

2023-2025

ADVANCE

ACCOMPANYING MEASURE FOR DISSEMINATION, VALORISATION AND COLLABORATIVE EXPLOITATION OF CIRCULARITY OF CONSTRUCTIONAL STEEL PRODUCTS

Basic information

- FUNDING: RFCS (Research Fund for Coal and Steel)
- CALL TOPIC: RFCS-02-2022-AM (Accompanying Measure)
- DURATION: 24 months (1.9.2023 – 31.8.2025)

Project objectives

- Provide **guidance for reuse** of existing components or structures and design of new ones, introduce recommendations for product/waste status and material testing protocol for re-certification of steel products in the updated Recommendations for Reuse
- Support declaration of the environmental benefits of steel reuse implemented in the **mobile LCA app and web tool**
- Increase **awareness** about the alternative end-of-life options for constructional steel and steel-based products
- Identify the possibilities and **roadmaps** for scaling up the outcomes of the background projects beyond their original focus area

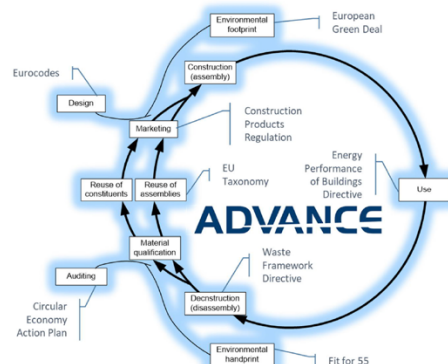


Figure 8 Constructional steel lifecycle with two most important reuse paths (reuse as constituent products and reuse as whole assemblies or building kits) and their link to different EU strategies.

Project consortium



UNIVERSIDADE DE COIMBRA



The project's ambition is to contribute to greenhouse gas reduction and circular economy goals by addressing these challenges in both deconstruction and reuse of existing steel buildings, and in the design of new buildings, their construction and documentation to facilitate future reuse. Its scope includes reuse of constituent products, fabricated components, and reuse of component assemblies. The reused material may originate from primary structures, secondary structures and envelopes.

The reduction of greenhouse gas emissions of steel industry became essential in the recent years with the major focus on the construction sector, the single largest source of its environmental footprint. The construction sector comprises the opportunity to establish steel-based technologies in a leading position for the decarbonisation of other relevant industries dependent on steel solutions.

The activities supporting this goal can be divided into two categories (a) efficient and clean energy utilization in steelmaking and (b) taking advantage of excellent durability of steel products that enable their re-manufacturing and reuse without the need of energy intensive recycling. The project will focus on the latter category and utilize and further develop the outcomes of several successful background projects such as PROGRESS, SB STEEL and LVS3.

Although some of the background projects had more general or more limited scope than ADVANCE project, it is always possible to generalize or select the topics suitable for the ambition. For instance, PROGRESS project focused primarily on the single-storey, steel framed buildings, but its outcomes are generally not limited to those structural typologies. Many of the project results can be directly applied to all constructional steelwork and, with some modifications, to the timber and prefabricated concrete elements as well. Single-storey buildings were typically used in the project as demonstration cases because of their simplicity, demountability and relatively large number of successful reuse cases over the last decades.

It is expected that existing steel buildings can be reused in-situ, relocated or deconstructed into elements such as cold-formed or hot-rolled sections, sheets, panels, frames or truss girders. These components have very high reuse potential, but require verification of the material quality, dimensions and tolerances in order to be included in new building projects. The future reuse of modern buildings, however, may be different, because those structures are increasingly designed as systems and their design information can be easily maintained for instance as a building information model (BIM). Therefore, the ADVANCE project addresses both topics and its results will cover both, existing and future buildings.

The ambition to provide pathway to achieve impact beyond the scope of existing projects can be described in three levels: (1) to address all constructional steelwork with the support of partners and background from PROGRESS, SB STEEL and LVS3 projects, (2) to extend it to other construction products and materials in the generalized recommendations for reuse and (3) to select suitable outcomes (such as LCA methodology and reusability assessment methodology) supporting recovery and reuse of any other fabricated building products.

The primary objective is to increase the recovery and reuse of constructional steelwork by providing engineers, investors, contractors and other decision makers with reliable performance data and guidance. This will be achieved by disseminating the information about the products, systems, methods and protocols that facilitate reuse of various components of constructional steelwork using the tools and methodologies developed within activities of the consortium partners.

The outcomes of the project will include recommendations to enable reuse of building components in-situ or in different location(s), and in the original layout or in a different design with the necessary modifications/adaptations to resist the new external loads (due to the relocation) or internal loads (due to the modification of the structural layout). Our goal is to address the wider scientific, business and engineering community in the Member States with the localized Recommendations for Reuse, information brochure, mobile app and presentation materials.

For more information: <https://www.steelconstruct.com/eu-projects/advance/>

