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Creating a better world: Circularity in Construction

All around the world, governments, companies, and NGOs have committed to minimizing raw material usage in the real estate and construction industry as the demand for such materials keeps rising. More than half of all greenhouse gas emissions relate to materials management activities[1]. A shift towards circularity is pressing, but remains a challenge. Materials' passports can function as a crucial tool in accelerating this shift. By changing the perspective on materials and acknowledging their continuous economic value, the built environment becomes a material depot that can be re-utilized.

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The demand for raw materials continues to increase worldwide. Consumption of raw materials is set to nearly double by 2060[1]. The construction industry is one of the largest producers of waste. Thus, a new perspective towards materials is needed. Reusing materials reduces the consumption of raw materials and depicts a first step from a linear to a circular economy. The transition to a circular economy is essential in achieving the objectives of the Paris Agreement. Many governments have therefore set themselves the goal of stimulating a transition to a fully circular economy. While the construction and real estate sector are mainly financially driven, moral and social arguments prevail in the discussion around circularity. Making the morally desirable financially attractive could speed up the transition.

Materials database: providing insight into reusable construction materials

Over the last decade there has been an increased focus on circularity in construction and real estate. Initiatives range from reusing materials and design for deconstruction to efforts to establish marketplaces for used building materials. However, in order to transition to a fully circular construction industry, reuse of materials from the built environment should increase. In order to do so, materials passports can be of use as they provide materials with a documented identity and value to enable them to remain visible in the economy. Knowledge of what is stored in the built environment stimulates reuse of products, prevents destruction of materials, and makes it easier to eliminate waste. Wide application of materials passports can steer the outlook towards valuing the existing built environment as a potential materials depot for future buildings.

A materials passport is designed as an online library of materials in the built environment, providing one central repository of all real estate data. This data includes all relevant information during the planning and execution phases of building administration and maintenance. The documentation and data can be useful for designing tenders, renovation, demolition, or new developments as well as for certification and sales/lease purposes. The idea is simple: based on global price benchmarks and corrected for demolition, transport, and reusage costs, the residual value of the materials is identified. One of the leading organizations in this approach is the Madaster Foundation, with its materials passport fast becoming the global standard.

From a financial value perspective, a materials passport takes away information asymmetry by providing a more accurate assessment of demolition costs or benefits. This impacts the cashflow of an organization and stimulates circularity by giving materials value and thus diminishing the amount of waste. When residual value becomes visible on the balance sheet, organizations and property owners will optimize design, maintenance, and demolition of property to increase residual value.

Digitalization in the construction industry: a chance for a free ride on current developments

Over the past decade, innovation and digitalization have finally taken flight in the construction industry. Mainly the larger construction companies are increasingly focusing on innovation and digitalization of their business models. In this area, building information modeling (BIM) serves as a main enabler. At an increasing pace, BIM models are used from the initiation phase to serve as a platform on which multiple stakeholders collaborate. Subsequently, the move towards digital twins allows failure costs to be reduced and more efficient work processes to be created. Digital twins are a real-time digital representation of a physical object that continuously delivers information on the assets' properties and statuses. These developments align well with the function of materials passports. IT platforms such as Madaster use BIM models to create materials passports of buildings. Once the passport is available, project developers can decide on more circular materials use in the design phase of the building, increasing circularity and, ideally, financial residual value—thus supporting the business case.

1. OECD, *"Raw materials use to double by 2060 with severe environmental consequences"*, October, 2018, https://www.oecd.org/environment/raw-materials-use-to-double-by-2060-with-severe-environmental-consequences.htm, accessed April, 2020.

Call to action: stimulate a feasible circular business case

The circular business case has proven to be complex, as the financial perspective remains dominant in investment decisions in construction and real estate. There are still hurdles to be overcome in order to accomplish a shift towards a circular construction industry. Reused and refurbished materials are often the more expensive option. At the same time, valuing reused and refurbished materials has proven to be hard—not least because of the lack of (public) circular marketplaces. Therefore, the industry as a whole must pick up the gauntlet to make circularity a viable business case. There is a need for front runners to create circular marketplaces and bring transparency to valuation in order to speed up the use of circular materials. In addition, we need governments to take a look at their tax regimes to see how they can stimulate the shift towards a circular construction industry by making the morally desirable more financially attractive.

Conclusion

Together with the Madaster Foundation and the Circular 8 (8 frontrunners in circularity: ASML, Bouwinvest, Erasmus MC, the Municipality of Rotterdam, Lefier, Rai Amsterdam, Shell, and Van Wijnen), Deloitte Netherlands has published research concerning the financial effects of applying residual value or future value of materials in property. Deloitte is continuously looking to facilitate the shift towards a circular construction and real estate industry by bringing down barriers in collaboration with partners in the ecosystem.