Benefits of steel reuse for the construction industry and EU strategies

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UN sustainable development strategy

By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.

By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, and significantly reduce their release to air, water and soil. By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

Strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 °C (Paris Agreement).
EU Circular Economy agenda

- EU scheme for environmental assessment of buildings (2014 - 2016)
- Harmonised rules on the declaration of the performance characteristics of construction products in relation to a sustainable use of resources (2013 – 2018)
- Voluntary industry-wide recycling protocol for construction and demolition waste (2016)
- Pre-demolition assessment guidelines for the construction sector (2017)
- Core indicators for the assessment of the lifecycle environmental performance of a building, and incentives for their use (2017)
- Strategy for a Sustainable Built Environment (2021)
- Mandatory requirements on recycled plastic content and plastic waste reduction measures for construction materials (2021 - 2022)

EU waste agenda

1975: Directive 75/442/EEC defines waste as: “any substance or object which the holder discards or intends or is required to discard”

1997: European Council confirmed that waste prevention should be the first priority of waste management


2018: Directive 2018/851 says that: “Member States shall take measures to prevent waste generation”
Contribution to the sustainability targets

- Reduction of carbon footprint of the constructional steel
- Reduction of generated construction and demolition waste
- Increasing safety in construction with protocols for testing, deconstruction and auditing
- Connecting industrial supply and demand chain with online trading portal
- Sustainable management of resources by circular business models
- Sharing knowledge by design guide, workshops and webinars

Reducing the carbon footprint of steel construction industry

According to the study published by SITRA in 2018, reuse of building components can save about 20 Mt CO$_2$e per year in Europe with a major contribution from the steel sector.

Method to calculate environmental impacts of reuse [webinar 3]

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- Method to calculate environmental impacts of reuse [webinar 3]

Pre-designed steel hall from PRECASTEEL¹
EPD data from Ruukki Construction²
LCA includes steelwork, concrete slab and foundations, envelope, windows and doors³

¹ http://www.unav.es/Precasteel/
² https://cdn.ruukki.com/docs/
³ S. Vares, P. Hradil, M. Sansom, V. Ungureanu, Economic potential and environmental impacts of reused steel structures, Structure and Infrastructure Engineering, September 2019
Reducing the amount of generated waste

In 2016, nearly 19 Mt of metallic waste was generated by the construction sector in EU

Generated waste in EU-28 (Eurostat 2016)

- Metal CDW, 19 Mt
- CDW other than metals, 369 Mt
- Waste other than CDW, 535 Mt

Sustainable management of materials and resources

Shorter loop means
- Greater environmental benefit
- Faster circulation
- Support for the local economy

- Assessment of reusability [webinar 3]
- Business models [webinar 3]
Safe design and quality control of the reused steelwork

Reuse process has to be compliant with

- Construction Product Regulation (CE marking according to the EN 1090-2:2018)
- Eurocodes (recommended partial safety factors to EN 1993 and/or service life to EN 1990)
- Waste Framework Directive and REACH (assessment of hazardous substances)
- Relevant work health & safety regulations

Education and information sharing

Lack of information was identified as one of the barriers to successful reuse implementation. The main target groups should be

- **Facility owners** to recognize the inherent value of their property and possibilities to trade reclaimed steelwork
- **Designers and architects** to be able to offer more responsible sourcing of materials for their design and/or better end-of-life performance
- **Material dealers** and stockists to start dealing with second hand materials and components
Summary

• Reuse of steel products has relatively big impact on the carbon footprint of the construction industry
• It supports most of the sustainability goals, especially related to the waste management, resource efficiency and climate change
• Innovations in the steel can be largely transferred to other materials

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