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## RE<sup>4</sup> Project

### REuse and REcycling of CDW materials and structures in energy efficient pREfabricated elements for building REfurbishment and construction

#### D10.1 EPQ Requirement N°1 Public summary of deliverable

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Abstract:	The deliverable D10.1 (EPQ Requirement N°1) belongs to T10.1 (WP10). The scope of this report is: a) to provide further information about the possible harm to the environment caused by the research and state the measures that will be taken to mitigate the risks; b) to ensure that appropriate health and safety procedures conforming to relevant local/national guidelines/legislation are followed for the staff involved in this Project.
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<sup>1</sup> Just mention the partner(s) responsible for the Deliverable

<sup>2</sup> PU: Public, RE: restricted to a group specified by the consortium, CO: Confidential, only for members of the consortium; Commission services always included.

<sup>3</sup> Draft, Revised, Final

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## Introduction

Research ethics, as it is practiced in all Horizon 2020 research activities, grow primarily out of the medical sciences but have come to be applicable to all fields for research. In Horizon 2020 Programme, all proposals considered for funding will be submitted to an Ethics Review procedure. Ethics issues must be an integral part of research, from the beginning to the end of the Project activities.

During the Grant Agreement preparation, the ESR (Ethics Summary Report) underlined that research conducted in the RE<sup>4</sup> Project will likely engage research ethics along the following two categories / issues<sup>4</sup>:

SECTION 6 - Non-EU countries involvement in the project

**SECTION 7 - Environmental protection and safety**

## Purpose and scope

The deliverable D10.1 (EPQ Requirement N°1) belongs to Task 10.1 (WP10).

The scope of this report is to:

- provide information about the possible harm to the environment caused by the research activities and state the measures and procedures that will be taken to mitigate the risks; this includes a list of the potentially hazardous substances and how their levels will be monitored, as well as evidence of conformity with local, national and EU laws regarding the handling, storage and disposal of said substances;
- ensure that appropriate health and safety procedures conforming to relevant local /

national guidelines / legislation are followed for the staff involved in this Project as well as a description of relevant training courses for staff involved in these activities.

This document may be considered an internal guidance to assist researchers involved in the project, offering an overview of the issues surrounding the safe use of chemical or dangerous materials in the workplace, sets out the broad outlines of preventive action and provides a practical tool for complying with specific aspects of ensuring workers' safety, such as risk assessment and risk management. This may be of particular value to assist in ensuring compliance with the Occupational Safety and Health (OSH) legislation at EU level.

## Main contents of the report

The first part of the report gives an introduction to terminology and main definitions used in the field of Environmental protection and safety.

The second part summarises the primary legal and ethical requirements related to occupational safety and health and environmental protection for each country involved in the project (Belgium, Czech Republic, Italy, Germany, Sweden, UK, and Taiwan) considering the following areas: occupational safety and health framework, environmental protection, consumer protection, good laboratory practice, and hazardous waste management.

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<sup>4</sup>H2020 Programme - Guidance - How to complete your ethics self-assessment

Moreover, this report focuses on a review of existing literature and information for the hazardous materials to be used as a starting point to obtain characterisation, hazard and exposure data necessary to inform an adequate risk assessment. The main key sources of information are the following: label (pictograms), safety data sheets, EU recommendations on the results of risk assessments and the risk limitation strategy for substances, occupational exposure limit values, and other sources (main databases for the chemical substances information).

Another relevant part of the document summarizes the health and safety procedure and environmental protection applied in RE<sup>4</sup>-Project activities, focusing on chemical hazards in laboratories and the related risks assessment and management.

The relevant phases of the risks assessment methodology are the following:

- Risk identification is the process of finding, recognising and describing risks;
- Risk analysis is the process to understand the nature of the risk and to determine its magnitude, which results from the combination of consequences and their likelihood;
- Risk evaluation is the process of comparing the results of risk analysis with risk criteria to determine whether the risk and / or its magnitude is acceptable or not.
- Risk management / treatment is the process of identifying, selecting and implementing measures that can be applied to reduce the level of risk.

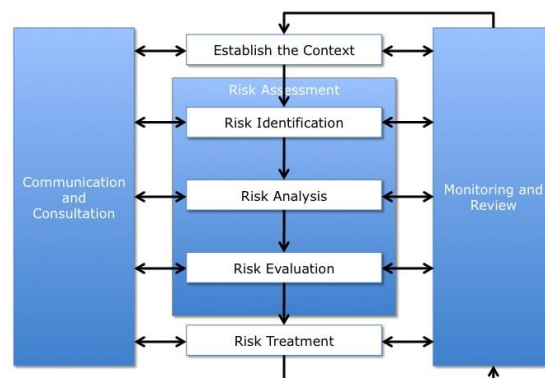


Figure 1 - Diagram on risk assessment [ISO 31000]

This document lists also the (potential) hazardous materials that may be handled in RE<sup>4</sup> activities and how their levels will be monitored (safety measures). The current (potential) hazardous materials already identified are the following: plastics deriving from CDW activities, Pulverised Fuel Ash (PFA), Ground Granulated Blast furnace Slag (GGBS), Sodium Hydroxide (NaOH), Sodium Silicate solution with SiO<sub>2</sub>, plasticisers, Hydrochloric Acid, Nitric Acid, Sulfuric Acid, Silver Nitrate, Ammonium thiocyanate (NH<sub>4</sub>SCN), Ammonium thiocyanate (NH<sub>4</sub>SCN, 0.1 M), 3,5,5-trimethyl-1-hexanol, Barium chloride dihydrate (BaCl<sub>2</sub>.2H<sub>2</sub>O), Iron chloride hexahydrate (FeCl<sub>2</sub>.6H<sub>2</sub>O), Cobalt chloride hexahydrate (CoCl<sub>2</sub>.6H<sub>2</sub>O), Stannous Chloride Dihydrate (SnCl<sub>2</sub>2H<sub>2</sub>O), wood dust, and fine dust.

Finally, the report describes the occupational health and safety management system of each partner organization in terms of:

- availability of a health and safety policy
- availability of health and safety services / department
- availability of a health and safety training programme.

The document is complemented by the following tools:

- the Occupational Health and Safety (OHS) Risks register that can be used to record the appropriate Control Level by material / substance / mixture and work activity.
- and the Training register to be used by each Partner to record the appropriate training activities identified every year.

### Conclusion and recommendations

This report is intended to provide guidance on how to select adequate risk control measures for managing the risks associated with exposure to chemical / harmful substances, according to the current state of knowledge on health and safety issues and environmental protection.

The ultimate aim here is to support employees / researchers working with these substances in their design of suitable control measures to organise and maintain a safe workplace.

Partners involved in the project (in particular Research Organizations) have a strong Occupational Health and Safety Management structure, that includes laboratory safety, and safety responsibilities in the job descriptions and performance plans of all employees.

Nevertheless, this report provides the following general recommendations:

- Each Partner is responsible for encouraging and promoting safe and efficient working practices in any lab of its organization involved in RE<sup>4</sup> project activities.
- The Heads of each organization involved in research activities are responsible for implementing and maintaining occupational health and safety standards and practices in laboratories under their control.

- Each researcher / employer must be familiar with all the safety information given about each experiment before starting the experiment.
- Each researcher / employer must follow the general rules of his / her own Lab in terms of Occupational Health and Safety.
- Each researcher / employer should be able to recognize and assess laboratory hazards (using *Annex 2 Health, Safety and Environment Risks register with risk rating*).
- Each researcher / employer should be able to identify how the risk level can be lowered by using appropriate control measures such as engineering controls (equipment such as hoods, ventilation systems, and safety interlocks), administrative controls (training, methods, procedures, and processes), or personal protective equipment (PPE).
- If necessary, it must be foreseen a safety education programme. The detailed information will be recorded using Annex 3 Training register.
- If necessary, the list of potentially hazardous substances in RE<sup>4</sup> will be implemented during the project lifetime.
- Finally, *Task 7.5 HSE issues analysis* will analyse the HSE issues related to the production and use of the RE<sup>4</sup> materials/components at two levels: process and product level.

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