



05. New Horizons

Information delivery model for a circular design process of buildings with mineral building material

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The transition towards a Circular Economy requires more knowledge and information, especially about materials and products, including their waste and energy streams, data about their origin and quality but also their environmental impact.

Since a building is a conglomerate of building products where material streams come together, the entire life span of each product needs to be considered. In this regard, planners have a strategic position in implementing circularity aspects and managing information flow within the design process of a building. For example, by selecting recycled or reused products and designing demountable connections, planners could have a substantial impact on future material flows. On the one hand, planners are confronted with an increasing amount of information about products and how they should be constructed. On the other hand, they lack experience and knowledge in implementing circularity into practice and handling information about circularity related aspects. Furthermore, essential information about products gets lost during the lifecycle of a building.

Important considerations during a building's design and construction

When we look at the life cycle of a building, designers or architects usually deal with the design of the building and the construction phase. During

these phases, information errors or absence of information often cause misleading communication between stakeholders. Consequently, a lack of data leads to a higher workload and lower quality of circular material flows.

But there is a lot more to consider in these stages, such as for example the *building product design* or the *disassembly* phase. When we look closer at the design phase of a building, *physical properties, judicial and organizational information* regarding circularity become important as they influence the product selection and construction process. For example, by knowing the key information about a product's circular performance, planners can estimate the environmental impact of potential decisions. The working process can be influenced and the design process steered by delivering the relevant information about a product or design task at a specific time.

Therefore, the definition of essential qualitative and quantitative information requirements during the entire design process and predefined information exchange points are essential for closing material flow loops. *Only if all relevant product information is defined, documented and exchanged, material streams can be managed transparently, efficiently and more circularly.*



Circularity for Educators

Developing an information delivery model

Within my research, relevant information such as product properties, judicial and organizational data that influence a circular material flow come into focus. All tasks during a circular design process, the involved stakeholders, and the information that needs to be exchanged amongst them are determined based on case study research analysis and literature review.

Moreover, there is a standardized method called the *Information Delivery Manual (IDM)*, that can distribute all relevant information about, for example, building products and construction methods to the planners and their collaborators. In my research, I used the Information Delivery Manual to document and deliver information about circular products, but also to support the collaborative work of stakeholders during a circular design process through a transparent information and material flow. Based on this, I developed a *model for three different scenarios of a circular design process: building with reused products, building with recycled products, and disassembly of buildings and products.*

All relevant information and design tasks that follow circularity principles are implemented with this model. The model is based on IDM, which is developed by the buildingSMART organization that also develops standards, norms and technologies for BIM application. So, the model is compatible with digital tools such as BIM.

The goal of the model is to support planners during their design process and provide guidelines along each design phase of a building. The research also presents a standardized framework for the usage

of circular mineral building products. The model has the potential to make the design process more transparent through a standardized way of exchanging, documenting and managing the design process, and with the ability to be implemented into digital tools. With the implementation into tools like BIM, planners will be guided throughout their design process, and relevant information about products will be stored for future reuse.