Material Reusability Assessment for Circular Renovation of Urban Quay Walls

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Abstract Topic : Circularity **Abstract Status :** Accepted **Submission Type :** Oral presentation

Abstract Summary : Within the framework of 'Blueprints for messy cities? Navigating the interplay of order and complexity at the "Reinventing the City" conference, this paper delves into a critical aspect of circular urban development and the assessment of building material reusability. As cities like Amsterdam strive for greater liveability, resilience, and sustainability, a good understanding of circularity becomes imperative. In the dynamic landscape of urban innovation spanning mobility, renewable energy, climate adaptation, and digitization, our research focuses on the intricate domain of building material reusability. We integrate key factors influencing construction product reusability into our assessment framework. The intention of my ongoing PhD program is to establish a framework that incorporates various factors, including practical, financial, organizational, and others. These factors constitute integral elements guiding our decision-making process. The primary contribution of this study lies in the development of a BIM-integrated method designed to quantify the material reusability value. This method, rooted in numerical analysis, focuses specifically on material life expectancy. The lifespan, or in other words, the age of the material, plays a crucial role in determining the material reusability value. As the initial step in my PhD research, gaining insight into the reusability level involves investigating the impact of age. The benefits of this method are manifold. Firstly, it serves as a forecasting tool, enabling stakeholders to anticipate the amount and quality of materials obtainable from buildings at the end of their life

cycle. This foresight facilitates strategic planning for material reuse, recycling, and disposal, contributing to more sustainable urban development practices. Secondly, the method provides vital information about the categories of materials resulting from deconstruction and demolition processes, namely, those suitable for reuse, recycling, and disposal. This insight assists stakeholders in making informed decisions regarding proper equipment and resource allocation for each category, thereby optimizing the efficiency of the overall process. As urbanization continues to reshape our global landscape, cities emerge as catalysts for transformative change. This transformative potential is exemplified in pioneering initiatives like Urbiquay. Urbiquay, embodies the essence of urban evolution, showcasing a commitment to sustainable urban development and progressive methodologies. The method presented in this paper is developed to contribute to such transformative endeavours, particularly in the Logiquay project's Work Package 2 (WP2), which is also my ongoing PhD research. The method's ability to forecast the obtainable materials, categorize them based on reuse potential, and guide decision making on equipment and resource allocation aligns with the objectives of Logiquay, WP2. It bridges the gap between innovative research and practical, on the ground application, offering a pathway for cities to integrate sustainability into their ongoing urban transformation.

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