

DURABLE TRANSPORT INFRASTRUCTURES IN THE ATLANTIC AREA

NETWORK

ACCESSIBILITY & TRANSPORTS
PROJECT 2008-1/049



www.duratinet.org

DURATINET

NEWSLETTER

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June 2010

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ATLANTIC AREA Transnational Programme
ESPACIO ATLÁNTICO Programa Transnacional
ESPACE ATLANTIQUE Programme Transnational
ESPAÇO ATLÁNTICO Programa Transnacional

Investing in our common future



European Union

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This Newsletter reports on the dissemination activities and project progress achieved during the 3rd semester of the DURATINET project.

The 3rd Consortium Meeting and the 3rd Trans-national Workshop took place in Bordeaux on 21-22 Jan 2010. The Meeting and the Workshop were hosted by the Bordeaux University and were organised by the project for the communication and dissemination of project activities to the partners and to French stakeholders



Bordeaux University

Was created in 1441. In the early times of the French Revolution, it consisted of 5 Faculties. These Faculties were assembled as a University in 1898. In 1961, the University was relocated from the center of Bordeaux to the suburbs, for expansion, and, in 1968, it was divided into three universities, and then into four universities, in 1995, with science being assigned to Bordeaux 1 University and Medicine to Bordeaux 2 University. The tendency now is to merge all 4 universities into one. Science in Bordeaux 1 is broken down into 5 Teaching and Research Bodies (UFR : Unité de Formation et de Recherche): Mathematics and Computer Science, Physics, Chemical science, Biological science, Earth and marine science (geology and geotechnics). It contains also several research institutes or laboratories and some 1400 researchers work in various research teams.

Civil engineering is housed at the Institute for Mechanics and Engineering. It deals with: Construction materials (asphalt mix, concrete, stone and wood), their evolution and environmental conditions and loadings; evaluation of sites, works and substructures (NDT, diagnostics, geophysics, reliability, maintenance); Interaction of site and works with their environments (natural site evaluation and modelling, soil structure interaction).



This is the 4th edition of the DURATINET Newsletter. The Newsletter is one of the ways developed in the project for communication and dissemination of information on project activities. The format of the newsletter is mainly designed for on-line download

3rd Trans-national Workshop

The 3rd Trans-national Workshop was held on 21 January 2010 at Bordeaux University. The event was attended by 55 delegates including engineers responsible for maintenance and repair of infrastructures, as well as product and repair system developers in France. This Workshop was divided into two sessions.

Session 1: was devoted to presenting the DURATINET project, its objectives and progress to date. The project leader presented an overall view of the objectives and expected results of the project and the various Work Group leaders gave more detailed information concerning the DURATINET activities, progress to date and future plans.

Session 2: was a round table with the project end-users chaired by Dr Dennys Breyse. It was a very interesting discussion between the end-users and the members of the project, in which it was possible to understand the main questions to which answers were to be obtained from the project results. Also, a few ideas and proposals for collaboration with some enterprises represented in the round table and with the project partners were born from this discussion, in particular as regards the evaluation of the performance of new repair materials for reinforced concrete.



3rd Consortium meeting

The 3rd Consortium Meeting was held on 21-22 January 2010 at Bordeaux University in a beautiful building and was attended by 32 consortium members from 5 European countries, representing the 17 Institutions of the consortium.

During this meeting, the progress achieved in the first project year was discussed and the WG leaders presented the planned activities for the project semester 3. The agreement of the progress attained with the project plan was evaluated by the Steering Committee and the milestones and deliverables for the third semester were established with all partners. The Advisory Committee discussed aspects related with the public project documents, their contents and the formats to be adopted.

After the meeting, partners and invited guests met informally at a reception and conference dinner hosted by Bordeaux University, which provided the opportunity for informal but, nevertheless, important discussions to take place in relaxed and convivial surroundings.



Dissemination Actions in International T&SC Conferences

During the project semester 3 several papers for oral or posters presentations were prepared and submitted to various technical and scientific International and National Congresses, for DURATINET activities dissemination



MEDACHS'10

Marine Environment Damage to Coastal and Historical Structures: Mechanisms of degradation, Durability, Diagnostics, Maintenance and Rehabilitation

This International Conference follow the first MEDACHS'08 ,organized in 2008 by LNEC, in Lisbon and was organized by our project partner LEPTIAB, University of La Rochelle. Was attended by more than 100 participants.

Keddam M., Novoa X.R., Puga B., Vivier V.; Impedance based method for on-site determination of corrosion rate in reinforced concrete structures , Medachs'10, La Rochelle, 2010

Silva, A.; Soares, D., Matos L., Salta M., Inhibition of internal expansive reactions in cement based materials with mineral additions, Medachs'10, La Rochelle, 2010

M. J. Correia, M. M. Salta, I. T. E. Fonseca; Corrosion resistance evaluation of welded stainless steels in concrete; Medachs'10, La Rochelle, 2010



A. Silva, A. Gonçalves, M., Salta; Degradation of concrete bridges by internal expansive reactions—Portuguese case studies, 16th International Road Federation World Meeting, Lisbon 2010

M. Salta; DURATINET: Trans-national network to promote “Durable Transport Infrastructures in the Atlantic Area”, poster presented at 16th International Road Federation World Meeting, Lisbon, 2010

H. Pernaut; M. Correia; A. Batista; M. Salta; Reparação de Estruturas Metálicas, Reabilitar 2010, Lisboa, 2010

A.O'Connor; Ib Enevoldsen; Probability Based Assessment and Whole Life Maintenance Optimisation for Bridges, Reabilitar 2010, Lisboa, 2010



Participation in other international events was also planned by partners :

TRA 2010, Bruxelas, 2010

Structural Fault and Repair , Edimburgh , 2010

FMS2010, Toulouse, 2010

Special Session DURATINET, 24th June - Lisbon

Included in the program of REABILITAR 2010, this Special Session DURATINET will be organized for project activities dissemination and discussion of DURATINET activities with Portuguese project end users



WG A 2 - Maintenance decision tools for repair optimisation

A questionnaire devoted to technical administrations and end-users has been developed in this WG to acquire information mainly on infrastructure stock and age distribution, as well as on complexity of the management tools used. A first draft of the state-of-the-art report on deterministic, semi-probabilistic and probabilistic methods was prepared and is under internal discussion. After approval by the SC, this will be made public on the DURATINET website.

WG A 3 - Maintenance and repair of concrete structures

The partners involved in this workgroup have developed work to prepare internal draft reports, including a review of the requirements for concrete durability, main deterioration processes, a review of the testing techniques intended to assess the reinforced concrete structure condition and to identify the deterioration causes, as well as a review of the most relevant repair methods and their adequacy to treat reinforced concrete or to mitigate the causes of deterioration. One working meeting within WG3.3 was held in Lisbon on 6th and 7th of January for discussion of subjects related with testing techniques in concrete structures. Based on these technical reports, the web and printed version of DURATINET Guidance Manual for maintenance, assessment and repair of reinforced concrete structures are under preparation.

WG A 4 - Maintenance and repair of steel structures

Within this WG, internal draft reports were prepared on steel degradation processes and on methods of steel repair and protection, together with a list of the testing techniques for inspection of steel structure condition. Based on these reports, also the two versions of DURATINET Guidance Manual for maintenance, assessment and repair of steel structures are in preparation.

WG A 5- Quality control needs for repair products

Within the framework of this WG, the work progress to identify the emergent needs in quality control of repair works and an internal draft report with guidelines for tender specifications are in preparation for discussion within the consortium.

WG A 6- Smart and green structural materials

Reports were prepared for dissemination of the application of different materials, in particular, stainless steel in reinforced concrete structures, fibre plastic composites in structures and green concrete. A bibliographic study was made on the recycling of construction demolition wastes .

WG A 7- Performance evaluation of repair systems

Reports on Ferrycarrig and Barra Bridges were prepared. The research work involving new repair systems was initiated, as well as the research on the evaluation of durability of materials at the experimental stations of Peniche-Portugal and of La Rochelle-France, to follow-up the performance in marine environment of structural and repair materials.



WG A 8 –Creation of web-tools in the project : DB-DURATI Database

The database in preparation will collate and display reliable and useful data on the performance of structural and repair materials in transport infrastructures and other type of structures.

It also includes general information on the structures, environment characteristics and on the corrosivity classification, materials performance and durability materials parameters.

Materials performance data will be also useful for the benchmarking of materials performance models and structures service life models.

GENERAL INFORMATION

Country:	Portugal
Owner/Manager:	x
Construction date:	y
(...)	(...)

General view

Sketch 1

Type: _____
Spans: _____
(...) _____

Ref. Point (x, y, z): _____

ENVIRONMENTAL DATA

Atmosphere		Corrosivity	
Rural	<input checked="" type="checkbox"/>	C1	<input checked="" type="checkbox"/>
Urban	<input type="checkbox"/>	C2	<input type="checkbox"/>
Industrial	<input type="checkbox"/>	C3	<input type="checkbox"/>
Marine	<input type="checkbox"/>	C4	<input type="checkbox"/>
Marine plus industrial	<input type="checkbox"/>	C5	<input type="checkbox"/>

Meteorological Atm. pollution Water Soil

Date: 2006/04/01

pH	8,01
CaCO ₃ (mg/dm ³)	0
NH ₄ ⁺ (mg/dm ³)	0,7
Mg ²⁺ (mg/dm ³)	10,4
SO ₄ ²⁻ (mg/dm ³)	18,9

ME – left riverside

MATERIAL PROPERTIES

Material: Concrete Steel Steel

Designation	x
Class	y
(...)	(...)

Chemical Physical Protection Images

C	Si	Mn	P	S	Cr	Mo	(...)
...	(...)

Microstructure

HISTORICAL – INSPECTION DATA

2006/04/01 Special inspection: Beam East (VE); Beam West (VO); Abutment South (ES); Abutment North (EN); Piers P1 to P6; General observations

Images: _____

Methods	Elements									
	VE	VO	ES	EN	P1	P2	P3	P4	P5	P6
Cover Thickness	x	x		x					x	x
Icorr	x	x		x					x	x
Compressive Strength	x	x	x	x						
Carbonation Depth	x	x	x	x	x	x			x	x
Chloride content		x							x	
Microscopy					x					x
Mineralogy					x					x
Visual inspection	x	x	x	x	x	x	x	x	x	x

Maintenance Repair Monitoring

STAKEHOLDERS

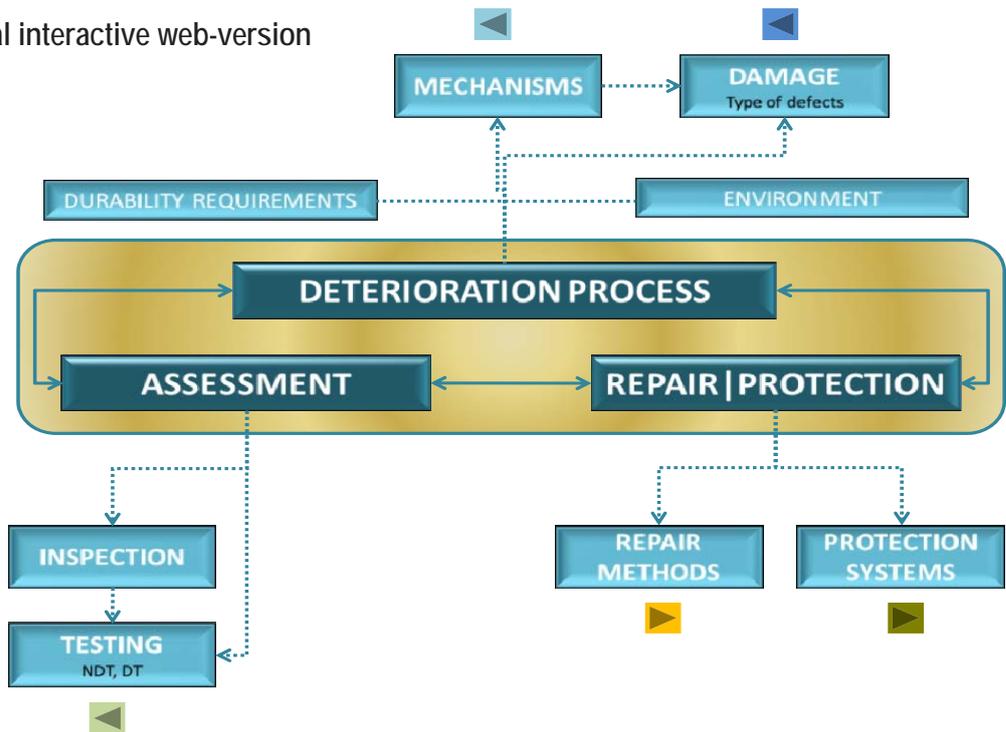
Examples of good practices on maintenance and reliable experimental information on performance and durability of new repair materials may be proposed by stakeholders for inclusion in the database.

WG A 8 –Creation of web-tools in the project: DURATI Manual

The Manual will contain guidance for steel and reinforced concrete structures maintenance and repair, as refers to: methodologies for optimizing the maintenance of infrastructures, main topics on durability requirements, deterioration processes, testing techniques for inspection and diagnosis of degradation, as well as the options in terms of repair procedures either to restore the original integrity of a structure or to compensate for the damage induced by the deterioration processes and to avoid its recurrence.

The guidance manual will have both a printed version with detailed information about the different topics considered and an interactive web-version where the information is given in toolboxes.

Manual interactive web-version



CONCRETE STRUCTURES

REINFORCEMENT CORROSION

Over-reinforced concrete is potential rebar corrosion. Due to the high alkalinity of concrete, a passivating layer (protective oxide film) forms on the surface of the steel. In practice, this protective oxide film can be broken down by:

- Chloride ions (Cl⁻)
- Free chloride ions (Cl⁻)
- Free chloride ions (Cl⁻)

Free chloride ions: The free chloride ions, but calcination or other in the composition of

DETERMINATION OF THE CRACKING INDEX

Measurement with the help of a crack scale and determination of the cracks that interest that are measured in a section or in the entire part of the structure to be tested.

SPALLING

Damage classification

Description

Causes

Reinforcement

Other

Control

Rehabilitation

Testing techniques

Repair methods

References

STEEL STRUCTURES

SURFACE PREPARATION

PROTECTION SYSTEMS

REPAIR METHODS

PROTECTION SYSTEMS

METALLIC CORROSION

Control

Rehabilitation

Testing techniques

Repair methods

References

NEXT PROJECT MEETINGS

5th Trans-national Workshop & 5th Partners Meeting

January 2011

U. Vigo, Spain

6th Trans-national Workshop & 6th Partners Meeting

May -June 2011

Nantes University, France

Next issue:

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More information on DURATINET can be obtained from the website

www.duratinet.org

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