EUREKA PROJECT E!1382 - EUROCARE EUROPLASTER

1. General description

Project	E! 1382 - EUROCARE EUROPLASTER	**Status**	Finished - 12-FEB-1999
Title	**Preservation And Restoration Of Historical Plaster**		
Class	Sub-Umbrella	**Technological area**	Environment
Start date	01-JUN-1995	**End date**	01-DEC-1997
Duration	30 months	**Total cost**	0.37 Meuro
Partner sought	No		
Summary	Using Selected Historical Buildings As A Basis, Determine Quantitative/Chemical Parameters And Limit Values To More Accurately Define Historical Properties So Historical And Current Production Methods/Techniques Can Be Compared.		

Budget and duration

Phase	Budget(Meuro)	Duration (Months)
Definition phase	0.03	3
Feasibility phase	0.03	6
Full Exploitation	0.19	15
Implementation phase	0.12	6
Total	**0.37**	**30**

Member contribution

Member	Contribution	Position	Since
Austria	**30.40%**	**Notified Finished**	**12-FEB-1999**
United Kingdom	21.40%	Notified Finished	12-FEB-1999
Poland	17.70%	Notified Finished	12-FEB-1999
Sweden	2.50%	Notified Finished	12-FEB-1999
Slovenia	28.00%	Notified Finished	12-FEB-1999

Participants

Company	Country	Type	Role
Bautechnische Pruef- Und Versuchsanstalt Gmbh	**Austria**	**SME**	**Main**
Sp Swedish National Testing And Research Institute	Sweden	Research Institute	Partner
Hochschule Fuer Angewandte Kunst In Wien Institut Fuer Silikatchemie Und Archaeometrie (Isca)	Austria	University	Partner
Ljubljana University/Civil Engineering	Slovenia	University	Partner

Participants

Company	Country	Type	Role
Institute (Zrmk)			
Queen'S University Of Belfast/Built Environment School	United Kingdom	University	Partner
Institute Of Catalysis And Surface Chemistry	Poland	Research Institute	Partner
Konserwacja Zabythow S.C.	Poland	SME	Partner

2. Project outline

Project description

1. State-of-the-art and project scope:
As a rule, the repair and maintenance of historical buildings (HBs) are required because they are to be re-utilized in total or in part. However, the exterior structural elements of such buildings, in particular the plaster facades which have been exposed to weathering and pollution impact, have suffered a decrease in durability during long time exposure. When dealing with repair, renovation and conservation of such facades, modern standard methods of plastering apply only to a limited extent. It is therefore essential to develop guideline information and test modifications of recent recipes on mortar preparation and application for the above purpose.
In particular, the scope of the project is the development of suitable methods which allow for the evaluation whether:
- the outdoor plaster of a given HB can be preserved; if so, which repair and conservation measures must be undertaken;
- the outdoor plaster of a given HB must be removed; if so, which properties other than essential appearance must be defined for the new mortar system.
Such methods must be as little destructive as possible, easy to handle and relatively cheap, as frequently they will have to be applied by craftsmen at the worksite.
2. Definition Phase:
- Selection of HBs in AUSTRIA (in accordance with the AUSTRIAN FEDERAL MONUMENTS PERSERVATION OFFICE) and in partner countries; the HBs selected (in total about 5 to 7) will be mainly of the classicist and historicist architectural styles in keeping with the foregoing items.
- Selection of suitable mechnical and physical examination methods, preferentially applicable in-situ.
- Definition of sample parameters to be measured by conventional means.
3. Implementation phase:
- Analyses of major parameters of historic plaster samples from the selected HBs, both defining their original composition including aspects of mixture and application technology, and their state and degree of alteration (chemical and petrographical properties, physico-mechanical properties like permeability, water absorption, various mechanical strength parameters, frost resistance, etc.). Wherever possible, relevant standard and norms will be applied.
- Application of selected in-situ methods and calibration by the conventional ones.
- Definition of the properties of suitable repair and substitution mortars according to the results from HP analyses. Thus, not more than five types of mortar with respect to mixture on to raw and primary materials will be developed. Development of corresponding process technologies for mortar production.
- Tests of the above materials according to the relevant standards, with particular attention being paid to the limit values worked out in the earlier stages.
4. Exploitation Phase:
- Commercial production of mortar systems by manufacturers.

- Eventual commercial production of in-situ test devices.

Technological development envisaged

1. According to item 2.4 and the aims of the suggested activities, at present there exists no suitable technology.
2. Using the results of this project it will be possible to protect historical buildings for future generations and use them in an economic manner.

Markets application and exploitation

By 2002 the market for the preservation and restoration of historic buildings will amount to approximately 4,500 million ATS (350,000 ECU) for the area AUSTRIA specified. This new amount is the actual one and it differs from the foregoing EUREKA application form.
With respect to historical plasters, the share will probably be roughly 900 million ATS (20%, 70,000 ECU).
The introduction of the results into the market will last no more than one year, because these results are one of the main interests of the FEDERAL MONUMENT PRESERVATION OFFICE.

Project codes

BSI

AUY	conservation
BA/BK	measurement

NACE

9252	Museum activities and preservation of historical sites and buildings

3. Main participant

Company	**Bautechnische Pruef- Und Versuchsanstalt Gmbh** Neubaugasse, 5 2236 Lanzendorf Austria Tel +43 2235 42363 40 Fax +43 2235 42363 20
Contact	**Dr. Roland Travnicek** General Manager Tel Fax
Organisation type	SME
Participant role	Main

Contribution to project

Project management. Selection of historical objects in cooperation with the AUSTRIAN FEDERAL MONUMENT PRESERVATION OFFICE. Testing programme. Development of HPs (historical plasters)in cooperation with special manufacturers.

Expertise

1. Field of testing materials - Cement, lime, gypsum - Concrete, mortars, plasters. 2. Analysis of building condition - Determination of current state of materials by analysing building elements/buildings made of bricks including plasters, natural stone. - Development of renovation concepts for the building elements mentioned above, including development of tender documentation.

4. Partner

Company	**Sp Swedish National Testing And Research Institute** Brinellgatan, 4 501 15 Boraas Sweden Tel +46 33 16 50 00 Fax +46 33 13 55 22 www.sp.se
Contact	**Dr. Jan-Erik Lindqvist** Tel +46 33 16 51 43 Fax +46 33 13 45 16 info@sp.se

Organisation type Research Institute
Participant role Partner

Contribution to project

Testing of frost resistance of historical plasters. Quantitative microscopical analysis of air void systems and microstructure of plasters that will be tested with respect to frost resistance.

Expertise

Expertise in testing, consultancy, standardisation and quality control in the field of masonry, renderings and plaster. SP is active both in the field of new products and historical materials and participates in the EUROLIME project and the Nordic Seminar on Building limes. SP is active in developing microscopical methods applied to the analysis of building materials. This includes light microscopy, SEM and image analysis.

4. Partner

Company **Hochschule Fuer Angewandte Kunst In Wien Institut Fuer Silikatchemie Und Archaeometrie (Isca)**
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Organisation type University
Participant role Partner

Contribution to project

Full range of petrographic analyses of mortar samples. Part of chemical analyses of binders. Qualitative/quantitative analyses of chemical and physical corrosion and deterioration features.

Expertise

Since 1982: research consultancy and lecturing in the field of stone, plaster, wall coverings and related matierals. Numerous publications in the above field.

4. Partner

Company	**Ljubljana University/Civil Engineering Institute (Zrmk)** Dimiceva, 12 1000 Ljubljana Slovenia Tel +386 1 176 8669 Fax +386 1 125 0667
Contact	**Prof. Roko Zarnic** Head Of Technology Center Tel +386 61 188 8286 Fax +386 61 125 0667 rzarnic@gi-zrmk.si
Organisation type	University
Participant role	Partner

Contribution to project

Development and implementation of a numerical model for distribution of fluid in a porous medium. Sensitivity studies of various parameters influencing the fluid/solid system will be studied to assess their relative importance.

Expertise

Civil engineering institute established by the SLOVENIAN GOVERNMENT in 1949. Part of its activities is oriented to experimentally supported development of methods and techniques for strengthening and restoration of structures. The research group for Mechanics of Materials in the Department of Materials and Technologies performs a scientific support to market-oriented development and implementing of materials used for restorative works and durable structural elements. The group is skilled in using experimental and computational methods oriented to research of materials.

4. Partner

Company	**Queen'S University Of Belfast/Built Environment School** University Road, Bt7 1nn Belfast United Kingdom Tel +44 1232 245 133 Fax +44 1232 663 754
Contact	**Prof. Adrian Long** Director Of School Tel +44 1232 245 133 EXT. 4005 Fax a.long@qub.ac.uk

Organisation type University
Participant role Partner

Contribution to project

Preliminary testing of plaster samples from historic buildings to determine suitability.Modification of equipment Full testing with other partners including in-situ testing in AUSTRIA. Production of monitoring method recommendations.

Expertise

Field of testing structural materials: - concrete, mortars, brickwork - coatings, repair material. Specialist testing equipment has been developed at QUEEN'S UNIVERSITY to measure in the laboratory and in-situ the following properties which are relevant to this project: i) air permeability and water absorption of mortar, brickwork and plaster using the AUTOCLAM. These properties are indicative of the likely durability and the tests can be backed up by accelerated testing using our intensive range of computer-controlled environmental chambers in the School of the Built Environment. ii) Tensile strength of mortar/plaster and the quality of the bond between the plaster and the main structural elements. The Structural Materials Research Group has published over 100 technical papers over the past 5 years.

4. Partner

Company **Institute Of Catalysis And Surface Chemistry**
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Contact **Dr. Roman Kozlowski**
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Organisation type Research Institute
Participant role Partner

Contribution to project

* determining the pore structure of mortar samples by means of mercury porosimetry and water vapour adsorption * microscopical analysis of finish and paint layers on the surfaces of historic mortars.

Expertise

Since 1985, research in the field of deterioration and conservation of historic building materials with a special

focus on pollutant deposition, the effect of climatic parameters, salt migration and cyrstallisation. Based reseach was always related to field studies and practical conservation works. Participation in a number of international research projects and numerous publications.

4. Partner

Company **Konserwacja Zabythow S.C.**
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Contact **Mr. Aleksander Piotrowski**
Co-Owner Of The Company

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Organisation type SME
Participant role Partner

Contribution to project

* Implementation of the project recommendations into practical conservation * Assessment of aesthetic aspects of the recommended measures.

Expertise

The company is a group of highly qualified professional conservators carrying out a wide range of tasks in the field of art conservation such as: * conservation and restoration of all types of cultural properties * research into object history and deterioration * preparing comprehensive documentation and conservation programmes. The group has carried out several complex conservation works on richly decorated 19th century facades.