Fact sheet

Building sustainability and Metals

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Metals are synonymous with the structural and functional performance of a building, ensuring its integrity as well as the security and comfort of the occupants. They also contribute to the aesthetic appeal of buildings.
Architect and design communities wishing to build sustainably must pursue a design philosophy which maximises the building's output; this includes consideration of occupant comfort and productivity as well as climate protection while at the same time focusing on increasing efficiency of resource use — energy, water, and materials — and simultaneously reducing the building's impact on human health and the environment. There is a need to ensure that during the building's lifecycle siting, design, construction, operation, maintenance, deconstruction/ demolition and recovery of resources are optimised for sustainability.

Metals maximise circularity and value along the building life cycle

Future buildings will have to be resilient to a changing climate: a changing purpose and changing surroundings. A building designed to be ecological will have certain characteristics for the materials deployed; these will include ability for deconstruction, recovery, recycling and reuse. Materials used should be long lasting, reliable and fit for purpose both in the present use and in future use. Construction techniques should lend themselves to disassembly, repurposing, redeployment and recycling. Metals provide solutions to these challenges.
Metals have a long history of use in buildings. Sustainable design techniques deploy metals in a vast array of building types, from temporary buildings to ornate modern architecture or timeless buildings of the past. Metals by their very nature are durable, almost maintenance-free with minimal running costs, easy to identify and demount whilst retaining their market value and easily returned to the value chain thanks to their high residual economic value at end of life

European Assessment framework starts considering building circularity aspects

Level(s) is a voluntary reporting framework to improve the sustainability of buildings. Using existing standards, Level(s) provides a common EU approach to the assessment of environmental performance in the built environment. It places a strong emphasis on the need for higher levels of recycling of Construction and Demolition Waste (CDW) and explicitly addresses End of Life (EoL) issues around waste, as well as the adaptability or flexibility of buildings.

Under Level(s), recognition is given to the need for resource efficiency criteria to be in balance between the production stage and the EoL stage. The Life Cycle Assessment (LCA) “cradle to grave” approach explicitly refers to Module D, which brings in credits for recycling as part of the assessment, with a strong reference to EN 15978.
The three performance Levels used to assess building performance allow a broader implementation of Level(s) across Europe. However, some areas for improvements have been identified: for example some criteria, e.g. building adaptability, are only optional and/or semi-quantitative and do not lead to strong differentiating results. Whilst with respect to greenhouse gas calculations, no aggregation of results is allowed and there is no obligation to report or address all life cycle stages.

Boosting circularity in buildings through best practices and appropriate legislations

- Consider whole building life extension/reuse – metal construction components help buildings become more flexible and adaptable and can even be used to extend a buildings height without the need for changing the foundations below.
- For some applications, individual metal building components can be easily removed and reused again. While possible reuse is to be prioritised and metal construction components are flexible and adaptable, LCA techniques should be used to determine whether reuse or recycling is best for the environment. For example, it may be possible to reuse steel or aluminium beams for structural applications but in the case of non-standardised components of unknown performance, for example, recycling may be the best option.
- Pushing certain regulatory measures without a holistic assessment of sustainability may actually hamper the reversibility and resource recovery of metals in buildings. For example, energy efficiency measures to improve insulation and airtightness can result in complex assemblies that are glued together, hampering the recovery of products and clean fractions for recycling. Energy efficiency and circularity should go hand in hand; therefore, we should avoid such conflicts.
- Generally, it is beneficial to inform users and decision makers of the recovery potential of construction products and materials in order to encourage sustainable use of natural resources. However, focussing only on high recycled content, of building parts can be counterproductive for metals if the entire recycling loop is not taken into account.
- Design for deconstruction should not only be focused on the characteristics of specific building products, but also on how these

products are assembled and the way they put together in the building. Hence, criteria should focus on the building holistically rather than focusing at the product level.

- Building schemes for sustainability still need to prove their value for supporting Circular Economy principles. To this end it would make sense to have a better understanding of their principles and requirements, and how these building schemes enhance concepts such as “Design for Deconstruction” for example.

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