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Energy, environment and sustainable development
Key Action 4: City of Tomorrow and Cultural Heritage
Contract no. EVK4-CT-2002-00092

IRMA

Integrated Decontamination and Rehabilitation of Buildings, Structures and Materials in Urban Renewal

NIRAS-DEMEX (DK), Dansk Beton Teknik (DK), Intron (NL), DETECSA (E), Belgian Building Research Institute (B), BRANDIS (DK), Enviro Challenge (B), Contento Trade (I), SBS Byfornyelse (DK), Hochschule Bremen (D), Delft University of Technology (NL), Brussels Institute for Management of Environment (B), Amarsul (P), Rotterdam Public Works (NL), Dr. Tech. Olav olsen (N), Meldgaard (DK), Federal State of Bremen (D)

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Background

IRMA stands for "Integrated Decontamination and Rehabilitation of Buildings, Structures and Materials in urban renewal" and it is a project carried out within the European Commission's Fifth Framework Programme "Energy, Environment and Sustainable Development". The legal terms of the project are in the contract no. EVK4-CT-2002-00092.

Problem formulation

Most buildings and structures contain substances of significance to the environment and human health. Some buildings have been constructed with materials containing substances considered harmful today, e.g. asbestos, PCB, heavy metals, certain paints etc. In the context of urban renewal the major problems are that:

- very little practical applicable knowledge on the decontamination of buildings and materials is available;
- there are no accepted technologies or guidelines for the decontamination of polluted buildings and materials;
- there are no standards for the classification of decontaminated buildings and materials as "clean";
- the means of classification of polluted soil cannot be applied to recycled materials;
- a considerable amount of vandalism (graffiti) results in the need for decontamination;
- the health and safety of personnel carrying out work on contaminated buildings is insufficiently regulated.

Objectives

Some of the most important challenges of urban development are the rehabilitation of old buildings, minimisation of waste and the recycling of materials. The scientific objectives consist of a sequence of measures to identify and manage contaminated structures and buildings.

The main objective is to develop and implement a general "City Concept" comprising a toolbox of improved technologies and processes, together with decision-making and management tools, for sustainable urban renewal, focusing on contaminated buildings, in order to protect the environment from hazardous compounds and save reusable buildings and materials.

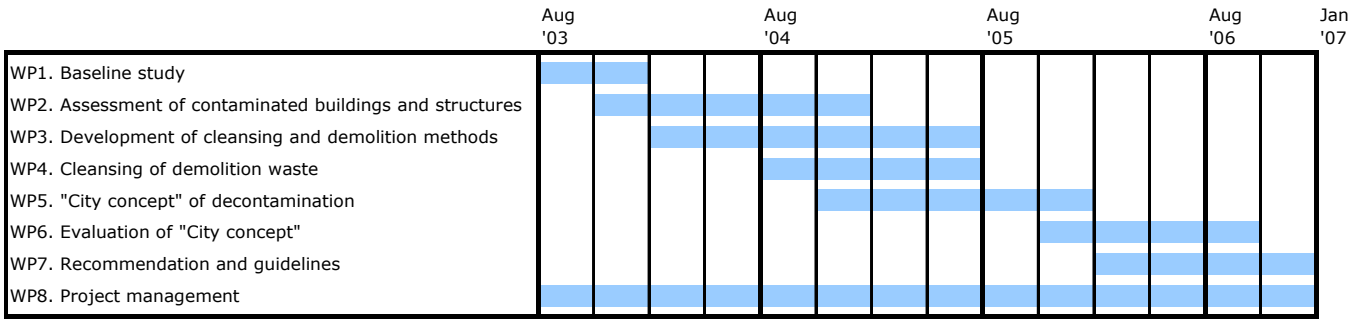
This includes:

- Minimisation of risk to occupants of buildings
- Health and safety of construction and demolition workers
- Reduction of waste
- Preservation of buildings and resources

Time framework

The Contract was signed in July 2003, the actual project's commencement date was August 2003, and it has a duration of 42 months, i.e. until January 2007.

See below a schematic representation of the project schedule.



Project partners

The project consortium consists of seventeen (17) partners from eight (8) European countries.

They represent important stakeholders with interests in the decontamination of buildings in urban development: housing and civil contractors, demolition contractors, recycling specialists, consultants, universities, research institutes and municipal administrators.

The participating partners are listed below:

NIRAS - DEMEX (DK)

Dansk Beton Teknik (DK)

INTRON (NL)

Demoliciones Técnicas (E)

Belgian Building Research Institute (B)

BRANDIS (DK)

Enviro Challenge (B)

Contento Trade (I)

SBS Byfornyelse (DK)

Hochschule Bremen (D)

Delft University of Technology (NL)

Brussels Institute for Management of Environment (B)

AMARSUL (P)

Rotterdam Public Works Engineering (NL)

Dr. Tech. Olav Olsen (N)

Meldgaard (DK)

Federal State of Bremen (D)

Content

The project content is organised in a modular scheme, addressing each of the main objectives in separate Work Packages (WP).

WP 1 - Compilation of data on building contamination and development of database

WP 2 - Assessment of contaminated buildings and structures

WP 3 - Development of cleansing and demolition methods

WP 4 - Cleansing of waste materials

WP 5 - Development of "City Concept" for decontamination and rehabilitation of buildings, structures and materials

WP 6 - Evaluation of "City Concept" for European cities

WP 7- Implementation and exploitation – Reporting, recommendation and guidelines

WP 8 - Project management

Below, the objectives of each of the Work Packages are described.

Work Package 1
Baseline study

- Development of a database to be used as information tool
- Compilation of the relevant baseline information
- Description of the state-of the art on decontamination of buildings, structures and materials.

Work Package 2
Assessment

- Identification of existing contamination and assessment of the related risk for human health and environment based on their behaviour with respect to emissions.
- Environmental impact and risk assessment of selected urban development scenarios comprising large groups of buildings, including contaminated buildings and structures.

Work Package 3
Cleansing and demolition

- Improvement or further development of clean processes for the removal of surface contamination in buildings and structures
- Improvement or further development of clean processes for the selective (partial) demolition of structures

Work Package 4
Cleaning waste material

- Development of techniques for eco-efficient cleansing processes of demolition waste
- Development of techniques for maximum recovery and reuse of building waste materials

Work Package 5
Development "City Concept"

- Development of a model and a computer program for an integrated management system called "City Concept" for

activities and processes related to decontamination and rehabilitation of urban structures and buildings:

- Demolition (partial and total)
- Cleansing of surfaces and materials
- Recycling and reuse of recycled materials

Work Package 6
Evaluation "City Concept"

- Feasibility study and evaluation of the "City Concept" in the following European cities and urban areas: Bremen (D), Brussels (B), Copenhagen (DK), Aarhus (DK), five municipalities on the Setubal Peninsula (P) and Rotterdam (NL)
- Demonstration of the "City Concept" during a test project in connection with an actual rehabilitation plan

Work Package 7
Implementation and exploitation

- Development of a "Code of Good Practice for Works on Contaminated Buildings" including:
- Guidelines for sampling and analysis procedures for contaminated building surfaces, presentation of criteria for the emission behaviour of pollutants; and guidelines and input data for risk assessment
- Proposed decontamination methods for construction waste on an industrial scale with related environmental impact analysis and socio-economic optimisation
- Guidelines for project management, including decision making, planning, supervision and administration

Work Package 8
Project Management

- Project coordination and administration in accordance with the contract requirements and pursuing the highest quality of the project's outcome

Project results

The main outputs of the project suitable for exploitation follow the objectives of the individual work packages. The outcome of the project concentrates on the introduction of cleaner processes and maximum waste recycling in the construction industry focusing on urban rehabilitation and supporting safe and extended lives of buildings.

The results of the project will be materialised in the following deliverables:

- **Final Report**. Descriptive document about the development and findings of the specific work packages and the project in general.
- **Database**. Database of pollutants appearing in buildings and related materials, their physico-chemical properties and their

possible interactions with building materials; preferential disposition sites, methods for their quantitative; efficiency of appropriate cleaning techniques.

- **City Concept**. Report on an integrated management system for decontamination and rehabilitation of buildings, structures and materials in urban renewal.
- **Code of Good Practice for Works on Contaminated Structures**. Guideline providing a structured approach for the identification and safe and efficient handling of contaminated structures and leading to maximum recovery of materials and minimum consumption of resources.
- **Dissemination material**. Demonstration and training material – including video documentation of different activities – for training and further education of engineers and skilled workers in clean construction, refurbishment and demolition procedures.

Budget

The project total cost is estimated to be 5,110,728 Euro, being half of it financed by the European Commission.