

EUREKA PROJECT E!1270 - EUROCARE KERASANITATE

1. General description

Project	E! 1270 - EUROCARE KERASANITATE	Status	Finished - 17-APR-2000
Title	Masonry Dehumidification Systems And Masonry Desalination Systems In The Treatment Of Protected Architectural Heritage		
Class	Sub-Umbrella	Technological area	Environment
Start date	01-JUL-1994	End date	01-JAN-2000
Duration	66 months	Total cost	0.15 Meuro
Partner sought	No		
Summary	Parallel Comparative Field Testing Of Kerasan Masonry Dehumidification And Desalination System In Different Types Of Masonry Which Vary Considerably In Their Composition In The Different Regions Of Europe.		

Budget and duration

Phase	Budget(Meuro)	Duration (Months)
Definition phase	0	1
Development stage	0	50
Research stage	0	15
Total	0.15	66

Member contribution

Member	Contribution	Position	Since
Austria	80.00%	Notified Finished	17-APR-2000
Germany	15.00%	Notified Finished	17-APR-2000
Italy	5.00%	Notified Finished	17-APR-2000

Participants

Company	Country	Type	Role
Kerasan Ges Mbh & Co. Kg	Austria	SME	Main
Societa Studio Sei S.R.L.	Italy	SME	Partner
Technisches Buero Fuer Bauwerkstroekkenlegung (Tbb Dessau)	Germany	SME	Partner
Inst. Fuer Bauwerkdiagnostik Und Denkmalsanierung (Baudiag)	Germany	Research Institute	Partner
Ingenieurbuero Fuer Bauwerkserhaltung Weimar Gmbh	Germany	Research Institute	Partner
Mess- Und Regeltechnik Gesmbh	Austria	SME	Partner
Hochschule Wismar	Germany	University	Partner

Participants

Company	Country	Type	Role
Schuster Und Grundmann Gbr	Germany	SME	Partner
Oesterreichisches Bauinstitut	Austria	Research Institute	Partner

2. Project outline

Project description

project proposed in the framework of the EUREKA research programme for EUROCARE:

1. KERASAN masonry dehumidification system
2. KERASAN masonry desalination system.

Masonry dehumidification methods such as making incisions into the masonry or chemical injection methods, constitute irreversible interventions into the old building substance and in fact do not always yield the desired success.

The active electro-osmosis system is the gentlest, least aggressive method of masonry dehumidification. So far, the technical efficiency of the system and the durability of the electrodes has not been proven.

In cooperation with the scientist Dipl.-Ing. Dr. Karl Heinz Steininger, KERASAN will conduct a full scale parallel field test to establish the functional parameters of active electro-osmosis masonry dehumidification systems under varying conditions.

Since different building materials have been used in the various regions of Europe, the applicability and efficiency of KERASAN systems are to be investigated in field tests; corresponding parameters will be established.

The objective is to determine what period of time would be necessary to reduce the humidity of different types of masonry in relation to:

- wall thickness
- wall material
- climatic conditions
- accompanying measures
- reasons for the damage,

and to what extent this could be accomplished.

Furthermore, the research project aims to provide information on the period of time required to reduce masonry salts in the different types of masonry and determine which parameters would be necessary to evaluate the efficiency of this system. Moreover, the velocity of the salt ions in the masonry will be studied in relation to the current flow and humidity of the masonry.

A large scale scheme of masonry dehumidification equally suited to the desalination of concrete (e.g. bridges) will be developed.

Procedure:

1. Identification of suitable objects.
2. Detailed analysis of both building and masonry, carried out by a Technical University Department, an officially authorised institution or a technical institute.
3. Development of a rehabilitation concept by the research partners in cooperation with the testing institution and KERASAN.
4. Installation of the KERASAN system by the research partners or KERASAN.
5. Subsequent inspections of the system at appropriate intervals determined for each individual project in cooperation with the testing institution (after approximately 6 months, 1 year, 2 years).
6. The reduction of the humidity and salt content of the masonry will be documented.
7. The cost of each individual object will depend on its

size and the extent of damage caused.

We plan to use the system on about 6 objects, i.e.

1 object in Venice, ITALY

1 object in HUNGARY

2 objects in GERMANY

2 objects in AUSTRIA.

Technological development envisaged

Up to now, the KERASAN systems have been used mainly in Vienna and the surrounding region.

The efficiency of the system has been documented in practice for several objects.

Since it is well known that a wide variety of building materials have been used in the various regions of Europe, field tests are required to determine whether the systems can be applied to any building and what criteria should be observed.

The state-of-the-art still provides no answers to the following questions, which will therefore be scientifically studied and resolved:

1. What is the long-term life of electrically conducting plastic electrodes in the various types of masonry?
2. What must the performance capacity of an electrode (mAh/cm²) be, to cause the de-humidification of different types of masonry?
3. What parameters are necessary to ensure current conduction from the electrode to the masonry over a protracted period of time?
4. How long does the dehumidification of different types of masonry, either in contact with the soil or above ground take, in relation to wall thickness, climate, utilisation, penetration of humidity, etc?
5. What current intensities are required to document an acceptable dehumidification effect in various types of masonry characterised by different degrees of humidity penetration and wall thickness?
6. To what extent is the drying of the masonry after the dehumidification process impaired by different types of plasters, coatings, etc?
7. What is the influence of masonry salts on the dehumidification process?
8. What are the dangers for different types of masonry, if the salt concentration exceeds a certain limit (mass per cent)?
9. What salt concentrations are acceptable under what conditions and when is it necessary to reduce them?
10. What salt combinations are acceptable under what conditions and when is it necessary to reduce them?
11. What is the duration of the desalination process in relation to the penetration of humidity into the masonry and the various salts?
12. How can salts be removed from joints in the masonry (large surface desalination)?

Markets application and exploitation

There is a large market for masonry dehumidification both on the entire European continent and in parts of Asia.

The KERASAN system can be used in a global level for the

dehumidification of objects damaged by rising moisture.
The masonry desalination system can be used to the same extent.

There is also a global demand for large-scale desalination, such as bridges.

Where: ITALY, GERMANY, AUSTRIA.

By whom: KERASAN and partners in ITALY and GERMANY.

Market Introduction: immediately after termination of the project.

Project codes

BSI

BL/BY

RKW.JN

RXH.D

VEJ.J

testing

dehumidifiers

stone

desalination

NACE

4521

General construction of buildings and civil engineering works

3. Main participant

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Organisation type SME
Participant role Main

Contribution to project

Project Coordination. Supply of materials to partners where work is carried out by others. Inspection of systems both in AUSTRIA and abroad. Coordination of operations with the testing institutions and evaluation of test results.

Expertise

The company has operated in the field of masonry dehumidification for 15 years; its focus is on "active electro-osmosis". Numerous studies and practical analyses resulted in the development of a masonry dehumidification systems which has, as a matter of fact, proved to be highly efficient. In the framework of the research programme, the parameters for "active electro-osmosis systems" have been drawn up. These findings have led to the development of the KERASAN masonry desalination system. The function of the masonry desalination method developed by KERASAN has been proven and documented in connection with several objects.

4. Partner

Company **Societa Studio Sei S.R.L.**
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Manager

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Organisation type SME
Participant role Partner

Contribution to project

Installation and inspection of KERASAN systems.

Expertise

The company has been active in the field of masonry dehumidification for one year and uses KERASAN systems by preference in its operations. SEI is a specialised company authorised by KERASAN. Technical and scientific evaluation of the examined KERASAN systems.

4. Partner

Company **Technisches Buero Fuer Bauwerkstroekkenlegung (Tbb Dessau)**
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Organisation type SME
Participant role Partner

Contribution to project

Installation and inspection of KERASAN systems.

Expertise

Has been active in the field of masonry dehumidification for 3 years and uses KERASAN systems by preference in its operations.

4. Partner

Company **Inst. Fuer Bauwerkdiagnostik Und Denkmalsanierung (Baudiag)**
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Organisation type Research Institute
Participant role Partner

Contribution to project

Has acquired several years of experience in the area of building analysis. The company is therefore able to analyse systems in a thoroughly objective fashion.

Expertise

Mr. Wolko is mentioned as an expert in the field of masonry rehabilitation in numerous trade publications.

4. Partner

Company **Ingenieurbuero Fuer Bauwerkserhaltung Weimar Gmbh**
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Organisation type Research Institute
Participant role Partner

Contribution to project

Has acquired several years of experience in the area of building analysis. It is therefore able to analyse systems in a thoroughly objective fashion.

Expertise

Mr. Burkhardt is mentioned as an expert in the field of masonry rehabilitation in numerous trade publications.

4. Partner

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Organisation type SME
Participant role Partner

Contribution to project

Has acquired several years of experience in the area of building analysis. Therefore it is able to analyse systems in a thoroughly objective fashion.

Expertise

Mr. Steininger is the inventor of the KERASAN electrodes.

4. Partner

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Contact **Dr. (Rer.Nat.) Helmuth Venzmer**
Professor

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Organisation type University
Participant role Partner

Contribution to project

Mr. Helmuth Venzmer is the Professor for Construction Physics at the University.

Expertise

Mr. Venzmer is mentioned as an expert in the field of masonry rehabilitation in numerous trade publications.

4. Partner

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Organisation type SME
Participant role Partner

Contribution to project

Installation and inspection of KERASAN systems.

Expertise

The company has been active in the field of masonry dehumidification for one year and uses KERASAN systems by preference in its operations. SCHUGRU is a specialised company authorised by KERASAN. Technical and scientific evaluation of the examined KERASAN systems.

4. Partner

Company **Oesterreichisches Bauinstitut**

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Organisation type
Participant role

Research Institute
Partner

Contribution to project

Has acquired several years of experience in the area of building analysis. Therefore it is able to analyse systems in a thoroughly objective fashion.

Expertise

Mr. Balak is mentioned as an expert in the field of masonry rehabilitation in numerous trade publications.