes, either humanistic or naturalistic, allowing the diffusion to an heterogeneous public of the results

 to design and realize a WebGIS site based on OpenSource software that, starting from thematic maps, allows the user to reach the data of interest in an easy and efficient way



# EUROPEAN PROJECT DETAILS

P.I.C.A. (Portale Informatico delle Alpi occidentali - Portail Informatique Culturel des Alpes occidentales) is a project funded by

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## P.I.C.A – Portale Informatico Culturale delle Alpi occidentali: a multi-disciplinary and integrated project for cultural heritage

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Key words: GIS, internet/WEB, information system, mapping, patrimony

### **Introduction and content**

The presented work is the result of the integration of different informatics and cartographic instruments into a project named P.I.C.A. (Cultural Informatics Portal of the Western Alps – Interreg IIIA Alcotra) – a CeST-Marcovaldo project, in cooperation with Turin University and the Politecnico di Torino, which has begun in year 2000 – concerning the diffusion and valorization of cultural heritage. As showed in figure 1, in this project the computer technologies are used to obtain a complete tool for browsing and researching multidisciplinary data, from historic monuments to geological morphologies up to anthropological studies.

All these data are strictly connected to the territory and had been structured in a GIS; the project itself is integrated in a transalpine scenario, to stimulate the sharing of data between transalpine researchers and institutions, linking them to their presence on a common territory.

The main technical goal is the design and realization of a WebGIS site that, starting from thematic maps, allows the user to reach the data of interest in an easy and efficient way. With these intentions, thinking about the need of obtaining an open product, usable by researchers and also by an heterogenic public, the OpenSource technologies have been considered the best solution to reach the different goals of the activity.



Figure 1: Aim of the project, to use new technologies for cultural heritage valorization

In figure 2 is specified the structure of the system, where a Java Engine is shared by different accesses and it is the interface with the DataBase. From DataBase, the data are extracted to be showed in the two main methods: the cartographic visualization and the card describing the entity selected, as for example an historic monument.

The management of data on the dynamic map are passed through MapServer system and then elaborated by Java Engine to be prepared for Web visualization as HTML page.

Descriptive cards are generated by Java Engine also, but the repository of reference is based on SDX system, that is connected to Postgres Database. From SDX are then directly generated the pages that are result of searches introduced in Web site. In this case the functionality is similar to a classical textual search engine.



Figure 2: System architecture

In the Website are implemented didactical explanations of concepts and terms used in the descriptions of monuments. These didactical cards (figure 3), realized by L. Terzi, are present at different levels, allowing users to have also clear and simple information.



Figure 3: Didactical cards

### **European dimension**

P.I.C.A. project is a cooperation between Italy and France that is integrated in a wider strategy of valorisation of the transalpine area. The territories involved are the Italian area of the Province of Cuneo (Marchesato of Saluzzo) and the departments of France: Alpes de Haute Provence (chief of French partners); Isère (Conservation Departementale de l'Isère); Hautes Alpes. These areas have in common not only a homogenous geographic picture, but a cultural substrate strongly characterized, where the alpine territory has always represented a link between different traditions. For these cultural and historical reasons the territories are extremely interesting and are ready for a multimedial integration for management of data and initiatives.

### Innovation and originality

The system was built to be used by researchers, local administrators who have to preserve the local cultural heritage, and by ordinary citizens who wish to use the land for tourism. In the last five years a great deal of data coming from different fields, such as archeology, geology, botany, and cultural anthropology, have been collected by experts in different and specific

fields, and organized in a database. This great research effort required tools that could improve the understanding of the data and deepen the investigation potentiality of such a quantity of data. The preparation of a stand alone GIS made it possible to put together, to compare and to interpret archived data. It is in fact believed that interdisciplinarity is necessary to understand land transformations and the role humans play in this.

In the wide software scenario of OpenSource solutions, have been selected the applications that had to fundamentally solve three problems: Web presentation, Map and data management, Powerful Search Engine.

In the activities performed before P.I.C.A. project was started, the researchers worked on many cultural aspects and the management of data was based on specific applications, developed for dedicated workstations and with offline usage. The extension of the system to new Internet technologies, with the developing of a dedicated Web site with the well known facilities obtained by a shared and networked repository of data, was a natural step. The goal of the project was not only to share data, but also to exploit the powerful opportunities of Internet network to reach a larger number of users, that can be not only experts or researchers, but also people interested in cultural information for tourist purposes. With these premises, the site specifications were first focused on thinking an easy to use system that could make the user access detailed or less precise, but more general and addressed to cultural diffusion. For these reasons it was chosen to implement a platform that could satisfy both needs, and allow the user to deepen the quantity and quality of the information depending on the navigation choices in the Web site.

### Impacts

One of main goals reached by PICA project was to value and to disclose a transalpine area and, as final result of a correct scientific research, to produce an easy access to cultural routes, either humanistic or naturalistic, allowing the diffusion to an heterogeneous public of the results. In the meantime, a multidisciplinary and transnational research group was created, with a very interesting exchange of experience and skills.

### Acknowledgement

We sincerely thank Mr. Fabrizio Pellegrino, president of the Cultural Association "Marcovaldo" (Caraglio, Cuneo – Italy), for his continous support to the realization of our projects concerning the territory of "Marchesato di Saluzzo". Moreover, we want to thank the expertise and professional contribution that Pass-Tech Technologies (France) put into the project.

### References

- [1] Di Gangi, G. and Lebole C.M, *La gestione del Territorio: memoria, partecipazione, sviluppo della ricerca*, Atti del Convegno Nazionale, Saluzzo 11<sup>th</sup>-12<sup>th</sup> november 2000.
- [2] Di Gangi, G. and Lebole C.M., 'Un esempio di studio integrato del territorio: il Marchesato di Saluzzo (CN)', Atti del X<sup>e</sup> Colloque International sur Les Alpes dans l'Antiquitè, "Bullettin d'études Prehistoriques et Archéologiques Alpines", XV, Cogne, 12<sup>th</sup>-14<sup>th</sup> september 2003, pp. 327-338.
- [3] Di Gangi, C.M. Lebole, D. Demarchi and L. Nejrotti, 'P.I.C.A. Portale Informatico Culturale delle Alpi occidentali: a multidisciplinary and integrated project for cultural heritage', CIPA XX International Symposium, Turin, 26<sup>th</sup> September – 1<sup>st</sup> October 2005.
- [4] E. Agosto, D. Demarchi, G. Di Gangi and G. Ponza, 'An OpenSource system for P.I.C.A.: a project for diffusion and valorization of cultural heritage', *CIPA XX International Symposium*, Turin, 26<sup>th</sup> September – 1<sup>st</sup> October 2005.

### **European project details**

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## Initial Results of the ATHENA Project at IESL-FORTH

Austin Nevin<sup>1,2</sup>, Iacopo Osticioli<sup>1,3</sup>, Demetrios Anglos<sup>1</sup>, Costas Fotakis<sup>1</sup>, Emilio Castellucci<sup>3</sup>

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#### **The ATHENA Project**

LIF

The Marie Curie Host Fellowships for Early Stage Research Training 'A scientific Training for High Education iNitiatives in Art conservation' (ATHENA) project trains early stage researchers on scientific methodologies for the characterisation and conservation of the cultural heritage patrimony with the aim of structuring European research in this field. The training activity in science for cultural heritage involves three European research laboratories with complementary and reliable expertise for the use of scientific techniques applied to conservation problems: LENS of Florence (Italy), IESL-FORTH of Heraklion (Crete, Greece), UA-MITAC of Antwerp (Belgium). Research at FORTH-IESL has focused on Laser-based spectroscopy for the analysis of inorganic and organic materials found in art. A combination of the techniques of Laser Induced Breakdown Spectroscopy (LIBS), Laser Induced Fluorescence (LIF) and Raman spectroscopy can be used for the analysis of materials, revealing atomic, molecular and structural information respectively.

#### Raman

LIBS

Inelastic scattering of photons by molecules and is **non-destructive**. Using a microscope focusing the laser beam in a very small zone of the sample ( $\sim\mu$ m), a complete mapping and visualize the presence of each different pigment composition can be achieved

The laser vaporizes and ionizes a few micrograms of material in the form of plasma that emits light characteristic of the material's composition. No sample preparation is required. Small amount of sample can give good results.



provide both atomic (LIBS) and molecular (Raman) information about the composition of materials



### Further aspects of research

Laser excitation in the red to limit interference from fluorescence

Portable instrumentation

References

1.L. Burgio, K. Melessanaki, M. Doulgeridis, et al., Pigment identification in paintings employing laser induced breakdown spectroscopy and Raman microscopy Spectrochimica Acta B 2001. 56 (6): p. 905-913.

2. A. Giakoumaki, I. Osticioli, D. Anglos, Spectrocopic analysis using a novel LIBS Raman system, Applied.Physics A, 2006, in press

#### **European Project Details**

European Union 6th Framework Programme, Marie Curie Early Stage Training Fellowship, ATHENA Project (MEST-CT-2004-504067) Coordinator: Prof. Emilio Castellucci, LENS, University of Florence, castel@unifi.it

Protein-based materials have often been included as binding media and an understanding of their origin and behaviour is critical for conservation. The aim of research is to develop a protocol for laser induced fluorescence spectroscopy for the analysis of proteins found in paintings. Analysis is **non-invasive** and **non-destructive**. The following key results have been obtained:

Intensity (a.u.

Auto fluorescence can be attributed to

(1) Excitation 260 nm, Tyrosine (red)

& Collagen/ Parchment Glue (green)

350 400

emission of same protein film. In films

(2) oxidation products at emission at

500

velength (nm

Wavelength (nm)

Strong wavelength dependence of

(1) amino acids (Tryptophan) at

emission approx. 335 nm

approx, 430 nm

400

of egg white.

= 390 nm

= 248 nm

(2) Excitation290 nm Tryptophan

(black) & Milk/Casein (Blue)

aromatic amino acids



 Emission & Excitation Spectra of Collagen/Rabbit skin glue reveal presence of different fluorophores which are ascribed to:

(1) amino acids (Tyrosine)

(2) cross-linkages in Collagen/Glue<sup>1</sup>



•LIF of films of Egg white (black) and Milk/Casein (blue) at Excitation 248 nm (KrF Excimer) exhibit strong emissions ascribed to amino acid tryptophan and photooxidation products<sup>2</sup>

LIF promises means of differentiating between classes of protein materials on the basis of compositional differences

### Further aspects of research

- Fluorescence Emission Lifetime and Fluorescence Lifetime Imaging (FLIM)
- 2-dimentional Fluorescence scanning
- Synchronous Excitation-Emission Spectroscopy
- Chromatographic investigations of degradation reactions

References 1. Z. Deyl., I. Miksik, and J. Zicha, Multicomponent analysis by off-line combination of synchronous fluorescence spectroscopy and capillary electrophoresis of collagen glycation adducts. Journal of Chromatography A, 1999. 836(1): p. 161-171.

2. A. Nevin, D. Anglos, S. Cather, C. Fotakis. Analysis of Protein-based Binding Media found in Paintings using Laser Induced Fluorescence Spectroscopy, Analytica Chimica Acta, 2006, in press.







### Initial results of the ATHENA project at IESL-FORTH

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Key words: conservation science, early stage training, Marie Curie, laser, cultural heritage

### **Introduction and content**

The Marie Curie Host Fellowships for Early Stage Research Training 'A scientific Training for High Education iNitiatives in Art conservation' (ATHENA) project trains early stage researchers on scientific methodologies for the characterisation and conservation of cultural heritage patrimony with the aim of structuring European research in this field. Research at FORTH-IESL has focused on Laser-based spectroscopy for the analysis of inorganic and organic materials found in art. A combination of the techniques of Laser Induced Breakdown Spectroscopy (LIBS), Laser Induced Fluorescence (LIF) and Raman spectroscopy can be used for the analysis of materials, revealing atomic, molecular and structural information respectively.

### **European dimension**

The training activity in science for cultural heritage involves three European research laboratories with complementary and reliable expertise for the use of scientific techniques applied to conservation problems: LENS of Florence (Italy), IESL-FORTH of Heraklion (Crete, Greece), UA-MiTAC of Antwerp (Belgium). At IESL-FORTH, students from the UK and Italy have been actively involved in investigations of laser-based techniques for the conservation of cultural heritage, with a focus on the analysis of artists' materials.

### **Innovation and originality**

Using ultraviolet laser sources, autofluorescent proteins can be analysed. The exploration of Laser Induced Fluorescence (LIF) for the analysis of organic material found in paintings has been investigated. The characterisation of painting materials is crucial to their conservation. Analysis typically involves taking samples – it is invasive – so that characterisation using noninvasive methods is clearly advantageous. Paintings consist of multiple layers of pigments, and inert material bound in a medium. Protein-based materials have often been included as binding media and an understanding of their origin and behaviour is critical for conservation. Traditionally-used methods for protein analysis can provide specific information regarding composition of even complex mixtures of very small samples; however, protein analysis often requires sampling. Hence, analysis of protein-based painting materials using LIF, which is both non-invasive and non-destructive provides advantages for the analysis of cultural heritage [1]. Analysis of many inorganic materials (including many pigments) can be undertaken with the integration of the two techniques LIBS (invasive) and Raman (non-destructive) with minimum and invisible damage to the sample, using the same laser source and detector. The combination of the two techniques is complimentary, allowing a more thorough characterisation of artists' pigments and conservation materials. Further, the introduction of a microscope for the focalisation of the laser beam on a very small area (on the order of µm in diameter) minimises energy losses and increases the spatial resolution of the techniques [2]. Moreover, using a lower

laser intensity, less sample is required for LIBS analysis. Finally, the presence of a microscope allows the determination of the exact point where the measurement is taken.

### Impacts

The analysis of protein based binding media with LIF spectroscopy has revealed a strong wavelength dependence on fluorescence emission, and allows the discrimination of proteinfilms on the basis of their spectra, as seen in Figure 1. Collagen-based media are well distinguished from casein and egg binders due to the presence of autofluorescent cross-linkages in the former and strongly fluorescent amino acid tryptophan in the latter. This research will potentially assist the interpretation of complex fluorescence spectra, as well as serve to develop an analytical protocol for the analysis of protein-based binding media using LIF.



*Figure 1: Excitation of films of binding media with different laser sources which indicates differences in emission spectra which can be ascribed to different composition of the proteinaceous binders (a) KrF Excimer at 248 nm and (b) Nd:YAG 3<sup>rd</sup> Harmonic 355 nm* 

Raman Spectroscopy has been combined with LIBS for the analysis of pigments, hence providing molecular and atomic information with the same set-up and laser-source (Figure 2.) and indicated in Table 1.



Figure 2: Set-up for LIBS-Raman spectroscopy using the same laser

Laser Parameters	Imaging	Detector	Delay/pulse generator
	Spectrograph		
Q-switched Nd:YAG,	0.32 m,	ICCD	delay: 100-500 ns,
$2^{nd}$ Harmonic $\lambda = 532$ nm	600 gr/mm grating	(pixel size 26 µm)	gate: 600 ns
pulse length: 15 ns	Resolution:	-or-	
0.01-10 mJ/pulse	0.4 nm (LIBS)	CCD (pixel size	
	$20 \text{ cm}^{-1}$ (Raman)	13µm)	

Table 1: Experimental conditions for LIBS-Raman spectroscopy using the same set-up as outlined in Figure 2

These innovative methods for novel applications in the characterisation of cultural heritage are being explored further with the hopes of developing a protocol for the analysis of organic materials using LIF, and for the development of a combined LIBS-Raman instrument. In addition, research has furthered the use of laser-based spectroscopic techniques for the analysis of paintings.

### References

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- [1] Nevin, A, Anglos, D, Cather, S and Fotakis, C, 'Analysis of protein-based binding media found in paintings using laser induced fluorescence spectroscopy', *Analytical Chimica Acta*, 2006, in press.
- [2] Giakoumaki, A, Osticioli, I. and Anglos, D, 'Spectrocopic analysis using a novel LIBS Raman system', *Applied.Physics A*, 2006, in press.

### European project details

ATHENA, MEST-CT-2004-504067, A scientific Training for High Education iNitiatives in Art conservation, Professor Emilio Castellucci, LENS, University of Florence, Italy.





### Study of technology of cultural heritage conservation at the Institute of Chemical Technology Prague, Czech Republic

Petr Kotlík, Irena Kučerová, Kateřina Doubravová and Markéta Škrdlantová

A special laboratory focussing on technical problems of conservation, restoration and renewal of objects of cultural heritage was established at the Institute of Chemical Technology Prague (ICT) in 1974 as a *Laboratory for Investigation into the Causes of Ageing of Objects of Art and into Methods of Their Conservation*. This event was linked to the agreement on "co-operation in efforts to identify causes of ageing of objects of art and to develop the best methods for their conservation" signed between the Institute of Chemical Technology Prague and the Academy of Fine Arts (Akademie výtvarných umění, AVU) in Prague. After the political regime change in Czechoslovakia in 1989 the ICT Departments were reorganized and this purely technological laboratory was transformed into a regular ICT Department, to be engaged in scientific work as well as in the education of students. The name of this department is the *Department of Chemical Technology of Monument Conservation*.

No specialized institution dealing with the protection and restoration of objects of cultural heritage existed in Czechoslovakia at the time the Laboratory was established, and even now it is quite unique not only in the Czech Republic but on a global scale. This facility – a research laboratory combined with a department educating specialists-technologists in the field of restoration and preservation of cultural heritage – benefits from the Institute's background, comprising both state-of-the-art instrumentation and experts in various branches of chemical technology, such as the technology of glass, ceramics and other silicate materials, as well as metals and polymers, either natural or synthetic.

ICT's study programme is conceived as a structured system. The following study programmes and courses can be chosen within the shorter study system to gain the bachelor's degree: Study programme: Applied Chemistry and Materials, comprising the course: Chemistry and Technology of Materials, with focus on the technology of restoration of cultural heritage; or the study programme: Conservation and Restoration of Cultural Heritage – Works of Arts and Crafts, with the study course: Technology of Conservation and Restoration. The ensuing 4-semester study to gain the master's degree includes the study programme: Chemistry of Materials and Materials Engineering, with the course: Polymeric Materials, with focus on the technology of restoration of cultural heritage. Postgraduate study involves the study programme: Chemistry and Technology of Materials, with the specialization: Technology of Macromolecular Substances, with focus on the technology of restoration of cultural heritage.

The study course *Chemical Technology of Monument Conservation* is so conceived that by completing it, the students acquire the competence of a technologist (i.e. not a restorer or conservator). In the materials science subjects the students are made familiar with the links between the structure and properties of the basic materials of objects of cultural heritage, both organic, such as wood, paper, parchment, organic binders, ..., and inorganic, such as stone, building materials, metals, glass and ceramics. The students also gain knowledge in the fields of technology and analytical chemistry as relevant to the examination and analysis of objects of

cultural heritage. In addition to the above subjects which are of purely technological nature, the students also hear lectures in the history of fine arts and selected topics from the history of architecture. Theoretical study is completed with laboratory practice and practical tasks on which the students work in museums, archives, in co-operation with private restorers, and in manufacturing plants with production aimed at the protection of cultural heritage, etc.

Graduates from this study programme have found jobs at technological departments of national institutions such as the National Agency for Cultural Heritage, Academy of Fine Arts, National Gallery, and the National Archive, in other museums, galleries and archives, as well as at companies producing tools and substances for restoration of objects of cultural heritage. Some of them are free-lance counsellors in the field of technological problems of preservation of cultural heritage.



### Bachelor study programme "Conservation and restoration of cultural heritage – works of arts and crafts" at the Institute of Chemical Technology Prague, Czech Republic

Pavel Novák, Petr Kotlík, Irena Kučerová, Kateřina Doubravová and Markéta Škrdlantová

In December 2004 the Institute of Chemical Technology Prague (ICT) was accredited by the Czech Ministry of Education for a new study programme entitled "*Conservation and Restoration of Cultural Heritage – Works of Arts and Crafts*". This study programme benefits from the tradition of teaching and scientific research at ICT's Faculty of Chemical Technology, particularly at the following Departments:

- Department of Chemical Technology of Conservation Monument,
- Department of Metals and Corrosion Engineering,
- Department of Glass and Ceramics.

Still, launching of the study programme at ICT would have been impossible without a close cooperation with appropriate post-secondary technical schools which have a wealth of experience in handicraft and in the conservation of objects of decorative arts; with the Faculty of Humanities, Charles university in Prague; with the Museum of Decorative Arts in Prague; and with many other institutions and experts.

Currently, four study courses are accredited within the bachelor study programme "Conservation and Restoration of Cultural Heritage – Works of Art and Crafts": three are 4-year study courses and one is a 3-year study course. They are as follows:

- Conservation-Restoration of Metallic Works of Arts and Crafts joint accreditation of ICT and the Secondary School of Decorative Arts and Post-Secondary Technical School in Turnov (4-year course),
- Conservation-Restoration of Glass and Ceramic Works of Arts and Crafts joint accreditation of ICT and the Post-Secondary Technical School, Grammar School, Secondary School of Glass, Secondary Vocational School in Světlá nad Sázavou (4-year course),
- Conservation-Restoration of Textile Works of Arts and Crafts joint accreditation of ICT and the Post-Secondary Technical School for Textile Crafts in Prague 1 (4-year course),
- *Technology of Conservation and Restoration* (3-year course).

The four-year courses are intended to produce experts who will directly perform the conservation and restoration work. After completion of the course, the student's handicraft skills in the respective field should be comparable with those of people who have graduated from the post-secondary technical school but his/her knowledge and expertise in science in general and in materials science in particular should be much deeper. During their study, the students who have completed the course can obtain underlying documents to seek for a Culture Ministry licence.

The 4-year courses are open to students who have graduated from a secondary school of art, satisfy ICT admission criteria and have passed a talent examination at the relevant post-secondary technical school.

The 3-year course "Preservation, Conservation and Restoration Technology" is intended for students who are not expected to directly perform restoration work. Therefore, in contrast to the 4-year courses, art and crafts skills are not among the admittance criteria. Graduates from this course can engage themselves in cultural heritage conservancy as well in the manufacturing, application or commercial sphere related to the manufacture and sale of tools, agents and technologies for preservation, conservation and restoration of cultural heritage, collection pieces and decorative art.

The 3-year course admits graduates from secondary schools who satisfy ICT admittance criteria. This study course also includes a study plan version enabling the student to switch to full-length study at ICT's Faculty of Chemical Technology and gain his/her MSc degree.

The study is conceived as interdisciplinary. It is based on the principle of interconnection between the three key areas:

- Subjects of chemical technology and sciences, which give the student basic knowledge of the composition, structure and properties of the majority of organic and inorganic materials, of degradation and corrosion phenomena and processes, and of preservation / conservation / restoration methods. During their subsequent specialization, the students acquire deeper knowledge and understanding of the particular materials – metals, textiles, or glass and ceramics.
- Humanities subjects concerned with visual arts and history (history of arts, conservation of cultural heritage, ...), which are mostly common to the entire study programme. A high standard of teaching of those subjects is guaranteed by the Faculty of Humanities, Charles University in Prague. The lecturers are experts who are teachers at the Faculty of Humanities or at other universities or who are with other renowned institutions.
- Subjects of visual arts and crafts (such as drawing courses, modelling, practical exercise in visual arts, craftsmanship techniques), which develop the students' artistic skills and workmanship and educate prospective conservators / restorers so that they should be able to apply their theoretical knowledge in real situations. This teaching is mostly provided by the above post-secondary technical schools. Some visual arts practice (drawing and modelling) is taught in co-operation with the Academy of Visual Arts and its teachers.

Within the study programme the students work on their individual semestrial and bachelor tasks, aimed at developing and deepening their knowledge of the technology and laboratory and handicraft skills and abilities to work with literature.

In the 4-year courses, the semestrial and bachelor tasks consist in the restoration (conservation) of specific objects, examination of the objects and development of all the relevant documentation needed for preparing restorer's (conservator's) report. Semestrial work is also aimed at improving students' skills in craftsmanship, crafts techniques and processes by working on specific objects.

In the 3-year course, the semestrial and bachelor tasks consist in developing technological proposals for conservation or restoration of objects of cultural heritage (from a collection, from archaeological findings, a historical building), including complete survey and examination of the object and, where applicable, verification of the proposal through conservation of a specific

object and development of conservator's report. The semestrial work can be completed with an experimental study of the materials applied (their properties, stability, etc.).

### Conclusion

The bachelor study programme "Conservation and Restoration of Cultural Heritage – Objects of Decorative Arts and Crafts" is based on state-of-the-art knowledge of and experience in the education of conservators and restorers. We are confident that this programme will contribute to a higher standard of preservation, conservation and restoration of historical heritage in the Czech Republic so as to match developed countries. Since practical experience in this university-level teaching of the subjects involved is lacking in the Czech Republic, the teaching contents will be modified and upgraded on an ongoing basis both in line with developments in the relevant fields of science and technology and based on experience with the conservator / restorer practice.

For details about the study courses please contact Dean's office, Faculty of Chemical Technology, Institute of Chemical Technology Prague (Technická 5, Prague 6, Czech Republic). Information in Czech can also be found at:

http://www.vscht.cz/main/studenti/bakalari/prehledbak.html

ICT homepage in English is at http://www.vscht.cz/homepage/english/main .

# NATIONAL RESEARCH ACTIVITIES AT THE DEPARTMENT OF **CONSERVATION OF ANTIQUITIES & WORKS OF ART** (T.E.I. OF ATHENS) FOR THE CONSERVATION, PROTECTION **& MANAGEMENT OF CULTURAL HERITAGE**

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#### Introduction

The Department of Conservation of Antiquities and Works of Art (T.E.I. of Athens, Greece) is the only one of its kind in the Greek Higher Education System, dealing with the conservation of Cultural Heritage and is currently running 10 national research projects funded by a Greek Ministry of Education with a total budget of 573.462 euros, all designed to investigate national Cultural Heritage issues. The programs deal with research into innovative conservation treatments and materials, deterioration mechanisms, analytical techniques, management of Cultural Heritage, standardization, environmental parameters and museology. A detailed presentation of the research programs of Conservation Department is followed.

#### The research programs

"Study of the effects of airborne particles on the surface of historic buildings. Cleaning and surface protection treatments". Scientific coordinator Dr. P. Theoulakis , budget 49.000 €

Aim: The correlation of deterioration mechanisms construction materials with the related of phenomena of airborne particles and their behavior in the atmosphere in order to evaluate treatments and materials used for the cleaning and the surface protection of stone



Observation of airborne particles in Rhodes Medieval citv.

"The application of new technologies for the cleaning of archaeological and historical metal objects. Investigation of the possibility of applying laser technology and electrolytic methods". Scientific coordinator Dr. V Argyropoulos and funding 50.000 €

Aim: Testing and evaluation of the application of new technologies, laser and electrolytic methods in comparison to classical methods of cleaning archaeological and historical metal objects.

"Environmental consequences and protection of outdoor bronze monuments in Greece". Scientific coordinator Dr. D. Charalambous , budget 80.000 €

Aim: Testing the most effective coatings to protect the surface of the monument from effects of vandalism and the environment.





Analysis of the bronze surface of the sculpture by means of XRF.



Wall painting sampling for further

analysis

"Study of Epirus post-Byzantine mural painting of 16th and 17th century bv physicochemical and immunochemical techniques. Determination of the chemical composition and the degree of decay of their binding media". Scientific coordinator Dr. E. loakimoglou , budget 60 000 €

Aim: The determination of the preservation condition of mural painting and the reliable selection of the appropriate materials and methods for their conservation.

"Study on the painting decoration of the catholicon of Dimiovis' monastery at Scientific coordinator Mr. Th. Messenia" Avaritsiotis , budget 50.600 €

Aim: The comparative study and evaluation of the manner, technique and preservation condition of painting works at Byzantine and post-Byzantine monuments

The "catholicon" of Dimiovis' Monastery.



#### "Study for the management and the protection of Monuments of Nature in situ". Scientific coordinator Dr. V. Lambropoulos , budget 52.839 €

The study of deterioration parameters and mechanisms on paleodological finds in situ and the evaluation of conservation materials used for protect them and inhibit their decay.



Fossils retrieval during the excavation.

"Development of a biochemical cleaning method for museum objects of Natural History through enzymes and inhibitors for a controlled removal of aged conservation materials from similar in chemical composition substrata". Scientific coordinator Dr. G. Panagiaris , budget 51.890 €

Aim: The comparative study and the evaluation on new and conventional cleaning methods of organic materials substrata deriving from mainly natural history specimens.



"Copy letters: Historical-Physicochemical study and Documentation. Conservation Treatments proposals". Scientific coordinator Dr. A. Alexopoulou, budget 49.133 €

Aim: The formulation of conservation and preservation proposals for copies of archival material based on the application of diagnostic optical physicochemical methods of analysis.



Macrophotography of a copy letter belonging to Schliemann's archive in different regions of spectrum: a. visible, b. UV reflectance, c. UV fluorescence.

"The role of local museums for the local and regional development". Scientific coordinator Mrs. E. Tsilaga , budget 80.000  $\in$ 

Aim: Revealing the appropriate strategies that a local museum could follow in order to be a carrier of the local economic development.

"Research for the development of standards on the field of Conservation/Restoration of Cultural Heritage". Scientific coordinator Dr. A. Pournou , budget 50.000 €

Aim: Development of standards for diagnostic procedures and application of materials and methods on the field of Conservation/Restoration of Cultural Heritage.



## The plumage of a Paradise bird before and after laser cleaning.

### National research activities at the Department of Conservation of Antiquities & Works of Art (T.E.I.-A) for the conservation, protection & management of cultural heritage

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Key words: conservation, diagnosis, environmental protection, cultural heritage, standards, management

### **Introduction and content**

The Department of Conservation of Antiquities and Works of Art (T.E.I. of Athens, Greece) is the only one of its kind in the Greek Higher Education System, dealing with the conservation of Cultural Heritage and is currently running ten national research projects with a total budget of 573.462 euros, all designed to investigate national Cultural Heritage issues. These programs are co-funded by 75% from the E.C. and 25% from the Greek Ministry of Education under the framework of "Archimides" program. These projects are entitled as follows:

- 1. "Study of the effects of airborne particles on the surface of historic buildings. Cleaning and surface protection treatments". Scientific coordinator Dr. P. Theoulakis, budget 49.000 euros.
- 2. "Study for the management and the protection of Monuments of Nature *in situ*". Scientific coordinator Dr. V. Lambropoulos, budget 52.839 euros.
- 3. "The application of new technologies for the cleaning of archaeological and historical metal objects. Investigation of the possibility of applying laser technology and electrolytic methods". Scientific coordinator Dr. V. Argyropoulos, budget 50.000 euros.
- 4. "Development of a biochemical cleaning method for museum objects of Natural History through enzymes and inhibitors for a controlled removal of aged conservation materials from similar in chemical composition substrata". Scientific coordinator Dr. G. Panagiaris, budget 51.890 euros.
- 5. "Environmental consequences and protection of outdoor bronze monuments in Greece". Scientific coordinator Dr. D. Charalambous, budget 80.000 euros.
- 6. "Copy letters: Historical-Physicochemical study and Documentation. Conservation Treatments proposals". Scientific coordinator Dr. A. Alexopoulou, budget 49.133 euros.
- 7. "Study of Epirus post-Byzantine mural painting of 16<sup>th</sup> and 17<sup>th</sup> century by physicochemical and immunochemical techniques. Determination of the chemical composition and the degree of decay of their binding media". Scientific coordinator Dr. E. Ioakimoglou, budget 60.000 euros.
- 8. "Study on the painting decoration of the catholicon of Dimiovis' monastery at Messenia". Scientific coordinator Mr. Th. Avaritsiotis, budget 50.600 euros.
- 9. "The role of local museums for the local and regional development". Scientific coordinator Mrs. E. Tsilaga, budget 80.000 euros.
- 10. "Research for the development of standards on the field of Conservation/Restoration of Cultural Heritage". Scientific coordinator Dr. A. Pournou, budget 50.000 euros.

The projects deal with research on innovative conservation treatments and materials, deterioration mechanisms, analytical techniques, management of Cultural Heritage,

standardization, environmental parameters and museology. The respective main objectives of the above projects are the following:

- The correlation of deterioration mechanisms of construction materials with the related phenomena of airborne particles and their behavior in the atmosphere in order to evaluate treatments and materials used for the cleaning and the surface protection of stone. [1, 2]
- The study of deterioration parameters and mechanisms on paleodological finds *in situ* and the evaluation of conservation materials used for protect them and inhibit their decay. [3]
- Testing and evaluation of the application of new technologies, laser and electrolytic methods in comparison to classical methods of cleaning metal objects.
- The comparative study and the evaluation on new and conventional cleaning methods of organic materials substrata deriving mainly from natural history specimens. [4]
- Testing the most effective coatings to protect the surface of the monument from effects of vandalism and the environment.
- The formulation of conservation and preservation proposals for copies of archival material based on the application of diagnostic optical physicochemical methods of analysis. [5]
- The determination of the preservation condition of mural painting and the reliable selection of the appropriate materials and methods for their conservation. [6]
- The comparative study and evaluation of the manner, technique and preservation condition of painting works at Byzantine and post-Byzantine monuments. [70]
- Revealing the appropriate strategies that a local museum could follow in order to be a carrier of the local economic development.
- Development of standards for diagnostic procedures and application of materials and methods on the field of Conservation / Restoration of Cultural Heritage.

All projects are implemented with the collaboration of the Greek Ministry of Culture, academic institutions, research centers, Greek Orthodox Church and other private and public organizations.

### European dimension

These research projects deal with problems revealed through the study, documentation, protection, conservation and management of movable and immovable cultural heritage that concerns also the international conservation community. Many of the projects apply the methodology or results from European projects in related topics to ascertain the characteristic problem on a Greek national level.

### **Innovation and originality**

The projects implemented at the Department of Conservation of Antiquities and Works of Art show their significant innovation and originality on the following points:

- On the investigation of deterioration mechanisms and *in situ* conservation of various monuments (ex. historic buildings, wall paintings, outdoor bronze monuments, geological / paleodological monuments).
- On the development of innovative methods by applying new technologies for the diagnosis, conservation and protection monuments and museum objects such as laser techniques, electrolytic methods and biochemical methods.
- On the study and documentation of works of art and archival material.
- On the development of standards on the field of Conservation / Restoration of Cultural Heritage in national and European level.
- On the regional socioeconomic development through the contribution of local museums.

### Impacts

Via the above mentioned projects the following impacts are expected for Greek cultural property:

- The choice of the most effective cleaning method and protective coating materials for the protection of stone.
- The choice of suitable material (or materials) for the consolidation of fossils in order to be managed and exhibited within geological parks.
- The choice of the most effective method for the cleaning of metal artefacts.
- The choice of the most effective method to remove organic deposits from organic substrates.
- Establishing a preventive strategy to protect and minimize possible changes that may occur to outdoor bronze monuments.
- The understanding of manufacture technology and conservation proposals for copy letters.
- Design of preventive conservation and the protection of painted layers of late Byzantine wall paintings, by using the antibodies technique against collagen.
- Understanding the late Byzantine wall paintings manufacture methodology and the documentation of the usual deterioration patterns in relation to them.
- Promotion of one or more successful museum models, in cities with less than 10.000 citizens, where the museum contributes to regional development.
- The development of European standards will reassure the quality of works in the field of conservation / restoration of Cultural heritage. Such works will be based on specific procedures derived from science and experience and thus optimum results can be achieved.

The above projects will be integrated at the end of 2006, when their results as well as their applications will be presented.

### Acknowledgment

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### References

- [1] Theoulakis, P., Pilinis, C., Stefanis, A. and Karatasios I., "Study of the effects of airborne particles on the surface of historic buildings" in *1<sup>st</sup> Conference EPEAEK ARCHIMIDES*, 14-26 Nov. 2005.
- [2] Stefanis, A., Theoulakis, P. and Pilinis, C., "The decay effects of sea-salt aerosol on the surface of historic buildings" in 9<sup>th</sup> International Conference on Environmental Science and Technology, Rhodes, 1-3 September 2005.
- [3] Mertzani, M., Papadimitriou, P. and Lambropoulos, B., "The study of preservation and proposals for in situ consolidation of fossilized dwarf hippopotami tusks from Katharo basin Crete" in 1<sup>st</sup> Conference EPEAEK ARCHIMIDES, 14-26 November 2005.
- [4] Karantoni, E., Malea, E and Panagiaris, G., "The influence of cleaning methods on natural history specimens' feather structure: a comparative study" in 1<sup>st</sup> Conference EPEAEK ARCHIMIDES, 14-26 November 2005.
- [5] Alexopoulou, A., Banou, P., Gerakari, K., Kaminari, A. and Stasinou, A., "Non destructive documentation of the Schliemann copy letters archive" in 2<sup>nd</sup> International Conference on Iron Gall Inks, Northumbria University, New Castle, U.K., 23-27 January 2006.
- [6] Zeugiti, S., Panou, E., Sakarellos-Daitsiotis, M., Ioakimoglou, E. and Sakarellos, C., "Synthesis, conformation and immunological studies of collagen models: application in works of art" in 3<sup>rd</sup> *International and 28<sup>th</sup> European Peptides Symposium*, 5-10 September 2004.
- [7] Avaritsiotis, Th., Mouzakiotou, S. and Vlassas, G., "The painting decoration of the catholicon of Dimiovis' monastery at Messenia" in 1<sup>st</sup> Conference EPEAEK ARCHIMIDES, 14-26 November 2005.



# FOCUS AREA CULTURAL HERITAGE

The Focus Area on Cultural Heritage (FACH) is one of the seven Focus Areas underpinning the European Construction Technology Platform (ECTP), a new initiative that brings together all stakeholders of the construction sector, to identify strategic research needs for the sector over the next 25 years.

The aim of FACH is to promote the holistic management of cultural heritage, including the safeguarding, planning, regeneration and development of Europe's historic urban environment. Six working groups have been set up to support this goal, each one reflecting six important horizontal issues which are:- knowledge supporting education and training, and ethics - technical standards and specifications - preservation of artworks - socio-economic aspects - disaster prevention and risk management - communication and dissemination.







The Global objective of the FACH is to promote new sustainable and preventive strategies, concepts, methodologies and techniques for conservation and restoration of the cultural heritage in order to improve the quality of life of citizens and the attractiveness of Europe, particularly its cities, buildings and landscapes.

The importance of this cultural wealth can be measured in economic and social terms, in employment, job creation and has a considerable impact in many areas such as the environment, construction, tourism, regional development to enhance European competitiveness and skills through technical innovation and social identity. In the construction sector, this includes in particular the implementation of ambitious programmes of rehabilitation and energy-positive retrofits for existing buildings. That implies an extensive use of knowledge-based advanced technologies and the active participation of all stakeholders, practitioners, the industry and SMEs.

European cultural heritage is the testimony of our common past and the basis of our identity, it enriches the collective memory which makes the future of Europe more human and friendly for its population so it needs to be conserved with great care.

We are building now the cultural heritage of future European generations: today, a strong knowledgebased approach must be used to protect and promote our cultural heritage keeping it alive in an attractive Europe.



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### WORKING GROUP 1 Assessment, Monitoring and Diagnosis

The vision of WG 1 is the integration of technologies for building diagnostics (e. g. based on non-destructive and minor destructive techniques), monitoring and historic building research in the safeguarding and long term management process of Cultural Heritages to enable sustainable and cost efficient maintenance. Innovative imaging and 3D-surveying techniques together with adapted theoretical models for long-term simulation of structural and physical properties of relevant structural elements are used to predict natural decay procedures and the effects of interventions and to plan strengthening processes.

The research priorities defined by the Working Group members representing several European countries can be expressed as follows:

Priority 1: Damage free renovation of the existing building stock preserving authentic materials and structures with emphasis on energy concepts.

Priority 2: Prediction of physical, chemical and mechanical aging and damaging processes of Cultural Heritage buildings based on experience and innovative technologies taking into account past and future environmental influences as well as natural hazards (pollution, earthquakes, floods, etc.).

Priority 3: Development of preventive conservation strategy based on monitoring and the use of non-destructive techniques to promote the maintenance of Cultural Heritage buildings combined with small scale repair interventions during inspections, accompanied by competent supervision. (Profit should be taken from practical experience gained by organisations as Monumentenwacht "Monument watch" in the Netherlands and in Flanders, Belgium.)

Priority 4: Identification and optimisation of instruments and laboratory procedures used for monitoring, determination of material characteristics and investigation of the behaviour of old (ancient) or new building materials at Cultural Heritage buildings.

Priority 5: Development of non-destructive or minor destructive testing methods for on-site investigations of material and structural properties and validation of testing methods.

Priotity 6: Development of software models for evaluating and predicting the heat and moisture transport and the structural behaviour of Cultural Heritage buildings (and materials) under environmental influences.

Priority 7: Setting up databases, standard protocols and criteria for an integral structural assessment of Cultural Heritage, including seismically-active and flood prone areas. Integration of this database into an efficient management and maintenance system for Cultural Heritage buildings.



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The partnership of construction industry, institutes, universities and organizations responsible for heritage maintenance is of the crucial importance for development of knowledge that should be transferred to all involved parties in heritage protection in order to minimize the deterioral impact of **ignorance**, lack of knowledge and vandalism.

The pro-active policies should be developed to mitigate the negative impact of tourism on the built heritage. The breeding and basic education cultivates heritage users and prevents negative impact of turism. The care for heritage should be introduced in the entire life education process. Development of knowledge about the past should be based on public participation supported policies, strategies and tools for safeguarding and enhancement of cultural and natural heritage territorial values and archeological sites.

The main effort should be oriented to professional education and training through transfer of research results via innovation to formal and informal education processes.

Europe suffers from the lack of well trainned workers involved in heritage interventions, interdisciplinarry educated professionals and school and academic staff. Filling the gap can substentially contribute to opening new jobs and to contribute long-term preservation of movable and immovable heritage.

One of the FACH priorities is to assist in development of schemes to be used in all levels of formal and informal education.



### WORKING GROUP 2 Materials

Effective Protection of Cultural Heritage needs to be based on the knowledge that has been produced. Therefore, it needs to take into account:

- i) the materials, as composites, the system materials/environment, as a dynamic system and materials/structure/environment, as a more complex system
- ii) the knowledge of historic materials and their performance on historic structures in order to re-engineer the repair materials.

Development of innovative materials and structural components for cultural heritage and learning lessons from the past are considered the main lines

The research priorities in the field of materials are:

- 1.Development of materials adapted to better preservation of historic materials applying nano and other emerging technologies and including principles of self-healing, self cleaning, self learning, ....
- 2.Better understanding the historic materials and technologies
- 3.Introduction of innovative and low intrusive intervention techniques including introduction of replaceable additional or supplemental structural components
- 4. Evaluation of intervention techniques, conservation treatments, ... used in the past, including criteria for the choice of restoration materials and the assessment of their compatibility and durability
- 5.Reaching better understanding of historic materials and technologies in order to re-engineer compatible repair materials
- 6.Development of guidelines for integral diagnosis, assuring the multidisciplinarity of needed expertise (architecture, history of art, civil engineering, archaeology, chemistry, ...)
- 7.Development of decision support tools based upon characterization of materials and study of decay mechanisms

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### HORIZONTAL ISSUE 2 Technical Standards and Specifications

Throughout the last years a great amount of research projects in Europe with the objective of identifying the state of conservation of our Cultural Heritage has been developed. As a result of it one has an appreciable amount of techniques and methods of characterization of materials and phenomena. All these present and future techniques and methods need to be **standardized**; it is to say it must to establish a procedure, widely contrasted, for its correct use in each case or application.

On the other hand, the restlessness on the part of the people in charge of the conservation of the Cultural Heritage leads to the promulgation of diverse **Directives** for its Conservation, Restoration, Rehabilitation and position in its urban or rural surroundings. These **Directives** must of being promulgated with a previous work that identifies its real utility and, in addition, they must keep a harmony at regional, national and European level.

The FACH of the ECTP is a unique opportunity to approach these concepts since are included Companies, Technological Research Centres and Research Centres of several Universities with great experience in a big amount of research and development projects on the Cultural Heritage. Several of their members have even worked jointly in previous projects.

The HL2 titled **«Standards and Specifications**» has a noticeable transversal character. In coordination with the rest of the WG and the HL it is tried to take to **Standardization** the different techniques and procedures developed for the characterization of the state of conservation of all the components of the Cultural Heritage and of its foreseeable temporary evolution. A similar work, but specific, it will be made with respect to the **Directives** for the Conservation, Restoration and Rehabilitation of the Cultural Heritage. The **Standards**, **Specifications and Directives** must have an ample consensus at European level.

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### WORKING GROUP 3 Intervention techniques

The main goals for WG3 are: identifying intervention strategies that make use of interdisciplinary competences aiming at reducing the risk while preserving the authenticity and identity of the cultural heritage, be it single buildings or complex city fabrics, according to the fundamental principles of minimum intervention, compatibility, interpretability and reversibility and while fulfilling the basic requirements of value and use; developing appropriate intervention techniques with critical sense and with due consideration of performance issues.

Priority 1: To develop data-bases of different structural elements and structural typologies defined at different geographical level, and a validated catalogue of intervention techniques with respect to their effectiveness, their compatibility - removability - retreatability. Priority 2: To develop effective and reliable traditional and innovative "smooth"

Priority 2: To develop effective and reliable traditional and innovative "smooth" interventions techniques that alter at the minimum level the historic structure' s character. To optimize the single or combined techniques for application and propose integrated intervention systems.

Priority 3: To improve analytical tools for structural assessment and simulation of interventions.

Priority 4: To identify "strategies" for the design of the interventions, by defining "target" structural behaviour of single components and of the overall structure which are compatible with available and "admissible" intervention techniques.

Priority 5: To select enhanced and intelligent systems, such as smart systems for monitoring the intervention and real time modification of the working conditions (early warning systems), and select a number of pilot sites for case studies application and validation of the system; after the validation, on the long term, larger scale application of integrated interventions making use of smart technologies, with enhancement of durability and removability Priority 6: To identify proper methodology for analysis of seismic vulnerability

Priority 6: To identify proper methodology for analysis of seismic vulnerability and hazard mitigation

Priority 7: Optimization of all obtained results from financial and efficiency point of view (reduction of cost and duration of interventions); development of structural protocols, development and update guidelines; standardization of techniques and procedures

Priority 8: Setting up of cultural and technological programmes for disseminating and exporting technologies and knowledge to third and in particular developing countries

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### HORIZONTAL ISSUE 3 Preservation of Artworks

In Europe, fundamental research and applied research services rarely communicate. Restorers, with various training and a wide variety of professional statuses, hold a vision and a field of expertise directly linked to their precise cultural environment, specific methods, and to the majority heritage category they are entrusted with. Partnership, involving those responsible for cultural heritage, restorers, and research agencies, is not always ensured. Each country develops its own knowledge and intervention structures as regards to cultural heritage. The result is of course development, but also a fracturing of experience and knowledge.

Varying outlooks between European countries are easy to identify. It cannot be denied that, as regards cultural heritage, Anglo-Saxon countries adopted techno-scientific thought processes, whereas Latin countries - Italy in particular - had long since developed precise aesthetic concepts. Consequently, harmonization of vision, and the sharing of knowledge would undoubtedly enrich and unify any future action strategies.

This short inventory makes obvious the necessity to create a European tool for cultural heritage professionals. The project must afford itself technical means and goals in order to create favorable knowledge-exchange conditions:

- Creation of a technical lexicon
- Creation of a regularly updated data bank based on research results, completed works, publications and seminars
- Creation of a website for the collection of information
- Development of an applied research laboratory
- Standardization and diffusion of training requisites, restoring politics, intervention methods and diagnosis
- Implementation of state-of-the-art procedures

The creation of a European Institute would not only offer an adequate structure for pooling knowledge and procedures specific to each country, but also to enrich and harmonize them, free from any specific cultural or material constraint.

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### WORKING GROUP 4 Environment and Energy

Much progress has been achieved in energy efficient and environmentally friendly new buildings over the past decade. The introduction of new equipment and appliances (i.e. air conditioning) actually increase the average energy consumption in buildings and create considerable problems at peak load unless more sustainable construction strategies and for the adaptive re-use of existing buildings and sound principles of indoor environmental management are implemented. Thus, energy conservation efforts, while maintaining the required indoor environments for conservation of cultural heritage, indoor air quality and the environment, is a continuous struggle in helping to minimize dependency on fossil fuel sources, reduce their environmental impact and secure an appropriate energy balance. Building practices in the past have not properly addressed current concerns on how the use of energy in buildings can be optimized and environmental effects minimized. A clear distinction between the construction requirements of domestic, commercial or industrial buildings and the conservation of cultural heritage is emerging. Scientific knowledge of conservation and the environment can improve the refurbishment and operational effectiveness and efficiency of buildings: lowering of energy consumption using alternative forms of energy and costs and the reduction in maintenance cycles and costs.

The targets for the WG4 are:

- Improvements in environmental conditions and indoor air quality in refurbished buildings for sound conservation and occupant satisfaction
- Reduction in dependence on fossil fuels
- Promotion of energy efficiency in historic buildings
- Minimization of the use of natural resources and the impact on the environment through re-use and recycling of materials
- Promotion of maintenance of cultural heritage to avoid unnecessary repairs
- Provision of specific training to construction workers through the transfer of skills from the cultural heritage sector
- Maintenance of natural assets to enhance the local landscape
- Development of an integrated supply chain for procurement to maximize the use of local materials, products and services
- Decrease in restoration interventions and costs

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### HORIZONTAL ISSUE 4 Socio-Economic Aspects

European Cultural Heritage is the testimony of our common past and it is the base of our identity. Its cultural importance makes its preservation a primary objective. But besides their cultural dimension, cultural heritage goods also present a remarkable economic dimension: they contribute to employment creation; they are an important factor for tourism attraction; they constitute a source of economic development for the territory in which they are located and favour social cohesion and citizens' education.

This multiple dimension of Cultural Heritage requires addressing its conservation from a comprehensive approach that would allow satisfying the current needs and requirements without endangering its legacy to the future generations with all its beauty; authenticity and diversity. This makes it necessary to move forward a co-ordinated management of cultural heritage goods adopting a sustainable development approach which would lead to a balance between conservation for the future and the current use of cultural heritage goods for the service of economic development and citizenship quality of life.

In this sense, FACH of the ECTP constitutes a unique opportunity for progressing towards a co-ordinated cultural heritage management which introduces all the concepts already discussed. A large number of agents involved in the different stages of the process for conservation and management of cultural heritage goods would be motivated by common goals.

The HI4, titled "Socio-economic aspects" has a strong transversal nature. In co-ordination with the rest of WG and HL, it intends to contribute to the analysis of the impact that projects relative to Cultural Heritage have on society while fostering those impacts which are positive. More concretely, it is about introducing the notions of benefits and social costs to the decisionmaking processes related to Cultural Heritage with the goal of maximising the gains and profits that Cultural Heritage can create for society.

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### WORKING GROUP 5 Management, Exploitation & Maintenance

The main goals for WG 5 are: To set up sustainable strategies for the preservation of cultural heritage assets by developing new management and monitoring tools to ensure their added value for European cities and the local environment; this will enhance the European Society's knowledge and understanding, and promote a reliable predictive and cost effective maintenance.

Priority 1: Development of Cultural Heritage rational management and dissemination strategies and tools.

Priority 2: Promotion of sustainable and flexible use of Cultural Heritage, mostly reconciliation between Cultural Heritage and tourism by developing

Priority 3: Development of real dissemination plans of the whole Cultural Heritage conservation process to ensure accessibility for all citizens, by means of ITC tools and other techniques

Priority 4: Development of methodologies and establishment of appropriate criteria to elaborate sustainable and reliable predictive maintenance plans of European Built Heritage

Priority 5: Development of Cultural Heritage holistic and integral management strategies and tools, integrating multicultural assets of the Tangible and Intangible CH; groups of synergetic monuments as a whole; CH in its territorial and urban environment.

Priority 6: Use of Cultural heritage as an environment dynamisator for public, private and citizens, by developing new management tools based on multidisciplinary networks and Benchmarking based on ICT's and GIS

Priority 7: Use of new strategies and technologies to get new generations of EU citizens sensible to preserve Cultural Heritage

Priority 8: Development of tools and systems to prevent service life of ancient and new materials and structures





### HORIZONTAL ISSUE 5 Disaster Prevention & Risk Management

Management systems for disaster prevention: strategic goals, the form they take and how to integrate and manage systems to reach those goals with effectiveness and efficiency.

Assessment and management of risk: Building a management system for disaster prevention requires proper methods of risk assessment and management.

Software and hardware countermeasures for disaster prevention: planning, designing and building or improving software and hardware infrastructures, practical ways of application, development and monitoring of performance for European Cultural Heritage.

**Research and investigation on causes of disaster:** for example geological and meteorological disasters (typhoons, earthquakes, tsunami waves, floods, landslides, ...).



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### WORKING GROUP 6 Cties & Territorial Aspects



WG6 focuses on knowledge-based policies and strategies, supported by public participation, for safeguarding the territorial values of cultural and natural heritage. It suggests to conceive cultural heritage as an active, sustainable and enhancing agent in urban development, which contributes to the quality of life of European citizens

Taking the best advantage of this heritage requires developing new technologies, infrastructure systems, strategies and public participation patterns for monitoring, assessing and managing changes in historic environments. Historic cities and villages are central in future activities. A special effort on development of high technology for non- and semi-invasive surveying of archaeological sites is also considered.

The research should aim at scientific support of new urban planning approaches for safeguarding historic landscape and rehabilitating sprawl-field sites based on inter-settlement regional and inter-regional grids given by nodes of European historic environment and urbanisation.

Best European practices are to be analysed and the experience transferred for long term European wealth creation, identity and social cohesion. The resulting exchange and implementation tools should support holistic management of development and regeneration of historic cities, territories and industrial complexes.

There is a need for advanced tools for mapping of European Cultural Heritage, taking advantage of modern European global positioning system, flexibly accommodating requirements of different political and economical environments, and involving data on natural, climate change and man made risks.

Highly interdisciplinary research in historic cities must reflect not only land use aspects but also unique features of each historic city as an ensemble of individual architectural, structural and material values, as a living unit with complex history, social and economy characteristics and issues and as an open science laboratory ready for research participation of its citizens.

WG6 supports establishment of JTI "Conservation of European Cultural Heritage"

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### HORIZONTAL ISSUE 6 Communication and Dissemination

Communication and dissemination are major transversal issues in Cultural Heritage and are the key to success in interdisciplinary research.

Although a lot has been and is being done to support the dialogue among the different research disciplines and the stakeholders, there is still lots of work to be done.

FACH offers an excellent opportunity to reach the following goals: Priority 1

Supporting the research horizontal activities in all major Cultural Heritage sectors with particular attention on how to bridge the gap between science and industry and in particular SMEs, through the development of methodologies and tools with the aim to support and enhance technology transfer of research results, as well as knowledge.

#### Priority 2

Enhancing Decision-Making stakeholders' participation in management and governance processes, as well as citizens' Participatory Processes through information and communication (ICT) methodologies and tools with the aim to support discussions, dialogue and deliberations among citizen, stakeholders and policy makers. The most innovative elements of such tools should be the combination of interdisciplinary approaches to merge the knowledge from different sectors and disciplines with good possibilities for user interaction.



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### European technological construction platform: focus area cultural heritage – WG5: management, exploitation and maintenance

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Key words: cultural heritage, management, maintenance, dissemination, sustainablility

### **Research priorities**

Priority 1: Development of Cultural Heritage rational management and dissemination strategies and tools, including:

- Structural assessment, monitoring, diagnosis, planning, rehabilitation, maintenance, conservation, knowledge management, economic management, education, awareness management.
- Development of strategies for Cultural Heritage cataloging and appropriate ICT's and GIS systems to manage the information generated.
- Development of flexible, expandable, multilayer (different level of details) and web accessible computer tools.

Priority 2: Promotion of sustainable and flexible use of Cultural Heritage, mostly reconciliation between Cultural Heritage and tourism by developing:

- New socio-economical models generating resources and protecting the environment
- Integral strategic planning of Cities development that result to Cultural Tourism development plan, as an alternative type to the conventional massive tourism
- Project management tools, such as: Time planning, Funding scheme, Mobilisation and allocation of funds (public sector), Motivation and incentives to mobilise private sector's investments and entrepreneurship, Job creation
- Integrated project including archaeological sites as well as management of cultural landscapes even of rural settlements and industrial heritage; accessibility and fruition of leisure resources, the stability of ecosystems and the management of other fundamental resources of the territory
- Assessment and mitigation of the potential social and cultural impact of the 'artificial staging' of cultural identity for tourism
- Commercial production and use for tourist purposes of items belonging to the intangible cultural heritage should be encouraged as an emerging market (like those of indigenous ethnic minorities, religious traditions et al.).
- ICT's Platforms and sociologic techniques that facilitate the interaction between public, private and citizens
- Policies, monitoring progress, delivering services and configuration of public-private partnerships, by civil society organizations and private sector firms

Priority 3: Development of real dissemination plans of the whole Cultural Heritage conservation process (monument and environment, study, diagnosis, intervention) to ensure accessibility for all citizens (including disabled people), by means of ITC tools and other techniques.

Priority 4: Development of methodologies and establishment of appropriate criteria to elaborate sustainable and reliable predictive maintenance plans of European Built Heritage.

Priority 5: Development of Cultural Heritage holistic and integral management strategies and tools, integrating multicultural assets of the Tangible and Intangible CH; groups of synergetic monuments as a whole; CH in its territorial and urban environment.

Priority 6: Use of Cultural heritage as an environment dynamisator for public, private and citizens, by developing new management tools based on multidisciplinary networks and Benchmarking based on ICT's and GIS.

Priority 7: Use of new strategies and technologies (virtual and augmented reality, etc.), to get new generations of EU citizens sensible to preserve Cultural Heritage.

Priority 8: Development of tools and systems to prevent service life of ancient and new materials and structures.

### European dimension

The activities considered in WG5: Management, Exploitation and Maintenance of Focus Area of Cultural Heritage should be carried out at European level. Main reasons for this are:

- The need to identify research priorities in these issues at European level.
- The problem to be solved has an European dimension as FACH and ECTP are European associations.
- The need of addressing different environments in Europe: cultures, economical and development situation, legislation and policies, drivers and barriers.
- The need for strengthening collaborative efforts on the protection of our common European cultural heritage.
- The expertise and mobilisation of stakeholders required is not enough at national level.
- Allow to understand the different ways to face Cultural Heritage conservation all over the EU, to support potential European directives.
- The need to reinforce the networking capacity of CH actors at European level.
- The need to assure a wider dissemination in Europe.
- Contribution to European policies.

### **Innovation and originality**

The main goals for WG 5: Management, Exploitation and Maintenance are: To set up sustainable strategies for the preservation of cultural heritage assets by developing new management and monitoring tools to ensure their added value for European cities and the local environment; this will enhance the European Society's knowledge and understanding, and promote a reliable predictive and cost effective maintenance. This is a novel approach for the conservation of our Cultural Heritage, as up to now, establishment of methodologies and tools for study and intervention in Cultural Heritage have been emphasized, while a general strategy to get a sustainable living cultural heritage has not been developed at European level.

### References

ECTP-European Construction Technology Platform: http://www.ectp.org/ .

- [1] Council of Europe, Council Resolution of 26 May 2003 on the horizontal aspects of culture: increasing synergies with other sectors and Community actions and exchanging good practices in relation to the social and economic dimensions of culture, Official Journal C 136, 11/06/2003 p. 1-2.
- [2] Fundación Caja Madrid, "Preservación del Patrimonio Histórico de España. Análisis desde una perspectiva económica", Fundación Caja Madrid, Madrid, 2004.
- [3] Serageldin, I., "Architecture as an Intellectual Statement", Criticism in Architecture, Ed. R. Powell, Singapore, 1989.

### Integration of technologies for building diagnostics and monitoring in the preservation of cultural heritage – FACH

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Key words: diagnosis, monitoring, environmental technologies, assessment, management

### **Research priorities**

The current approach normally used to assess structural safety, damages, construction or increased moisture content of historic structures is based on manual optical inspection, laboratory tests on cored samples and load carrying tests. But without any volume inspection and without consideration of the history of the building and its structural behaviour, damages can worsen and might cause complex problems before they can be detected at the surface. Therefore, assessment methodologies and technologies as well as long term monitoring strategies are required for on-site investigation and have to be included in new management concepts for Cultural Heritage buildings.

The integration of technologies for buildings diagnosis and monitoring in the preservation and long term management process of Cultural Heritage will enable sustainable and cost efficient maintenance. Supporting this vision is the target of the Working Group 1 Assessment, Monitoring and Diagnosis. This group is part of the Focus Area Cultural Heritage (FACH) of the ECTP. The research priorities defined by the Working Group members are closely related to the ICOMOS charter [1] and can be expressed as follows:

- Damage free renovation of the existing building stock preserving authentic materials and structures with emphasis on energy concepts.
- Prediction of physical, chemical and mechanical aging and damaging processes of Cultural Heritage buildings based on experience and innovative technologies taking into account past and future environmental influences as well as natural hazards (pollution, earthquakes, floods, etc.).
- Development of preventive conservation strategy based on monitoring and the use of non-destructive techniques to promote the maintenance of Cultural Heritage buildings combined with small scale repair interventions during inspections, accompanied by competent supervision. (profit should be taken from practical experience gained by organisations as Monumentenwacht "Monument watch" in the Netherlands and in Flanders, Belgium.)
- Identification and optimisation of instruments and laboratory procedures used for monitoring, determination of material characteristics and investigation of the behaviour of old (ancient) or new building materials at Cultural Heritage buildings.
- Development of non-destructive or minor destructive testing methods for on-site investigations of material and structural properties and validation of testing methods (e.g. at test specimen as shown in figure 1).
- Development of software models for evaluating and predicting the heat and moisture transport and the structural behaviour of Cultural Heritage buildings (and materials) under environmental influences.

- Setting up databases, standard protocols and criteria for an integral structural assessment of Cultural Heritage, including seismically-active and flood prone areas.
- Integration of this database into an efficient management and maintenance system for Cultural Heritage buildings.



Figure 1: Test specimen featuring different types of historic masonry with damages and inclusions, located at BAM in Berlin. This test specimen was developed in the EC project ONSITEFORMASONRY [2]

### **European dimension**

Concepts and experiences, gained in several European countries represented by the members of the WG1, will be compared and classified. Knowledge generated in previous and running EC projects or projects funded by national bodies or industry will be evaluated and disseminated. The intention is to implement the above described research priorities in the 7<sup>th</sup> Framework Programme of the EC. The initiative is meant to support European Policies and its efforts of preserving the European Cultural Heritage.

### **Innovation and originality**

The main innovations intended by the WG are:

- Develop instruments that promote preventive conservation strategies for the built heritage based on monitoring and the use of non-destructive techniques;
- Long term automatic or semiautomatic (e.g. by robots or scanning systems) monitoring and periodic assessment of Cultural Heritage as part of a management system;

- Optimised and combined application of validated non and minor destructive techniques and monitoring technologies (environmental technologies as mentioned in the London Declaration [3]);
- Intelligent monitoring systems (wireless sensors) being resistant against environmental influences, needing only a minimum of service and being multifunctional for indoor and outdoor monitoring;
- Establishment of large multidisciplinary networks of experts in the area of monitoring, diagnosis and assessment of cultural heritage;
- Development of a new management system for Cultural Heritage integrating the innovations from the other WGs in the FACH ECTP.

### References

- [1] Recommendations for the analysis, conservation and structural restoration of architectural heritage, ICOMOS International scientific committee for analysis and restoration of structures of architectural heritage, 2005.
- [2] <http://www.ONSITEFORMASONRY.bam.de>.
- [3] London Declaration: European Conference Declaration on Sustaining Cultural Heritage Research, London, September 2, 2004.

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