

Sharing knowledge and field practice for recycling road and road related materials: the Direct-Mat project

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Abstract

In order to facilitate the share of national experiences on dismantling and recycling of road and road related materials, a three-year European project was initiated in January 2009, within the EU 7th Framework Programme Transport.

This project involves partners from 15 participating countries for a budget of 1,2 million Euros and its main outcome will be the construction of a European Web database and the preparation of best practice guides on Dismantling and RECYcling Techniques for road MATerials ("DIRECT-MAT").

The database compiles and displays the extensive existing and already validated research and jobsite data; the best practice guides on the dismantling and recycling of different types of materials will be issued from the benchmarking of national practices.

The intention is that the project results shall support the daily work of practitioners, researchers and standardisation bodies, by assisting CEN technical committees in incorporating scientifically-based material requirements on recycled road materials into European standards, increasing the confidence of stakeholders and practitioners in the use of recycled road products, an setting up a shared view of road material research needs to improve the coordination of national research.

The purpose of this paper is to describe the concept, objectives, benefits, partners and organisational strategy of the project and present the results achieved during the first year.

Keywords: Road Materials, Demolition, Recycling, Best Practice.

1. INTRODUCTION

1.1 Background

The EU 25 main road network is essential for passenger and freight transportation across Europe. However, its maintenance is costly and also responsible for detrimental impacts to the environment relative to waste production and natural resource consumption. As emphasized by the European Road Transport Research Advisory Council (ERTRAC) in its Research Framework (1), it is necessary to simultaneously optimise the quality-to-cost ratio of road infrastructure and encourage environmentally friendly road maintenance practices. A significant contribution to the ERTRAC view, consists of reducing the proportion of road materials originating from natural resource extraction and increasing the recycling of locally-available road wastes into new road materials.

Over the past few years, most European countries have started to work towards this goal, by implementing national strategies for dismantling and recycling road materials back into new roads. European projects ALT-MAT (2) and, more recently, SAMARIS (3) have also made significant contributions to boost recycling, by issuing selection recommendations and test procedures to assess the mechanical and environmental performance of road construction by-products.

At present, many European countries have acquired experience in dismantling and recycling road and road related materials back into roads, especially asphalt materials, either on their own or by applying European research results.

However, depending on available wastes and local regulations, the practice at national level differs significantly from one European country to another. In this way, a wide array of research results on road material recycling has been produced, yet they are dispersed throughout the various Member

States and not widely implemented.

Furthermore, pertinent databases and available documents are not often translated into a common language and site data are not often available to specialists from other countries. As a result, national experience based on local site data is seldom transferred to other European countries, and this is especially true for the newer Member States.

1.2 Objectives

In order to facilitate the sharing of national experiences at the European level, which will provide major benefit to the European economy and environment, a European project entitled “DIRECT-MAT” has started as a Coordination and Support Action (CSA), with a 1,2 million euro budget, within the 7th Framework Programme.

The objectives of the project are to build a European Web database and draft Best Practice guides on dismantling and recycling road and road-related materials back into roads. The Best Practice guides aim at issuing recommendations for dismantling and recycling those materials in order to offer the highest added value.

The project addresses the recycling of unbound, hydraulically-bound and asphalt road materials as well as other road materials not presently recycled to any great extent in road construction. It also addresses strategies for recycling road related materials, such as vehicle tyres in road construction.

2. PROJECT ORGANISATION

Twenty partners - research institutes, universities and private companies - from fifteen participating countries will contribute to collecting, analysing and sharing international as well as national information for the benefit of Europe (Table 1).

Table 1. Partners in the DIRECT-MAT European project.

Partner	Country
French Public Works Research Laboratory (LCPC), Coordinator	France
Belgian Road Research Centre (BRRC)	Belgium
Swedish Geotechnical Institute (SGI)	Sweden
Danish Road Institute (DRI)	Denmark
National Laboratory for Civil Engineering (LNEC)	Portugal
Dresden University of Technology (TUD)	Germany
Braunschweig Institute of Technology (TUBS/ISBS)	Germany
Institute for Transport Sciences (KTI)	Hungary
National Institute of Applied Science (INSA) Strasbourg	France
University College Dublin (UCD)	Ireland
Recipav/Recipneu	Portugal
Forum of European National Highway Research Laboratories (FEHRL)	
Branchevereniging Recycling Breken en Sorteren (BRBS)	The Netherlands
The Research Institute of VÖZ	Austria
Transport Research Centre (CDV)	Czech Republic
Swedish National Road and Transport Research Institute (VTI)	Sweden
Centro de Estudios y Experimentación de Obras Públicas (CEDEX)	Spain
Slovenian National Building and Civil Engineering Institute (ZAG)	Slovenia
The Highway Institute (IP)	Serbia
Road and Bridge Research Institute (IBDiM)	Poland

In order to achieve the objectives of the project, the work programme has been organised into seven Work Packages, WPs, (Figure 1).

To enable an operational management of the consortium, WP 1 “Management and coordination” will handle all organisational matters associated with the project.

WPs 2 to 5 focus on the various road construction materials covered in the project. More specifically, the information collected will comprise the entire spectrum of road materials used in Europe. In order to gather and organise existing knowledge and practices, it is necessary to combine skilled experts on identified types of materials used in road construction contexts. Such experts will collect existing knowledge and practices in the area of dismantling materials and recycling some of these road materials as end products. Then, the experts of each WP will organize the collected data and produce best practice guides on dismantling and recycling strategies of the material they are in charge with.

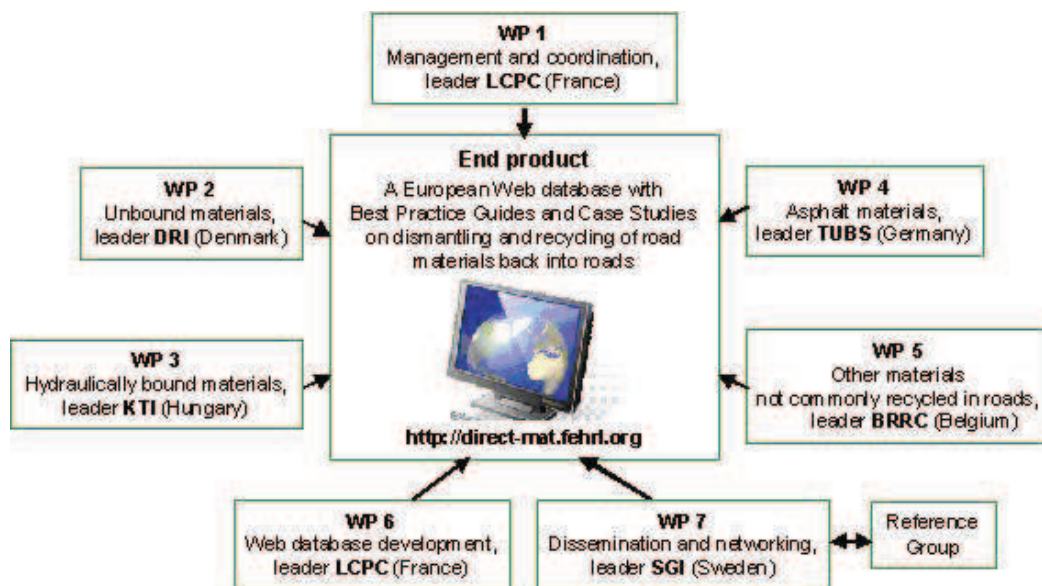


Figure 1 - Organisation of work program

Work Packages 2 to 5 run in parallel, with similar work plans. The results achieved by these WP will feed the project database, developed under WP6. WP 2 to 5 will include:

- A review of existing knowledge and National practices and regulations, which is being performed during the first year of the project.

- Reports on practical application case studies regarding dismantling and recycling of road and road related materials (from national and European experience), to be performed during the second year. An initial analysis of worksite data will be used to generate reports on the techniques of assessment, dismantling, disposal, re-use and recycling of the various road materials as well as the use of these materials in new road structures.

- Preparation of Best practice guides, based on the results of the literature reviews and database analyses. Furthermore, the results from new research projects, published during the project lifetime, will be introduced into the Best Practice guide, so as to ensure that it includes up-to-date data at the end of the project period.

3 BENEFITS AND STAKEHOLDERS

The Web database will provide on-line accessible information to road authorities, practitioners and researchers. Several benefits are expected from the project:

- From a technical standpoint, this project will provide stakeholders with online available and

validated guidelines, to help them decide and proceed appropriately with the dismantling and recycling of road and road related materials back into new roads. The information provided will not only stem from research results throughout Europe, but also from actual practice in laboratories and construction sites. By increasing the confidence of authorities and practitioners in the recycling of road products and road related products, the project will actively contribute to reducing the waste associated with road maintenance.

-From a scientific perspective, an integrated and shared view of road material research needs shall be stated in order to improve the coordination of corresponding national research programmes at the European level and establish priorities for European research and technological development. Moreover, the Web database will provide scientists with an online access to national document references, harmonised literature review, and practical application case studies based on jobsite data sets. These resources will prove helpful for developing research projects, as well as testing and improving models. In turn, scientists will be given the opportunity to upload new laboratory or worksite data for the benefit of the entire European road research community.

-From a regulatory point of view, a European regulation set regarding the recycling of road materials in new roads is under implementation on a step-by-step basis. Directive 2006/12/EC adopted by the European Parliament and the Council Directive of April 5, 2006 on waste prohibits the abandonment, dumping or uncontrolled disposal of waste and requires Member States to promote waste prevention, recycling and processing for re-use. Meanwhile, the experts from CEN committees, responsible for drafting European standards related to construction products, will certainly appreciate online access to a European database containing validated laboratory and worksite data of various national origins; this resource will assist them in incorporating scientifically-based requirements into European standards.

The project results are being presented in national and international papers and conferences to encourage further progress in data collection by as many stakeholders as possible. National seminars and a European workshop for end users will be arranged in 2011.

A project Reference Group, which include end-users from different countries, is being set-up. The Reference Group members will be invited to review the project deliverables at an early stage and provide their expectations on the final products.

Continuous project information will be available at <http://direct-mat.fehrl.org>, where also a questionnaire can be filled in by interested end users.

4. CONCLUSION

By gathering information on every type of road and road related material used along with local experiences, by drafting best practice guides and sharing all those elements on a website, the DIRECT-MAT project will establish a benchmark on the best practices for dismantling and recycling of road and road related materials back into roads. The work undertaken will also serve to identify further possible research needs for improving overall system optimisation with regard to material dismantling, manufacturing and implementation processes.

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