

# EUREKA PROJECT E!1069 - EUROCARE VENEZIA CARE

## 1. General description

<b>Project</b>	E! 1069 - EUROCARE VENEZIA CARE	<b>Status</b>	Finished - 12-JUN-1997
<b>Title</b>	<b>Eurobor In Venice</b>		
<b>Class</b>	Sub-Umbrella	<b>Technological area</b>	Environment
<b>Start date</b>	01-AUG-1993	<b>End date</b>	01-DEC-1996
<b>Duration</b>	40 months	<b>Total cost</b>	0.58 Meuro
<b>Partner sought</b>	No		
<b>Summary</b>	1. Protection Of Wood In Buildings, Esp. Wooden Piles/Grillages Around Re-Excavated Canals. 2. Prevention Of Capillary Transport Of Water In Brickwork If Salinity Of Bricks Can Be Solved. 3. Protection Of Wood In The Entire Construction.		

## Budget and duration

Phase	Budget(Meuro)	Duration (Months)
Definition phase	0.02	2
Feasibility phase	0.07	3
Full Exploitation	0.36	26
Development stage	0	2
Initial Exploitation	0.05	9
Research stage	0.08	3
<b>Total</b>	<b>0.58</b>	<b>40</b>

## Member contribution

Member	Contribution	Position	Since
<b>Sweden</b>	<b>40.00%</b>	<b>Notified Finished</b>	<b>12-JUN-1997</b>
Denmark	20.00%	Notified Finished	12-JUN-1997
Italy	40.00%	Notified Finished	12-JUN-1997

## Participants

Company	Country	Type	Role
<b>Jerbol System Ab</b>	<b>Sweden</b>	<b>SME</b>	<b>Main</b>
N. & R. Consultants A/S	Denmark	SME	Partner
Kjessler & Mannerstraale Byggt teknik Ab	Sweden	Large company	Partner
Consorzio Venezia Ricerche	Italy	Research Institute	Partner

## 2. Project outline

### Project description

When reconditioning canals, the following will occur:

1. Wooden piles and grillages enter a new environment. The organic matter will immediately start to decay. This decay must be avoided.
2. According to the reconditioning technology, the brickwork might be somewhat drained but not dry.
3. The reconditioning technology will not affect the construction timber which is already decaying.

There are thus three main problems relating to decay which have to be solved.

Piles/Grillages:

The EUROBOR and JERBOR biotechnology for the protection of piles and grillages is well documented for the Nordic environment. The main problems for us might be the wood of the Mediterranean coniferous type, the higher ground temperature and the salinity of the water. In order to prove that the technology works and if necessary change it, we must carry out laboratory work as well as practical tests. According to our technological knowledge and theoretical modelling, the problems are more of a practical nature on site than the EUROBOR biotechnology amounts to get a sterile and boron-donating barrier around the wood.

Protection from capillarity:

After having been reconditioned, the water level in the canal will rise. When building the foundation, an impermeable layer of rock was placed above water level in order to prevent the capillary transport of water to sensitive materials. This prevention must be restored and one way is to use EMI-beam technology to evaporate the water from the bricks and fill up the existing voids with a special resin of the silicon type. This technology is being tested in Nordic environments and seems to be useful in old buildings suffering from moisture problems. However, there are some questions which have to be elucidated before full scale work such as the type of water being evaporated and voids versus the energy and chemistry of the water can be carried out. The main problem might be the salinity of the bricks.

Protection of construction timber:

Timber has a naturally high water content and accordingly suffers from severe microbial attacks. In order to protect the timber, bioacids must be used. The problem is to get the chemicals into the wood and keep them there. According to our experience, it is necessary to dry the timber and replace the water with fungicides of the borocol type. The drying out and refilling technique has been studied in the Nordic environment with its low humidity compared to Venice. Before practical work can begin, testing and control of equipment for the refilling system must be done in situ because there is a marked risk of it drying out too fast.

### Technological development envisaged

Step 1:

- A. Testing various EUROBOR sludges on a pilot scale.

Taking samples for laboratory analysis of the boron content in the wood and the microbial environment.  
Assessment of the results.

B. On a pilot scale, testing the monitoring system for drying out moisture from construction timber and replacement of the water with boracol.

Taking samples for laboratory analysis of the boron content and the microbial environment.  
Assessment of the results.

C. Test on a pilot scale the EMI-beam system for drying out moisture in brickworks above the water surface and the replacement of moisture with resin in order to stop the capillary transport of water.

In situ measurements and assessment of the results.

Before starting the tests the problems with high salinity in the bricks must be solved.

Step 2:

Synthesis of results and formation of the KM philosophy from pile-to-ridge for the Mediterranean environment, especially Venice.

Step 1 and 2 correspond to the pre-study of the project.

Step 3:

Choosing a test area for full scale work based upon the synthesis of results. The area should be a whole building with decay of piles above the water surface and timber under decay on the upper floors.

We are aware of the fact that the buildings have great historical value and no methods should be used to change the historical environment in or under them. Therefore we have to be very careful when choosing methods and follow nature as closely as possible.

Step 4:

A technical and scientific report of the result will be produced in cooperation with the UNIVERSITY OF VENICE.

Note under Relationship to other EU Programmes:

Actions/programmes initiated by:

- CITY OF VENICE

- CITY OF GOTHENBERG.

In E! 341 the EUROBOR system was used in a way in which it could be used in Venice. Tested in the Nordic environment, its performance and results have given good prospects for the technology to be adapted to the Mediterranean environment. It does not contain protection from capillarity and the prevention of decay in construction timber as there were no such problems. However, E! 341 turned out to be one part of the KM 'pile-to-ridge' philosophy.

## Markets application and exploitation

During the period during which we have discussed this Venitian project, we have had enquiries of various types from the following countries:

GERMANY (SCHWERINER SCHLOSS):

Professor Sperling, TECHNISCHE HOCHSCHULE Leipzig

SLOVENIA (historic village):

Professor Gustin, Department of Archeology, UNIVERSITY OF LJUBLJANA

UKRAINE (General enquiry):

Professor Nikolay, Department of Basements and Piles at ODESSA CIVIL ENGINEERING INSTITUTE, Odessa.

CANADA (Cooperation):  
 Mr. Byrne, FORNITEC CANADA Corporation, Vancouver  
 U.K. (Cooperation):  
 Mr. Robertson, Channelwood, Cheshire  
 BELGIUM (Corporation):  
 Mr. Lousberg, P. LOUSBERG & ASS., Brussels  
 THE NETHERLANDS (Corporation):  
 Mr. Grooten, MNP, Simpelveld  
 THE NETHERLANDS (exchange of scientific results):  
 Professor Samson, CENTRALB & SCHIMMELFORSH., Baern  
 JAPAN (corporation):  
 Mr. Aso, MITSUI & CO., Tokyo.  
 Where: in Venice, ITALY.  
 By whom: The KM Group (KM ENGINEERING, Manager, Mr. W. Delfs)  
 Market Introduction: after pilot tests have been performed and report prepared, according to schedule this could be three months after start.  
 Note under development location:  
 JERBOL AB:laboratory research/project management  
 KM: pilot project/full scale project  
 N & R: pilot project  
 CITY OF VENICE: additional help.

## Project codes

### **BSI**

VL	biotechnology
YUB	maintenance (servicing)
ZW	arts

### **NACE**

2640	Manufacture of bricks, tiles and construction products, in baked clay
4521	General construction of buildings and civil engineering works

### 3. Main participant

**Company**                      **Jerbol System Ab**  
N. Mockleby,  
386 96 Faerjestaden  
Sweden

Tel +46 485 322 70  
Fax +46 485 324 47

**Contact**                      **Prof. Allan Jerbo**  
Manager

Tel  
Fax

**Organisation type**        SME  
**Participant role**            Main

---

### Contribution to project

Project manager, technical and scientific support, laboratory research, international contacts.

---

### Expertise

Mr. A. Jerbo, Assistant Professor (UNIVERSITY OF UPPSALA), specialist in wood decay and biocorrosion, experienced in soil mechanics and geochemistry. Cooperating with JERBOL SYSTEM AB: JORDHAELSAN, Kalmar - specialists in analysing trace elements in soil NEONTEKNIK AB, Faerjestaden - specialists in monitoring electric systems SVELAB, Kalmar - specialists in analysing urban ground water, microbiologists DANSKT TEKNOLISKT INST, Taastrup - specialists in wood decay and heat treatment LAVTOX A/S, Vejle - specialists in Boracol treatment of decayed wood.

---

### 4. Partner

**Company**                      **N. & R. Consultants A/S**  
Sortemosevej, 2  
3450 Alleroed  
Denmark

Tel +45 48 14 00 66  
Fax +45 48 14 00 33

**Contact**                      **Civ. Eng. Carl Birck**  
Division Manager

Tel +45 48 14 00 66  
Fax +45 48 14 00 33

**Organisation type** SME  
**Participant role** Partner

---

## Contribution to project

Will contribute throughout the project.

---

## Expertise

Specialists in all kinds of house building. Has been working with JERBOL AB for five years. Mr. C. Birck, civil engineer, Division Manager, is responsible for KM's interests primarily in DENMARK. Is experienced in soil mechanics and EUROBOR biotechnology. Obtains all N & R experience as obtainable. Cooperates closely with FRANCESCO MORELLI APS which is N & R's contact in ITALY.

---

## 4. Partner

**Company** **Kjessler & Mannerstraale Byggteknik Ab**  
Rullagergatan, 6  
415 26 Goeteborg  
Sweden

Tel +46 31 72 72 500  
Fax +46 31 72 72 501

**Contact** **Mr. Wilhelm Delfs**  
Regionchef Specialteknik

Tel +46 31 72 72 660  
Fax +46 31 72 72 501

wilhelm.delfs@km.se

**Organisation type** Large company  
**Participant role** Partner

---

## Contribution to project

## Expertise

Specialist in protection of piles and grillages using JEROR and EUROBOR biotechnological system. 13 years' experience. The company has specialists for all kinds of house building, soil mechanics, chemistry, microbiology, etc. Has cooperated with JERBOL since 1976. Mr. W. Delfs, Engineer, Manager of KM ENGINEERING, has been responsible for the EO project 341 and the development of the technical part of the JERBO/EUROBOR biotechnology. Cooperating with KM ENGINEERING: FUKTTEKNIK AB in Malmo - specialist in evaporating moisture from porous building media.

---

## 4. Partner

**Company****Consorzio Venezia Ricerche**

Palazzo Cavalli, Piazza San Marco, 4090  
30 124 Venezia  
Italy

Tel +39 041 52 39 006  
Fax +39 041 52 39 170

**Contact****Mr. Gianni Cagnin**

Tel  
Fax

**Organisation type  
Participant role**

Research Institute  
Partner

---

**Contribution to project**

Replaces COMUNE DI VENEZIA in the project.

---

**Expertise**