The Principles of Circularity

Sustainable construction and refurbishment encompasses a variety of aspects that aim to minimize the ecological footprint of the construction industry while creating and maintaining healthy, durable and resource-efficient buildings. Topics such as energy efficiency, resource conservation, durability and the health of the occupants play a central role here.

In this chapter, we would like to focus in particular on a key principle of sustainable construction: CIRCULARITY

The circular economy offers a pioneering approach to keeping materials and resources in technical or biological cycles throughout the entire life cycle of a building and thus avoiding waste. By focusing on circularity, we can ensure that the raw materials we use today will be available to future generations - paving the way for sustainable and future-proof construction. Careful planning and the conscious selection of materials make it possible to continuously recycle resources instead of disposing of them.

The following proposals present possible approaches to integrating circularity into construction:

1 Building Materials

When selecting building materials, our focus is on renewable, pollutant-free materials that are as pure as possible and should be biodegradable or fully recyclable.

In addition, preference should be given to building materials that are available in the region in order to minimize transport routes and the associated CO2 emissions.

2 Dismantling and separability

Building materials, products and components should be planned and installed in such a way that they can be easily dismantled and separated by type at the end of their useful life. This enables reuse, high-quality recycling or return to the technical or biological cycle. Solid connections such as bonding should be avoided.

3. Avoidance of harmful substances

The use of toxic or poorly degradable substances in products and building materials should be avoided. Only by using harmless materials can these later be returned unhindered to biological or technical cycles. This is crucial for the implementation of a genuine circular economy in the construction sector.

4. Durability and reparability

Building products and components should be designed to be robust, durable and repairable. Modular designs with easily replaceable components facilitate repairs and thus extend the service life.

5. Cascading use

Materials should be designed in such a way that they can be used for as long as possible and in several cycles of use. For example, wood can first be used as construction timber, then as insulation material or furniture and, in the final cascade, recycled for energy or composted.

6. Waste avoidance

By applying the above principles, the generation of waste can be reduced. Unavoidable residual materials can be reused as much as possible or returned to natural cycles.

7. Responsible production + take-back

Manufacturers should be responsible for taking back their used products, which creates an incentive to include end-of-life in development and promote recyclability.

8. Measurability and information flows

Circularity must be measurable and information must be made available, e. g. for subsequent reuse or recycling. This can be implemented, for example, with the help of a digital building passport, which compiles the product passports of the materials used, or an instrument such as the Urban Mining Index.

These principles should be considered from the outset when designing building materials, products and buildings. This is the only way to achieve a truly circular and sustainable economy that conserves resources and minimizes the ecological footprint in the construction industry.

Current challenges

The implementation of recyclability principles in the construction industry faces several challenges:

1. non-separable material mix: the combination of renewable raw materials with inorganic substances or non-biodegradable materials, such as support fibers made of PET or inorganic binders, makes it difficult to separate by type, reuse or recycle.

2. legal regulations: Strict regulations in the construction and waste sector can make the introduction of sustainable practices more difficult. Supportive frameworks are needed to facilitate the transition to a circular economy.

3. required technical properties: Building materials must meet specific requirements for safety and durability. Innovative approaches are needed to reconcile circularity and technical standards.

4. awareness-raising: there is a need for training programs to inform all players in the construction industry about the principles of circularity and to promote their implementation.

5. market incentives: Economic incentives are crucial to motivate companies to invest in sustainable materials and processes.

Conclusion

Through the targeted selection of crops, processing methods, building materials and procurement guidelines, we are making a significant contribution to creating a climate-friendly and future-oriented construction industry. By consciously integrating sustainable and circular practices in construction and housing, we not only promote innovative bio-construction systems, but also a long-lasting and sustainable building stock that serves as an urban mine for future generations. This holistic approach brings numerous benefits, such as environmentally friendly construction projects, healthy living spaces and ethically responsible business practices.

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