EUREKA PROJECT E!1589 - EUROCARE ARCH IN-SITU

1. General description

Project	E! 1589 - EUROCARE ARCH IN-SITU	**Status**	Announced - 28-JUN-1996
Title	**Development Of Preservation Systems For Archaeological Sites And Monuments In-Situ.**		
Class	Sub-Umbrella	**Technological area**	Environment
Start date	01-JUL-1996	**End date**	01-JUL-2002
Duration	72 months	**Total cost**	0.33 Meuro
Partner sought	No		
Summary	Further Development/Europe-Wide Implementation Of Original Method Of Preservation/Protection Of Archaeological Findings At Their Original Site. The Method Is Based On The Idea Of Protection Of Artefacts By A Transparent Physical Barrier.		

Budget and duration

Phase	Budget(Meuro)	Duration (Months)
Implementation phase	0.33	72
Total	**0.33**	**72**

Member contribution

Member	Contribution	Position	Since
Sweden	**23.00%**	**Contact Member**	**10-MAY-1996**
Slovenia	77.00%	Participating Member	10-MAY-1996

Participants

Company	Country	Type	Role
Preservation Of Cultural Heritage Group Ab	**Sweden**	**SME**	**Main**
Goeteborg University/Institute Of Conservation Gmv-Goeteborg Centre Of Environment And Sustainability	Sweden	University	Partner
Center For Restoration - Republic Of Slovenia	Slovenia	Research Institute	Partner
Zunkd - Inst. For Protection Of Natural & Cultural Heritage	Slovenia	Governm./Nat. Admin.	Partner
Civil Engineering Institute Zrmk	Slovenia	Research Institute	Partner
Milan Kovac Arhitekt, D.O.O.	Slovenia	SME	Partner

2. Project outline

Project description

Archaeological findings should be kept undisturbed at their original sites. Often, when kept in sites, problems arise because of inadequate conservation techniques, and the artefacts are subjected to deterioration due to environmental and microclimatic conditions and tourist erosion.
The current practice of transferring the artefacts into contemporary structures (where the microclimate is different from the original) has proved to be insufficient. Transferring the findings also damages the archaeological site, which hampers further discovery works on the site. The research techniques are continuously improving and new data can be obtained from an existing site.
The main idea of the method implemented in the proposed project is preserving, protecting and presenting the artefacts by ensuring the original conditions prevailing on the site prior to discovery. This is achieved by the physical protection of the artefacts, where they are isolated from external influence by a physical barrier. The original climatic conditions are undisturbed.
The external influence consists of:
a) Human impact (unintentional or intentional damage - vandalism, contaminating the environment, introducing the pollutants, such as water vapour and CO2, tourist erosion).
b) Environmental impact (pollution, changes in climatic conditions).
c) Impact of light (intensity, UV rays).
d) Microbiological impact (growth of micro-organisms and fungi).
The solutions to prevent deterioration of artefacts due to this external influence are the following:
a) Protection against vandalism and tourist erosion is achieved by isolating the visitor from the artefacts.
b) Keeping the artefacts in isolated natural environments separated from visitors in an artificial climate; by filtering and cleaning the incoming air. The air adjacent to the artefacts is temperature and humidity controlled which allows stability of these factors or natural annual climatic cycles.
c) By artificial and sun light control and implementing light filters, reflective glazing and other means.
d) By eliminating the factors stimulating microbiological growth, extremely low illumination of artefacts ensures protection from light and microbiological growth.
Keeping the artefacts in the above described controlled conditions is also beneficial for the artefacts themselves as they are kept in ideal environmental conditions. Also, the advantage of this method has increased the security of the artefacts, which results in a reduction of running costs, such as energy and personnel.

Technological development envisaged

Most of the existing technologies of preservation and protection of archaeological findings are based on the

transferring the artefacts into contemporary structures. The one proposed here is, on the contrary, oriented to keeping the findings undisturbed at their original sites. The area of application is as wide as the archaeological sites are varied. The current interest of potential users and according to experience gained from past applications of method show, that the most frequent cases of application are:
* Protection of natural and artificial subterranean chambers (tombs, temples, caves).
* Existing buildings (museums, historical buildings).
* Indoor and outdoor archaeological excavations. (fountains, monoliths, tombstones).
Protection technology is oriented to monument protection shield technology and to the technology of monument sites stabilization.
The technology of protection shields is based on special multilayer glass, ventilation techniques, light filtering and distribution. The supporting construction is also a part of high-tech shield. It has already been applied on various sites. Therefore, the collection data about the proposed method efficiency and response of visitors will be also be a part of the proposed project activities.
Due to excavation work on the natural support of a monument site this is usually changed and additional supportive measures have to be undertaken. The sites are exposed to soil erosion and landslides. Vibrations or additional loading by traffic, human activities in close proximity or caused by natural phenomena such as an earthquake, can also seriously affect archaeological findings. Therefore, a part of the project will be oriented to the development of methods and techniques for structural stabilization of archaeological findings exposed to various vibration environmental influences. The principle of action will be guided by the Venice Charter (1964), particularity by its Articles 15 and 16, and all other principles developed for the Venice Charter ideas.
The proposed method for protection and preservation of archaeological sites is also very attractive from the environmental point of view. The sites that represent the unique envrionmental entities shall, by using the proposed protective measures, remain unchanged and preserved for future studies on their original location and under virtually unchanged conditions.

Markets application and exploitation

Current interest of potential users and according to experience gained from past applications of the method show, that the most frequent cases of application are:
* Protection of natural and artifical subterranean chambers (tombs, temples, caves).
* Existing buildings (museums, historical buildings)
* Indoor and outdoor archaeological excavations (such as indoor excavations in churches)
* Outdoor architectural monuments (fountains, monoliths, tombstones).
The technology of protection is oriented to technology of monument protecting shield and to technology of stabilization of monument iste.

The main projects, where the proposed methods were applied are:
* Protection of artefacts - the Royal Ship of Khufu (Cheops), survey and study of the state of material.
* Museum plannings, subterranean museum for protection for the Royal Ship of Khufu (Cheops), EGYPT, subterranean mausoleum for Royal Mummies at Mukkatam, EGYPT, renovation of THE EGYPTIAN MUSEUM, (ICOM PROJECT),Cairo, EGYPT.
* Protection of tombs - Tomb of Nakht, Qurna/Luxor, EGYPT; Tomba Bartoccini, Tarquinia, ITALY, Ellora Cave 32, INDIA; pilot project for protection of Ajanta, INDIA; Tanf Dynasty Tomb at Qian, CHINA (in preparation).
* Protection of archaeological sites - Church of St.Jurij, Legen, Slovenia; pastoral centre and the church of Sv. Duh Cronomelj, SLOVENIA.
* Protection of monuments - Taj Mahal, INDIA - protection against tourist erosion.

Project codes

BSI

RBJ.D	building conservation
ZOO	archaeology

NACE

3. Main participant

Company	**Preservation Of Cultural Heritage Group Ab** Edsviksvaegan, 22 191 45 Sollentuna Sweden Tel +46 8 352 989 Fax +46 8 352 989
Contact	**Mr. Milan Kovac** Director Tel Fax
Organisation type	SME
Participant role	Main

Contribution to project

Basic development of a system for the preservation and protection of archaeological findings at their original sites.

Expertise

Consultancy in the protection and presentation of natural and cultural heritage in the field of architectural town planning and lanscaping and coordination with related consultants gathered for a specific project. The main projects are: * Protection of artefacts - The Royal Ship of Khufu (Cheops), survey and study of the state of material * museums planning - subterranean museum for the protection of the Royal Ship of Khufu (Cheops), EGYPT, subterranean mausoleum for Royal Mummies at Mukkatam, EGYPT, renovation of THE EGYPTIAN MUSEUM (ICOM Project), Cairo, EGYPT * protection of tombs - tomb of Nakht, Qurna/Luxor, EGYPT; Tomba Bartoccini, Tarquinia, ITALY; Ellora Cave 32, INDIA; Tanf Dynasty Tomb at Qian, CHINA (in preparation) * Protection of archeological sites - Church of St. Jurij, Legen, SLOVENIA; pastoral centre and the church of Sv. Duh Crnomelj, SLOVENIA * protection of monuments - Taj Mahal, INDIA - protection against tourist erosion.

4. Partner

Company	**Goeteborg University/Institute Of Conservation** **Gmv-Goeteborg Centre Of Environment And Sustainability** Bastionsplatsen, 2 411 08 Goeteborg Sweden Tel +46 31 772 4953 Fax +46 31 778 3848
Contact	**Prof. Jan Rosvall** Research Leader In Conservation

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Organisation type University
Participant role Partner

Contribution to project

Expertise

ICUG is organised with a comprehensive programme of conservation of mobile, in-situ cultural heritage, monuments, buildings, built environments on a cross/multi disciplinary scientific academic base. Graduate level and post graduate doctorate programmes. Scientific research on degradation, etc. are under constant development, including: - stone materials, - microbiology, - archaeometry, etc., based on strategic modelling of the conservation discipline.

4. Partner

Company **Center For Restoration - Republic Of Slovenia**
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Slovenia

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Contact **Prof. Josip Korosec**
Director

Tel
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Organisation type Research Institute
Participant role Partner

Contribution to project

Expertise

Research institute and governmental administrative body, institute for the restoration of architecture, sculpture and paintings, technology treatment and methodology.

4. Partner

Company	**Zunkd - Inst. For Protection Of Natural & Cultural Heritage** Grad Grm, Skalickega, 1 680 00 Novo Mesto Slovenia Tel +386 68 322 019 Fax +386 68 247 32
Contact	**Mr. Danilo Brescak** Director Tel Fax
Organisation type	Governm./Nat. Admin.
Participant role	Partner

Contribution to project

- Archeological study - Evaluation of findings

Expertise

Research institute and governmental administrative body, institute for the restoration of architecture, sculpture and paintings, technology treatment and methodology.

4. Partner

Company	**Civil Engineering Institute Zrmk** Dimiceva, 12 1000 Ljubljana Slovenia Tel +386 1 188 8100 Fax +386 1 348 363
Contact	**Mag. Gojmir Cerne** Director Tel Fax
Organisation type	Research Institute
Participant role	Partner

Contribution to project

Expertise

Continuing basic and applied research work has resulted in methods and technologies that are present in current building practice in SLOVENIA and some other countries. Major achievements in the field of repair and maintenance are: - integral technology for aseismic strengthening of masonry buildings where steel ties and injection of walls and vaults are used - strengthening of masonry vaults by replacing the gravel toppings with reinforced foam concrete, - historic monuments strengthening by injection and surface repairing and reinforced concrete structures strengthening by injection and surface repairing, and - reinforced concrete structures strengthening by applying steel strips and plates glued by epoxy.

4. Partner

Company	**Milan Kovac Arhitekt, D.O.O.** Opekarska, 11 1000 Ljubljana Slovenia Tel +386 1 283 9214 Fax +386 1 283 9216
Contact	**Mr. Milan Kovac** Director Tel Fax milan.kovac@siol.net
Organisation type	SME
Participant role	Partner

Contribution to project

Establishment of links between SWEDEN and SLOVENIA for cooperation in technology transfer/its further development. Research work on transferring existing technology to meet the local conditions in SLOVENIA.

Expertise