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Circular Building Sector Conference

CBSC2025

Lund, Sweden, 1-3 June 2025

WELCOME!

Dear colleagues, friends, and fellow changemakers,

It is with great pleasure that we welcome you to the Circular Building Sector Conference 2025 (CBSC 2025), here in the historic and vibrant city of Lund, Sweden. Whether you are joining us from across the globe or from just around the corner, we are truly honoured to have you with us.

Lund, with its thousand-year history, world-class university, and thriving innovation ecosystem, offers a unique setting for reflection, dialogue, and discovery. As we gather here, we are united by a shared purpose: to explore and advance circularity in the construction sector — a field that is not only technically complex but also deeply intertwined with our environmental, social, and economic futures.

The challenges we face in transforming the built environment are immense, but so too are the opportunities. Your research, your ideas, and your commitment are what make this conference meaningful. Together, we are shaping the future of construction — one that is regenerative, resource-efficient, and resilient.

We hope these days in Lund will be filled with inspiring presentations, engaging discussions, and new connections that will last well beyond the conference. We also hope you take a moment to enjoy the charm of our city, the Swedish hospitality, and the long, light-filled days of early summer.

Thank you for being here. Thank you for contributing to this important work. And once again — welcome to CBSC 2025.

The local organising committee,

Ulla Janson, Dennis Johansson, Riikka Kyrö, Karin Lundholm, Jonas Niklewski, and Erik Serrano.

Paper presentations (in order of presentations)

Abstract presentations (in order of presentations)

Papers presented at the conference

CITIES AS LOCAL GOVERNMENTS FOSTERING THE CIRCULAR ECONOMY IN THE CONSTRUCTION SECTOR – UNRAVELLING THE KEY ACTIONS AND OPERATIONAL ROLES OF CITIES THROUGH A MULTIPLE-CASE STUDY

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ABSTRACT

Background and aim. Climate change and environmental issues have driven cities to adopt more sustainable practices, with the circular economy seen as a solution. Cities, as built environments are responsible for 75% of global resource use and over 70% of greenhouse gas emissions, play a critical role in the circular transition. Harnessing the potential of circular construction is a key means for cities as local governments to achieve sustainability goals and reduce negative environmental impacts in the built environment. However, research largely describes circular actions in construction at general and conceptual levels. In addition, although the city's role in the circular transition within construction is recognised, few studies identify specific actions enabling cities to contribute to this transition.

Methods and data. To address these gaps, we conducted a qualitative multiple-case study of four Finnish construction cases engaging cities – the construction of an eco-industrial park and a circular city district; construction waste management through mass coordination; and a circular construction research project – based on primary (n=11 interviews and ethnographic observation) and secondary (n=over 100 documents) data.

Findings. We recognised that cities as local governments play an important role in fostering circular construction through 26 key actions categorised as facilitate collaboration, govern and monitor, develop, and operate. We also identified that cities actions manifest through two operational roles, actor and platform, where actions tend to have identifiable characteristics of both roles, depending on the action and its implementation.

Theoretical / Practical / Societal implications. This study contributes to research on circular cities and construction by highlighting cities' potential in the circular transition of the construction sector. It also provides practical guidance for city-level managers and policymakers on circular decision-making at the local level.

KEYWORDS: circular actions; circular economy; circular city; circular construction; operational roles.

STRATEGIC DECISION-MAKING IN UNCERTAINTY: INTEGRATING FORWARD-LOOKING SCENARIO PLANNING AND MULTI-CRITERIA ANALYSIS FOR ADAPTIVE REUSE PROJECTS

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ABSTRACT

Background and aim. Adaptive reuse enhances circularity by repurposing buildings, reducing carbon emissions, and preserving heritage. However, decision-making is complex due to stakeholder conflicts, regulations, and uncertainties. This study introduces an integrated framework combining Cross-Impact Balance (CIB) analysis, the Analytic Hierarchy Process (AHP), and Fuzzy-TOPSIS to support structured, participatory decision-making.

Methods and Data. A mixed-method approach integrates CIB for scenario development, AHP for stakeholder-driven prioritization, and Fuzzy-TOPSIS for ranking reuse scenarios. A hypothetical case study demonstrates the framework's applicability.

Findings. The integration of CIB, AHP, and Fuzzy-TOPSIS provides a structured decision-making approach that enhances scenario coherence, aligns decisions with stakeholder priorities, and improves scenario ranking robustness. The framework enables systematic exploration of adaptive reuse scenarios, ensuring alignment with stakeholder objectives.

Theoretical / Practical / Societal implications. Theoretically, this study advances scenario-based decision-making by integrating scenario development and decision-making approaches, addressing gaps in adaptive reuse decision frameworks. Practically, it provides policymakers, urban planners, and developers with a structured tool to navigate complex decision-making in adaptive reuse projects. Societally, it supports sustainable and inclusive urban development by fostering consistent, long-term strategies that balance environmental, economic, and social considerations.

KEYWORDS: Adaptive Reuse, Circularity, Cross-Impact Balance (CIB) Analysis, Multi-criteria Decision-Making, Scenario Planning,

DESIGN FOR THE FUTURE – VERSATILE, RELOCATED AND VERTICALLY EXTENDED TIMBER BUILDINGS FOR A CIRCULAR ECONOMY

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ABSTRACT

Background and aim. Developing timber buildings suitable for deconstruction, reuse, and adaptability in practice is challenging and complex. The project "Design for the Future - Reuse of Timber Buildings in a Circular Economy" developed two concept buildings to be reused with preserved functionality. Focus was on environmental benefits and was obtained through collaboration within the circular value chain and according to real estate developers' requirements. One building featured industrially manufactured volumes designed to be relocated and rebuilt. The other was an adaptable building with planar elements, designed to be flexible, relocated and vertically extended with two added floors.

Methods and Data. The concept method, a co-creation process, was used that involved possible scenarios, construction, deconstruction, reconstruction, waste management and estimation of reusability. The method SimFORCE, Simulation for Future Oriented Reuse and Circular Economy, was developed. Evaluation of reusability and preserved functionality was conducted in cooperation with expert groups. The climate reduction potential of reuse was analysed using Life Cycle Assessments.

Findings. SimFORCE helps identify whether structures are designed for deconstruction or need improvement. Further, the results were useful in preparing and writing deconstruction and reconstruction guides. Climate calculations show a significant reduction in environmental impact when buildings are reused.

Theoretical/Practical/Societal Implications. With SimFORCE, two timber buildings were demonstrated as possibly being reusable with preserved functionality (structural, acoustics, fire resistance, etc.) with a considerably reduced climate impact. Assessments were based on profound knowledge and experiences of the building systems, deconstruction and testing. The actual buildings have not been deconstructed and rebuilt.

KEYWORDS: Adaptability, Co-creation, Design for deconstruction, Reconstruction, Reuse

A FRAMEWORK FOR CIRCULAR BUILDING RENOVATION: INTEGRATING LCA, C2C, 10R, AND STAKEHOLDER ENGAGEMENT

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ABSTRACT

Background and aim. Circular economy (CE) practices in the built environment require integrating strategies such as life cycle assessment (LCA), cradle-to-cradle (C2C) principles, stakeholder collaboration, and the 10R framework to enhance resource efficiency and minimize environmental impacts across the entire building. However, existing research lacks a comprehensive framework that systematically combines these elements while demonstrating their practical application and addressing stakeholder alignment in real-world scenarios. The aim of this study is to propose a novel framework that integrates LCA, C2C principles, the 10R framework, and stakeholder engagement to advance CE practices in building renovation.

Methods and Data. By applying a mixed-methods approach, this study combines qualitative and quantitative analyses to evaluate CE strategies. The qualitative analysis involves material suitability for reuse, refurbishment, or storage, and explores stakeholder roles within the 10R and C2C frameworks. The quantitative analysis, based on LCA, measures GHG emissions comparing two scenarios using new and reused materials, highlighting potential carbon savings. A case study of a single-family building renovation from Sweden illustrates the practical application of these strategies and emphasizes the importance of stakeholder collaboration in overcoming barriers.

Findings. The findings underscore the importance of strategic material selection and the transformative role of material reuse in achieving long-term carbon savings and minimizing GHG emissions. Incorporating reused materials into building renovation practices can lead to a substantial 94% reduction in GHG emissions compared to using newly produced materials.

Theoretical / Practical / Societal implications. The study demonstrates how circular economy strategies can drive a low-emission building sector, offering practical insights and replicable method for real building projects.

KEYWORDS: Circular economy, Cradle-to-cradle, Life cycle assessment, Reuse, Stakeholder engagement

TOWARDS DOUBLE DESIGN:

CREATING DURABLE AND ADAPTABLE BUILDINGS

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ABSTRACT

Background and aim: Long-life and long-usefulness are to be achieved by recognising the processes of functional obsolescence and structural degeneration and embracing uncertainty as an essential component of the future. Applying the Double-Design concept envisages designing buildings that will not only last a long time but, by incorporating adaptability and flexibility, continue to be useful for as long as they last. The exploration addresses a research gap in that while there are several studies of flexibility and adaptability, there have been no efforts to expand their scope to the limit.

Methods and Data: The work explores the possibility of designing for multiple uses over time with a distinction made between “hard” compatibilities between different clusters of activities (uses) and “soft” compatibilities, which relate to each successive transformation of function within a Double-Design framework. The analysis of hard compatibilities is summarised, while the significance of architectural and engineering design in managing uncertainty is supported by a detailed longitudinal study of a university in UK.

Findings: The exploration confirms the feasibility of implementing Double-Design regarding resource conservation. It is consistent with a movement towards high-performance buildings that invite greater user engagement.

Theoretical / Practical / Societal implications. Architecture, the construction industry and Architectural education need to emphasise a building's lifetime rather than just its first day of use. The public interest regulations guiding design must cover ethical principles embracing resource use and the environment. The concept is physically feasible, but several aspects of the professional and social mindset must change.

KEYWORDS: architectural design, building life expectancy, building performance, sustainability

LIFE CYCLE ASSESSMENT OF STRUCTURAL MATERIAL REUSE IN ON-SITE PRESERVATION OF A CONCRETE STRUCTURE WITH TIMBER ADDITIONS

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ABSTRACT: The construction industry contributes approximately 19% of global greenhouse gas (GHG) emissions and accounts for one-third of worldwide energy consumption, underscoring its pivotal role in addressing climate change. This study evaluates the environmental impact of preserving an existing concrete structure versus constructing a new one with cross-laminated timber (CLT) or virgin concrete. The effectiveness of environmental comparison in mitigating carbon emissions and reducing resource consumption is investigated through a comparative lifecycle analysis of reuse and replacement scenarios. Utilizing the Life Cycle Assessment (LCA) framework, three scenarios were analysed: (1) preserving existing concrete floors on-site and adding two cross-laminated timber (CLT) extensions, (2) demolishing the existing concrete structure to construct an entirely new five story building using CLT, and (3) demolishing and constructing a new five story structure with cast-in-place virgin concrete. The analysis comprehensively quantifies the Global Warming Potential (GWP) across the production, operational, and end-of-life stages. Results demonstrate that reusing existing concrete floors reduces approximately 40 kg CO_2 e/m² gross floor area compared to a new timber construction and 121 kg CO_2 e/m² tons compared to new concrete construction. The results highlight the environmental benefits of implementing circular economy principles into construction practices.

Keywords: Life Cycle Assessment, concrete reuse, cross-laminated timber, circular economy, carbon emissions**.**

LIFE CYCLE ASSESSMENT OF DIFFERENT STRUCTURAL FRAMES APPROACH IN SWEDISH ROW HOUSE CONSTRUCTION: RECLAIMED CONCRETE, NEW CONCRETE, AND TIMBER

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ABSTRACT: The Intergovernmental Panel on Climate Change (IPCC) reported in 2019 that the building sector accounts for 21% of global greenhouse gas (GHG) emissions, with 18% originating from producing construction materials such as cement and steel. This highlights the urgent need to address embodied carbon in construction to align with climate goals. This study examines the potential of reusing structural materials, primarily concrete elements, to significantly reduce embodied emissions in the construction sector, which has increasingly focused on embodied carbon alongside operational energy efficiency. A lifecycle analysis compared the Global Warming Potential (GWP) of concrete elements reclaimed from an old building, conventional concrete, and timber construction for the structural frame of a row house. Reclaimed concrete demonstrated the lowest GWP, achieving a 77% reduction compared to traditional concrete and surpassing timber. These findings indicate that reclaimed concrete elements can rival timber as a sustainable building material. Prioritizing sustainable material choices and resource efficiency is crucial for the construction sector to meet increasingly stringent global climate targets. This study emphasizes the importance of reusing structural materials to lower carbon emissions during construction, contributing to a more sustainable built environment.

KEYWORDS: Carbon emissions, Circular economy, Life cycle assessment, Reuse, Structural elements

REUSE CHALLENGES IN CIRCULAR DECONSTRUCTION: LESSONS FROM EXPLORATIVE CASE STUDIES

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ABSTRACT

Background and aim. There is a lack of empirical insights into the challenges faced in deconstruction processes aimed at building element reuse, particularly from the perspective of demolishers. This study aims to address this gap by identifying the challenges that hinder the recovery of building elements for reuse in deconstruction processes.

Methods and Data. Using a multiple case study design, we examined deconstruction practices in two projects, an outpatient clinic and a brick factory. Qualitative data were gathered through ten semi-structured interviews, project documentation, and field visits. A combination of deductive and inductive approaches was applied to data analysis.

Findings. Our findings reveal several challenges that hinder reuse practices in deconstruction projects. We have categorised these into four key system elements: technology, people, processes, and policy. These challenges collectively impede the transition towards a more circular practice in the demolition industry.

Theoretical/ Practical / Societal implications. This study provides a holistic understanding of the challenges that demolishers encounter when attempting to reuse building elements. It also extends existing research by providing empirical insights into deconstruction practices.

KEYWORDS: Construction industry, Circular practices, Deconstruction, Reuse, Reverse Logistics

THREE OBJECTIVES FOR A HOLISTIC CIRCULAR ECONOMY POTENTIAL ASSESSMENT OF BUILT ASSETS

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ABSTRACT

Background and aim. Built assets can contribute to the circular economy (CE) in several ways, implying there are multiple CE objectives to consider. Existing measurement methods often yield suboptimal results for objectives that are not their focus. We are developing a holistic method for measuring the CEP of built assets; the present paper proposes three key CE objectives essential for a holistic CEP calculation.

Methods and Data. A holistic set of CE objectives encompasses all relevant end-of-use and end-of-life strategies for the CEP of a built asset. We analyse existing circularity quantifications, identify challenges that prevent a holistic assessment, and determine the requirements for a novel set of CE objectives. Furthermore, we propose and verify the novel set of objectives using the CEP framework and three illustrative use cases.

Findings. The three objectives for a holistic CEP assessment are longevity, reusability, and transformability. Longevity implies that a resource remains in place; reusability refers to outflows that retain a similar form and embodied value; and transformability involves the outflows that change their form. Through validation we demonstrate that these objectives apply to previously identified CEP influencing factors and all use cases.

Theoretical / Practical / Societal implications. The novel system of objectives provides a foundation for more accurate measurement of the CEP in the building sector. The proposed set is sufficient for navigating the complex landscape of CE assessments, strategies and parameters. A quantification method encompassing all objectives and reliably reflecting real-world performance would incentivise more circular design of built assets.

KEYWORDS: adaptability, building configuration, circularity, flexibility, quantification.

CIRCULAR STUDIO - COMBINING HERITAGE, TRANSFORMATION, RE-USE AND EMISSIONS TO A HOLISTIC STUDENT-ACTIVE LEARNING EXPERIENCE IN ARCHITECTURE

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ABSTRACT

Background and aim. Norway has approximately 6000 professional architects in its workforce. Their historical and current bulk of new-built projects will become scarcer as climate change, nature loss and societal considerations force increased use of existing buildings. It is therefore necessary that new architects have a solid, updated, and coherent education in efficiently working with existing buildings as they enter the workforce. This study follows the introduction of Circular Studio, a piloting curriculum development architectural studio course that focuses on existing buildings, re-use of materials and design development, aiming to report the identified concepts and perspectives as manifestations of experiential learning.

Methods and Data. The study utilised a before-after survey (N=19 first iteration, N=19 second iteration, of which 10 were matched pairs). Measured dimensions were correlation to NEP-15 environmental attitudes, BIDR Impression management, 20 statements about buildings focusing on resource use and circularity, 16 statements on the role of architects and 2 open questions focusing in the positive and negative impacts of architects as agents, as well as opportunities and barriers.

Findings. The explorative approach identified 5 concepts and perspectives as well as a multitude of indications on individual aspects of experiential learning in Circular Studio.

Practical implications. The study provides an initial test for a framework for the practical design of circularity curriculum in architectural education and suggestions for co-developing curriculum and evaluation research for evidence-based development for this shift in the architectural profession.

KEYWORDS: Circular Economy, architectural education, experiential learning, perception change

CIRCULAR ARCHITECTURE MEETS CIRCULAR ECONOMY: A PILOT EXPERIENCE IN INTERDISCIPLINARY TEACHING FOR CLIMATE-NEUTRAL BUILDING PRACTICES

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ABSTRACT

Background and aim. This study evaluates the implementation and effectiveness of a pilot course aimed at integrating circular principles into architectural education to respond to the built environment's pivotal role in the climate crisis. The course introduces undergraduate students to the foundational concepts of circular design, promoting climate-neutral practices. Co-taught by specialists in circular architecture and circular economy, it blends a design project with practical training in life cycle calculations. By analysing the course structure and outcomes, the study highlights how circular design, and economic considerations can be effectively incorporated into academic learning.

Methods and Data. The study employs a mixed-method approach that includes qualitative project analysis and quantitative student surveys. Reflexivity and self-critical discussions were central to minimize bias, critically assess teaching practices, and ensure a balanced evaluation of learning outcomes and course impact.

Findings. The course revealed the necessity of a holistic approach to teaching sustainable architecture, demonstrating a strong correlation between understanding circular design and effectively applying LCA and LCC tools. The dual approach enhanced students' design skills while equipping them with practical abilities to assess both the environmental impact and economic viability of their designs.

Theoretical / Practical / Societal implications. This experience highlights the importance of interdisciplinary teaching in architectural education. The findings suggest that future courses should continue to integrate design with environmental and economic analysis, better preparing students for sustainable practice. The course offers a model that can be adapted in other contexts, contributing to the broader goal of climate-neutral buildings.

KEYWORDS: circularity, circular design, circular economy, interdisciplinary teaching.

EARLY CASES OF PRECAST CONCRETE REUSE IN SWEDISH CONSTRUCTION (1984-2002): REPURPOSING THE MILLION HOMES PROGRAMME

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ABSTRACT

Background and aim: Precast concrete elements are structural components with significant potential to support circular construction practices, and several initiatives are currently underway to address the technical, regulatory, and economic challenges associated with scaling up element reuse from a niche practice to mainstream application. Although the reuse of concrete elements is gaining renewed interest within the broader framework of circularity, the earliest initiatives to reuse precast concrete elements in Sweden can be traced back to the 1980s. During this period, widespread vacancies in newly constructed mass housing developments under the Million Homes Programme prompted several municipal housing companies to explore deconstruction as a strategic alternative to conventional demolition. This paper examines the lessons learned from these early pioneering projects and investigates how insights from past reuse efforts can inform and advance current and future circular practices in the building sector.

Methods and data: The paper presents a comparative study of early cases involving the reuse of prefabricated concrete elements in Sweden over a twenty-year period. The analysis draws on a combination of literary sources, architectural drawings, and interviews with key individuals involved in the original projects. Through this multi-source approach, the study conducts a structured examination of the deconstruction and reuse processes associated with each identified case. Particular emphasis is placed on the architectural transformations between the donor buildings and their corresponding recipient buildings, providing deeper insights into the potential of precast concrete systems to be repurposed in new construction projects.

Findings: Between 1984 and 2002, seven building projects in Sweden were completed incorporating salvaged precast concrete elements from deconstructed Million Programme developments. Although the original structures were widely criticized for their systematization and repetition, these very characteristics made the precast concrete systems particularly well-suited for deconstruction and reuse. The recipient projects demonstrate that, through relatively simple design interventions, precast systems can be effectively adapted to meet diverse site contexts, building types, and spatial requirements.

Theoretical/practical/societal implications: Gaining a deeper understanding of the early cases of concrete element reuse in Sweden and the reasons why this seemingly successful approach failed to lead to broader implementation can support current reuse initiatives in fostering a more systematic and lasting transformation of the construction sector, extending beyond the scope of isolated pilot projects

KEYWORDS: Reuse, precast concrete elements, architecture, reuse potential, the Million Homes Programme.

ESTABLISHING THE REAL VALUE CYCLES FOR TIMBER STRUCTURES – FINDINGS FROM CASE PROSJECTS

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ABSTRACT

The four-year project XX aims to advance circularity in the timber industry, achieving key milestones in standardization, reuse, and market expansion through cooperation, innovation and targeted research. Historically, circular timber construction was common, and modern efforts, like Norway's Project X, work towards reintroducing wood reuse and recycling. XX is targeting an 8% reduction in CO_2 emissions aligned with Norway's commitments under the Paris Climate Agreement by repurposing 50% of Norway's annual 800,000 tons of counted wood waste by 2030. Regulatory frameworks, including the Waste Framework Directive, Construction Products Regulation, and EU Taxonomy, drive towards circularity. Norwegian building regulations (TEK17) also promote climate accounting and reuse mapping. Overcoming market and logistical barriers is crucial. Coordinated efforts across regions, regulations, and industry standards will determine the success of circular timber construction. A new Norwegian standard (NS 3691) facilitates quality assurance for reclaimed wood. In contrast, practical projects—such as circular prefabricated housing, N.N., post-consumer wood from demolition and barns, and modular timber skeleton buildings—demonstrate scalable reuse models. Studies confirm consumer readiness for recycled wood and highlight significant climate benefits from reuse over incineration. Research on digital product passports (DPPs) emphasizes their role in material tracking and lifecycle management. XX has shown the viability of large-scale timber reuse, yet regulatory, logistical, and technological barriers remain. Future efforts must focus on policy adaptation, industry incentives, and scaling innovative reuse solutions.

KEYWORDS: Circular economy, design for disassembly, innovation, post-consumer wood, regulations.

CIRCULAR ECONOMY PRINCIPLES IN INNOVATIVE FACADE APPLICATIONS: A REVIEW OF FIBRE-REINFORCED PULTRUDED PROFILES APPLICATIONS FOR ENERGY-EFFICIENT BUILDINGS

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ABSTRACT

Addressing resources and energy efficiency within the construction sector is the key to achieve the EU's ambition of climate neutrality and fully decarbonised of building stock by 2050. This paper explores the integration of circular economy principles, with a specific focus on fibre reinforced pultruded profiles as a sustainable material. It provides an overview of the characteristics and manufacturing processes of continuous pultruded profiles, exploring their potential implementation in facade components, and conducts a theoretical comprehensive sustainability assessment of their environmental impact. These materials contribute to potentially increase the environmental sustainability of the construction sector, reducing the overall lifecycle expenses, and boosting the energy performance of buildings. A mixed-methods research design was employed, combining a comprehensive literature review and analysis of case studies. These methods evaluated the characteristics, manufacturing processes, and environmental performance of fibre-reinforced pultruded profiles in facade applications. The research highlights key technologies that can increase resource efficiency and reduce waste in the fibre reinforced polymer industry. Prospects for technological advances in pultrusion processes are discussed. The findings reveal that pultruded composite materials offer significant advantages, including resource efficiency, waste reduction, and improved energy performance of building skins for durable and low-maintenance facade systems. Practically, this research highlights the potential of pultruded profiles for innovative facade design by incorporating circular economy principles. Societally, the findings support the transition to sustainable building practices, contributing to climate goals and resource conservation. This theoretical interdisciplinary approach addresses the challenges of modern façades systems and lays the groundwork for sustainable, energy-efficient buildings.

KEYWORDS: Facade application, Circular economy, Pultrusion, Recyclable, Glass fibres, Sustainability

DEVELOPING A CIRCULAR, TECHNOLOGY-ENRICHED TESTBED-ON-WHEELS FOR TEMPORARY AND SHARED USE

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ABSTRACT

Background and aim. In this fast-paced world, making choices for permanent learning environments that combine physical and digital environments can be complex due to the rapid development of educational technology (EdTech). One circular solution is to utilise modular buildings that offer flexibility, temporality, shared resources, and lower construction and maintenance costs while supporting the learning experience. This paper aims to analyse the mobilization and use phases, including the required servitization models, of a relocatable, shareable and circular classroom that also functions as a testbed for EdTech startups. This testbed-on-wheels, named the Mobile Testbed Tekla, operates in the City of Helsinki, Finland.

Methods and Data. The paper presents an ongoing case study utilising action research methodology on the Mobile Testbed Tekla, which is relocatable, sharable, flexible, multifunctional, and adaptable within urban structure. The data is collected through observations, project documentation, and an expert interview. Tekla functions as both a classroom and a testbed, moving from school to school every 2-4 weeks in Helsinki, Finland.

Findings. Action research with the iterative cycles provides learning points related to physical, digital and social structure of the testbed-on-wheels. The structural, logistic, technical, and functional elements are described in the process of co-creation and co-use of this new learning environment.

Theoretical / Practical / Societal implications. The academic contributions of the paper highlight the use of modular buildings to address temporal demands. Practical implication is valuable for stakeholders on the demand and supply side of learning environments, which explore connectivity and use of new technology.

KEYWORDS: Educational technology, relocatable classroom, shared use, temporality, testbed.

BEYOND EXPERIMENTATION: TEMPORARY USE AS A SOCIAL CIRCULAR STRATEGY

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1. ABSTRACT

Background and aim. Temporary use of vacant spaces—the short-term activation of properties awaiting transformation—has gained recognition for its potential to foster urban revitalization. While such uses provide a platform for experimentation, accessibility, and social inclusion through participatory and cultural activities, they often remain precarious and underutilized as strategic tools for circular economy. This study aims to explore how specific hybrid approaches to temporary real estate management can transform temporary use into a social circular economy strategy, balancing social values with market logics.

Methods and Data. This research employs a qualitative analysis, first defining a framework from literature and then analysing specific temporary use projects through a retrospective case analysis of three cases by Plateau Urbain (France), communa (Belgium), and Stad in de Maak (Netherlands). Data collection included interviews, project documentation, and field observations, allowing an in-depth exploration of the enabling conditions for successful hybrid approaches in creating social value.

Findings. This study makes three key contributions. First, it conceptualizes collaborative temporary use as a social circular strategy, clearly defining the evolution of the concept and its potential in temporary real estate adaptive reuse. Second, by drawing on the literature on organizational hybridity and case study analysis, it identifies key enabling conditions, such as tweaking the balance between social value and market logic over time to recalibrate impact—that underpin temporary use projects as social circular economy strategies. Third, it offers a framework to determine whether a temporary real estate reuse initiative can function as a social circular economy strategy.

Theoretical / Practical / Societal implications. This study offers theoretical insights into hybrid organizing for urban development and practical recommendations for integrating temporary reuse of real estate into social circular economy frameworks. Societally, it underscores the potential for collaborative temporary use to foster circular urban transformation by balancing economic goals with community-driven social value creation.

KEYWORDS: temporary use, adaptive reuse, social circular economy, real estate management, value creation.

PRODUCT-SERVICE-SYSTEM (PSS) IN TAIWAN'S PUBLIC HOUSING PROJECTS- DEVELOPMENT, BARRIERS, AND FACILITATORS

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ABSTRACT

Background and aim. Since 2018, various public sectors in Taiwan have started introducing the "circular economy" concept and implementing new business models, such as Product-Service-System (PSS), into their new housing projects. After several years of construction and operation, the feasibility of this new model has not yet been explored. This study aims to disclose whether the implemented PSS in these new public housing projects has reached its original goals of enhancing building circularity (e.g., extending products' lifespan, remanufacturing products) and long-term profit.

Methods and Data. In this preliminary study, data related to the original plans and actual performances of the implemented PSS is collected via interviews with project owners of these pilot public housing projects. Discussions on the potential reasons behind its success/ failure and suggestions to other project owners who plan to adopt a similar model are also made in the interviews.

Findings. The study identified several barriers to the success of the PSS model in Taiwan's public housing projects, including contract ambiguities, inappropriate bidding methods, and miscoordination during construction and installation. In the meantime, potential facilitators are also identified, including a more mature PSS ecosystem, supportive governance systems, coordinated management schemes, and increased resident sustainability awareness.

Theoretical / Practical / Societal implications. PSS for building operations in Taiwan's public housing projects is a pioneering experiment. Their experiences provide valuable insights for other Taiwanese projects and guide countries that newly adopt PSS in the building industry, helping them transition towards a more sustainable, circular built environment.

KEYWORDS: Circular Business Model, Product-Service-System (PSS), Product-as-a-Service (PaaS), Public Housing

IMPACT OF REASSEMBLY ON THE MECHANICAL PROPERTIES OF STRUCTURAL FLOOR ELEMENTS MADE OF INDUSTRIAL WOOD RESIDUES

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ABSTRACT

Background and aim. Considering the significant amount of timber constructions that end up in landfills or are incinerated, promoting efficient and circular use is essential. Designing structural elements for dis- and reassembly can extend their lifespan. However, uncertainties remain about these elements' material properties and functional performance after being disassembled, and whether they meet technical requirements for structural building products. This study investigates the impacts of using industrial wood residues to produce I-beams and multiple disassembly cycles on the mechanical properties of floor elements.

Methods and Data. The E-modulus and bending strength of elements were measured with bending tests performed according to EN 408:2010. The effects of dis- and reassembly on flooring elements made from a combination of graded sawn timber and industrial wood residues in the form of ungraded sawn timber offcuts were tested and evaluated after repeated cycles and compared to reference values. Initially, six elements were disassembled once or twice, and three elements were tested until failure to be considered as reference elements.

Findings. Two different types of reassembly processes were considered for the elements. The first reassembly type resulted in a decrease in both bending strength and E-modulus mean values. In contrast, the second reassembly type led to an approximately 78% increase in bending strength and a slight 9% decrease in E-modulus.

Theoretical / Practical / Societal implications. Using industrial wood residues in the form of ungraded sawn timber offcuts and graded sawn timber to produce load-bearing systems increases industrial wood residue utilization in structural elements. Studying the mechanical properties of elements after one or two dis- and reassembly processes ensures the user of the quality of elements after disassembly and increases the reuse rate and carbon storage time. The study shows that new end-of-life scenarios can be defined for flooring elements and industrial wood residues.

KEYWORDS: Circularity, Design for Disassembly, Experiment, Flooring Systems, Wood Residues.

ASSESSING THE ECONOMIC BOUNDARY CONDITIONS FOR REUSING PRECAST CONCRETE ELEMENTS IN CONSTRUCTION

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ABSTRACT

Background and aim. The reuse of Precast Concrete Elements (PCEs) offers a promising method to reduce emissions in construction. However, economic feasibility remains a significant barrier to widespread implementation. While technical challenges and value creation within supply chains have been explored, limited research addresses the economic aspects.

Methods and Data. This study constructs a supply chain model to compare standard demolition, PCE reuse, and construction with virgin materials. We investigate economic factors influencing building owners' decisions to donate or sell PCEs, building buyers' choices to use reclaimed materials, and the profitability of individual actors and the overall supply chain. Using 54 data sources, we identify cost and profitability drivers and analyze key decisions through economic theory and cost management perspectives.

Findings. Building owners have strong incentives to donate or sell PCEs for reuse, while buyers' decisions are highly context-dependent. Key costs in PCE reuse include deconstruction, refurbishment, storage, and transportation, while cost reduction drivers stem from savings on landfill fees, material costs and production costs. Long-term profitability depends on economies of scale, new markets, and innovation.

Implications. Investments can already focus on the most promising opportunities, but further research on cost structures, regulatory impacts, technological innovations, and supply chain dynamics is essential to guide decisions. Economies of scale, learning curves, and technological advancements offer significant potential to improve economic feasibility.

KEYWORDS: Circular Economy, Construction costs, Economic feasibility, Finance, Investment, Precast concrete element, Sustainability.

EXPERIENCE MEETS NEW IDEAS AND CHALLENGES- A STRATEGY-MODEL FOR CONSIDERATE BUILDING IN RURAL AREAS

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ABSTRACT

Background and aim. A challenge when building in rural areas is to minimize the negative effects on climate, environment and to avoid conflicts between local and national interests. In the Interreg project SOURCE (Sustainable and nature pOsitive development of housing for ReCreational usE) the aim is to learn more about building recreational homes with a minimal negative impact. The research project supports business growth by collaborating and transfer knowledge between university and schools, local companies and organizations. The aim is to develop a circular building process based on local conditions in rural areas, by mutual learning.

Methods and Data. A model with *"five strategies for considerate recreational-houses"* will be further explored and developed: **1. Share**, existing buildings. **2. Convert**, use and update existing buildings **3. Condense**, add new buildings. **4. Simplify,** identify local materials that can be used **5**. **Active maintenance,** an agile process.

Findings. Knowledge from local conditions can be of importance when planning a house without connection to municipal supply systems. Persons that are familiar to local traditions, materials, resources and conditions can have "tacit knowledge" to be transferred in well planned meetings with students.

Practical/Societal Implications. Challenges for building in rural areas will be identified and solved: Transports to the construction site. The design of the foundation. Heating, electricity, water-supply and waste planned for an off-grid solution. Respect for regulations and national interests. Local cultural and social values. The whole process must therefore be accurate planned in dialogue, taking care of different perspectives, and experiences.

KEYWORDS: Considerate building, local knowledge, mutual learning, off-grid solutions

REAL ESTATE COMPANIES AND CIRCULAR BUSINESS MODELS

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ABSTRACT

Background and aim. Many Real Estate Companies (RECs) develop, rent out and manage their buildings as landlords. However, as the buildings are used by their tenants, landlords do not have much opportunity or incentive to optimize the use and thereby reduce the need for space. On the contrary, to secure their investment, they have strong incentives for long-term rental contracts and expand their building portfolio, while commercial tenants have incentives for flexibility in their lease contracts. Besides RECs' commercial interests, they also meet increasing expectations from the public and potential tenants to behave in an ethical and sustainable way. This paper investigates how RECs balance these dilemmas and develop their business models.
Methods and Data. The paper is based on interviews with six RECs in Denmark.
Findings. The business models vary a lot and so does the focus on sustainability. The purely profit driven RECs lack incentives to become more sustainable. Legislation is the main drivers for these companies. State owned and ethical driven investors and administrator companies owned by pension funds have clear strategies towards being more sustainable. A new administrator company had recently been established by a pension fund particularly to meet the increased sustainability challenges with a strong focus on circularity.
Theoretical / Practical / Societal implications. The paper adds to the growing literature on circular buildings with particular focus on management of the use and operational phase. It can give RECs inspiration to develop circular business models.

KEYWORDS: Real estate, investors, administrators, circular, business models

DEVELOPMENT OF A PRELIMINARY, USAGE SPECIFIC PRODUCT DOCUMENTATION FOR RECLAIMED GLT – A NORWEGIAN CASE STUDY

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ABSTRACT

Background and aim. The paper aims to collect background information about the production of glued laminated timber (GLT) in Norway and to suggest content for usage specific product documentation for GLT intended for reuse based on laboratory work combined with practical experience from two case studies.

Methods and Data. Bond line quality in reclaimed GLT was assessed by testing the resistance of delamination. Adhesive systems were tentatively identified using stained microscopy sections and FTIR spectroscopy.

Findings. The paper illustrates the consequences of the youngest industrial history from the wood working industry in Norway for the reuse of glued laminated timber in load bearing applications. It shows difficulties with on-site evaluation of building products and points out the conflict between desired comprehensive knowledge of properties of reclaimed building elements and the need to keep destructive testing at a minimum.

Theoretical / Practical / Societal implications. The authors consider the findings of the paper practically relevant as they show the complexity of evaluating the reuse potential of a relatively simple building product. At the same time, they propose a solution for how this complexity can be overcome by suggesting test methods and deriving categories for usage specific product documentation.

KEYWORDS: Glued laminated timber, delamination, adhesives, casein, documentation

CIRCULAR IN, CIRCULAR OUT: APPLYING CIRCULAR DESIGN IN A POP-UP PUBLIC BUILDING IN LUND

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ABSTRACT

Background and Aim: Circular design, emphasizing sustainability and resource efficiency across a building's lifecycle, has become increasingly critical in addressing global environmental challenges. This paper examines the implementation of circular principles in a temporary kindergarten as a public building project in Lund, Sweden. The aim is to demonstrate how these principles can be integrated from conceptualization through to end-of-life considerations, highlighting their potential impact on environmental sustainability.

Methods and Data: The project's approach involved research into circular design methodologies and sustainable building practices. Methods included design-for-disassembly and design-for-circularity strategies to enhance material reuse and minimize waste generation. Data collection encompassed regulatory compliance, material sourcing, and stakeholder engagement processes.

Findings: Innovative solutions in designing light weight and affordable temporary modular construction techniques and using parametric modelling and lifecycle impact as a tool to ensure low carbon circular design. The findings contribute to a deeper understanding of practical applications of circular design in urban development contexts. The study highlighted the importance of holistic design approaches that prioritize environmental responsibility.

Theoretical/Practical/Societal Implications: Theoretical implications highlight the transformative potential of integrating circular principles into architectural practices, fostering sustainable urban development. Practically, this study demonstrates the feasibility of adopting circular design strategies within existing regulatory frameworks, promoting environmental stewardship and community well-being. Societally, the study advances discourse on sustainable architecture by showcasing Lund, Sweden, as a model for implementing comprehensive circular design strategies in public infrastructure projects.

KEYWORDS: Circular design, design-for-disassembly, public building, sustainable architecture

Abstracts presented at the conference

PRECAST CONCRETE REUSE AND EMBODIED CARBON SAVINGS IN SWEDISH BUILDINGS: PROSPECTIVE ANALYSIS

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ABSTRACT

Background and aim. The demand for construction materials in residential buildings is growing and will continue to rise, posing significant challenges to climate targets. Structural materials, which are substantial contributors to embodied carbon, also result in significant waste streams during demolition, but their availability through demolition is not explored. This research aims to explore the future supply of structural precast concrete elements in Swedish residential buildings, with a focus on evaluating the reuse potential and estimating the associated embodied carbon savings.

Methods and Data. The study uses bottom-up prospective Material Flow Analysis (MFA) and Life Cycle Assessment (LCA) to evaluate the future availability and reuse potential of structural precast concrete elements. The precast concrete intensity in Swedish buildings is estimated, demolition rates are projected based on historical data and embodied carbon performance is calculated considering technological advancements.

Findings. The study predicts that while the reuse strategy offers embodied carbon savings, the growing material demand will outpace the supply from demolitions, limiting this strategy's overall embodied carbon reductions.

Theoretical / Practical / Societal implications. This research supports societal efforts to mitigate climate impact by promoting sustainable resource use in construction. Informing urban planning and policy enables the design of strategies that align with urgent climate targets. Furthermore, this study advances the integration of dynamic prospective MFA and LCA for evaluating material reuse and embodied carbon savings on the urban scale. The methodological framework can also be adapted to assess other structural elements, broadening its applicability to circular economy strategies in the built environment.

KEYWORDS: Life Cycle Assessment (LCA), Embodied carbon, Circular economy, Material Flow Analysis (MFA), Precast concrete

EXPERIENCES AND STATE-OF-THE-ART OF HEMP-LIME RESEARCH IN SWEDEN

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ABSTRACT

Background and aim. Hemp-lime is a unique and sustainable building material that consists of the woody core parts of the hemp stem (shiv) and lime. It is a diffusion open material with good thermal performance. Hemp, cannabis *sativa,* is a very versatile crop, providing fibres for textiles and insulation, hemp shiv for animal bedding and hemp-lime construction and hemp seeds for oil, cosmetics and nutritional purposes. In 2003 the cultivation ban on hemp that was implemented in the 1960's was lifted, and several hemp-lime houses have been built in Sweden. Building with hemp shiv has many beneficial implications for the building sector in terms of a low environmental impact and good resource efficiency, when building with a renewable resource that is an agricultural residue.

Methods and Data. We have performed research on hemp-lime for additionally insulating historical buildings, while maintaining heritage values. We have also studied the hygrothermal properties of hemp-lime for new builds, exploring amongst others the performance of hemp-lime walls when exposed to high rain loads or salt-contaminated walls, and studying moisture fixation and moisture transport properties of hemp-lime.

Findings. Building with hemp shiv has many beneficial implications for the building sector as it combines low environmental impact and resource efficiency with unique hygrothermal properties. Hemp-lime works very well for additionally insulating historical buildings and can also be used for new buildings.

Societal implications. Bio-based building materials such as hemp are important accelerators of the environmental paradigm shift in construction, contributing to creating a circular building sector.

KEYWORDS: agriculture, bio-based, hemp-lime, historic buildings, hygrothermal properties.

BRIDGING THE GAP BETWEEN MATERIAL RECOGNITION AND REUSABILITY POTENTIAL: A LITERATURE REVIEW FOR CIRCULAR CONSTRUCTION

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ABSTRACT

Background and aim. Preventing demolition and renovation waste from reaching landfills requires greater awareness within the architectural industry of building materials available for reclamation. Researchers are developing machine learning methods to automatically identify building materials for this purpose; however, current research on material recognition methods does not align with studies identifying materials with high reusability potential. Methods that detect various materials do not guarantee they can easily be adapted to those materials most desirable for reclamation. This study aims to compare these two groups of articles to reconcile their overlaps and gaps.

Methods and Data. Insight into this topic will be uncovered through a literature review of two sets of studies: research that recognizes building materials for circular construction and research that identifies materials with high reusability potential.

Findings. This literature review uncovers the following results: materials with high reusability potential that lack recognition precedents, materials easily detectable with current methods, and materials with high reusability potential that might be recognized with existing methods. An in-depth discussion is presented explaining why methods that can easily recognize some building materials might not transfer to high reusability potential materials.

Theoretical / Practical / Societal implications. The findings from this study will enhance awareness for both researchers focused on material reusability and those developing recognition methods for circular construction, enabling each group to better target the materials relevant to their work.

KEYWORDS: “building material reclamation”, “circular construction”, “literature review”, “reusability potential”

VACANT SPACE IN SMALLER SWEDISH MUNICIPALITIES – INVENTORY AND NEW SPACE USE CONCEPTS

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ABSTRACT

Background and aim. The pandemic accelerated green and digital transition may benefit smaller towns. New opportunities include multi-locational living and working, emerging industries, and novel services to attract creative industries. All these developments entail more freedom for people to choose their place of living. Meanwhile, the real estate sector is in dire need of novel space use concepts and associated business models, to tackle rising vacancy rates. Yet, the potential of the green and digital twin transition to revitalize rural areas remains somewhat unexplored. Our aim is to identify vacant spaces suitable for matching with different types of new uses.

Methods and Data. We first identify vacant spaces in selected smaller Swedish municipalities. The inventory includes an initial, desktop evaluation of whether the space is suitable for new types of creative and collaborative uses. Jointly with international experts and case municipalities, we will engage in co-creative workshops to ideate new uses for the spaces.

Findings. The findings comprise an inventory of vacant spaces in case municipalities, as well as ideas for potential new uses. The new uses are presented in the form of the Business Model Canvas, which allows developing the concepts into business models for wider use.

Practical / Societal implications. Both municipal officials and private real estate owners may find the developed concepts useful in their work. Implementing the concepts have the potential to revitalize smaller towns.

KEYWORDS: business models, co-creation, rural, space optimization, vacancy

THE FUTURE OF RESHARING PRACTICES IN NORWEGIAN NEIGHBORHOODS: PERSPECTIVES FROM RESIDENTS AND STAKEHOLDERS

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ABSTRACT

Background and aim. This paper presents findings from a series of workshops conducted in Oslo's city region and explores the framing of 'resharing' through residents' and practitioners' framing of future sharing practices, needs and imageries for this city region. We define Resharing as a set of practices where spatial- and mobility-sharing practices are integrated and a vital part of an area.

Methods and Data. Data presented in this study was gathered from four workshops conducted in 2023, three of which were conducted with the residents, while one was undertaken with the mobility providers of Oslo city region.

Findings. What emerges is a picture of the gaps present at the core of the region's strategies for shared use. It is being discussed in rather narrow terms and remains disjointed from the mainstream agendas in urban and transport planning. Circular principles, spatial and mobility strategies remain separate domains. Findings reveal that residents' preferences for 'bounded sharing', 'car-free living', 'trust', 'guidelines for sharing practices' etc. are missing in strategies targeting circularity and business models.

Theoretical / Practical / Societal implications. We build on the theoretical foundations available on Sharing and Social Practice Theory. The paper discusses some future ReSharing practices and concludes by proposing a set of strategies for urban resharing, such as – (i) demarcation of units for sharing (ii) guidelines to control access to core sharing groups (iii) delineation of responsibilities for maintenance of shared spaces and shared mobility (iv) modalities to access via both digital and non-digital interfaces and information on different aspects of resharing (v) state's role in carving out affordable strategies.

KEYWORDS: Oslo City region, Shared spaces, Shared mobility, Social practices, circular planning.

ENHANCED MATERIAL INTENSITIES CONSIDERING BUILDING-SPECIFIC CHARACTERISTICS

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ABSTRACT

Background and aim. Understanding the material composition of national building stocks is vital for promoting sustainable transformations and renovations through urban mining and material reuse.

However, current methods for estimating materials in building stocks, such as Material Intensities, tend to oversimplify buildings' complexity and dynamic nature by overseeing their specific context, construction methods, and building regulations that influenced the buildings. This study aims to investigate how material use in buildings is influenced by various criteria.

Methods and data. We classify Norwegian wooden detached dwellings into representative types using building codes, historical literature and cadaster data. The cadaster data was accessed through a Geographic Information System's interface. We also used a national building energy register containing information about the primary structural materials of buildings.

Findings. Our investigation resulted in nine different cohorts (age groups) of buildings, defined by their width, number of floors, and proximity to other buildings. Based on these criteria, we determined the dimensions of structural components for exterior walls and roofs for different building and construction types. The results were validated for sample buildings by examining architectural drawings from local authorities

Practical and societal implications. This method enables a more accurate estimation of Material Intensities in Norwegian wooden detached dwellings by accounting for building-specific characteristics. The results can be scaled nationally by leveraging GIS data, providing valuable insights for sustainable urban planning, material reuse, and circular economy initiatives.

KEYWORDS: Material Intensity, Building Stock, Detached Wooden Dwellings, GIS

CIRCULAR DESIGN STRATEGIES AS DRIVER FOR BROADER SUSTAINABLE TRANSITION IN HOUSING RENOVATIONS

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ABSTRACT

Background and aim. The European building sector should prioritise transforming existing buildings, as most will still be in use by 2050. Without significant interventions, these buildings will underperform. So far, renovations have predominantly focused on energy performance, neglecting the environmental impact of materials.

The aim of this research is to assess the potential for circular renovation in the housing sector. First, the main challenges in renovation projects and design strategies used to mitigate these will be examined. Second, existing frameworks for circular design will be evaluated, and state-of-the-art approaches for circular housing renovation will be identified. Third, design strategies applied to address societal challenges, including climate change, biodiversity decline and changing housing needs, will be analysed to identify synergies for housing renovations.

Methods and Data. A review of academic and grey literature on housing renovation, circular design and circular housing renovations.

Findings. Both renovation and circular design strategies are complex, with circular renovation underexplored and often ineffective in addressing societal challenges. Integrated approaches are essential to bridge the gap between academic literature and architectural practice. Renovations are costly and material intensive; therefore, one design solution should not preclude another. Current approaches often fail to address broader societal challenges, underscoring the necessity for a holistic approach to housing renovation, driven by circularity.

Theoretical / Practical / Societal implications. This research focuses on circular renovations, an underexplored area compared to new construction. The societal relevance lies in its comprehensive design strategies, aiming to not only focus on circularity but also enhance comfort, reduce resource consumption, mitigate climate change, restore biodiversity and create adaptive homes to meet our current requirements of living.

KEYWORDS: Circular Economy, Design Strategies, Housing, Renovation, Review

ENVIRONMENTAL IMPACT ASSESSMENT OF REUSING POST-CONSUMER TIMBER IN A NEW FAÇADE, A CASE-STUDY

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ABSTRACT

Background and aim. Most of the wood collected at demolition sites in Sweden is incinerated in heating plants. We study prolonging the life of post-consumer wood in the project FÅTT (Refinement of reused wood through technology development). This study's aim is to calculate and discuss challenges of environmental impact analysis when repurposing post-consumer timber into a façade.

Methods and Data. The "diverted" circular scenarios are compared with the "Business-as-usual" (linear, directly to incineration). The circular scenarios comprise: collection of material from demolition and manufacturing side-streams, sorting, transports, screening of characteristics, registering size and defects in a database, deciding the new sizes, removing nails (or not) and processing into façade components. Quantitative and qualitative data is collected for scenarios at lab-scale and at industrial scale to model the new process-chain in order to compare their impacts using Life Cycle Analysis as method.

Findings. Defining system boundaries has a major influence on the final result. A lower impact of land use and land use change and refining being less intensive than obtaining a new wood product indicate that the cascading scenarios should be favoured. Nevertheless, a sensitivity study on transports shows that the effect on climate is influenced by the distances between components in the supply chain and thus play a decisive role in assessing whether cascading is a scenario with less climate impact.

Theoretical / Practical / Societal implications. Our study demonstrates that a repurposing route for recovered wood can be implemented at industrial scale. It also detects hotspots and discuss how the circular scenario can be beneficial for the environment and society in Sweden.

KEYWORDS: Reuse, timber, facade, environmental impact, deconstruction

PUBLIC BUYERS' PERCEPTIONS AND EXPERIENCE WITH RECYCLED MATERIAL IN CONSTRUCTION

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ABSTRACT

Background and aim. Circularity of construction material can counteract the large resource, waste, and carbon footprint of the buildings sector; but circular products are not widely used at present. The public sector can exert an influence on the building sector as it involves a large volume of material purchase and has the potential to set examples. We set out to gauge if local governments have used recycled construction materials and if they plan to do so in the future. We were interested in factors that can influence them include recycled materials in their tender process.

Methods and Data. We collected quantitative and qualitative data by surveying 104, i.e. around one-third of the municipalities, via phone interviews. An ordinal probit regression model was run to explain which kind of municipalities are likely to use recycled construction material in the future.

Findings. The survey revealed that a large majority of municipalities had none or little previous experience of using recycled construction materials; However, a large majority showed high likelihood of using such material in the next five years. We found that future likelihood of use was positively influenced by size of municipality, an increasing population trend and prior positive experiences. Top enablers for including recycled material in the tender process included economic influences, alongside infrastructure improvements. Municipalities did not consider regulation enablers and pressures from stakeholders to be important factors.

Theoretical / Practical / Societal implications. Study findings can aid policymakers to develop public procurement guidelines that convince local authorities to include circular practices in their tender process.

KEYWORDS: Built environment; Circular economy; Public procurement; Reuse; Tender process.