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Regenerating Habitats. A Housing Based on Modular Wooden Systems

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Abstract : Despite the ambitions to achieve climate neutrality by 2050, to fulfill the Paris Agreement's goals, the building and construction sector remains one of the most resource-intensive and greenhouse gas-emitting industries in the world, accounting for 40% of worldwide CO_2 emissions. Over the past few decades, globalization and population growth have led to an exponential rise in demand in the housing market and, by extension, in the building industry. Considering this housing crisis, it is obvious that we will not stop building in the near future. However, the transition, which has already started, is challenging and complex because it calls for the worldwide participation of numerous organizations in altering how building systems, which have been a part of our everyday existence for over a century, are used. Wood is one of the alternatives that is most frequently used nowadays (under responsible forestry conditions) because of its physical qualities and, most importantly, because it produces fewer carbon emissions during manufacturing than steel or concrete. Furthermore, as wood retains its capacity to store CO_2 after application and throughout the life of the building, working as a natural carbon filter, it helps to reduce greenhouse gas emissions. After a century-long focus on other materials, in the last few decades, technological advancements have made it possible to innovate systems centered around the use of wood. However, there are still some questions that require further exploration. It is necessary to standardize production and manufacturing processes based on prefabrication and modularization principles to achieve greater precision and optimization of the solutions, decreasing building time, prices, and waste from raw materials. In addition, this approach will make it possible to develop new architectural solutions to solve the rigidity and irreversibility of buildings, two of the most important issues facing housing today. Most current models are still created as inflexible, fixed, monofunctional structures that discourage any kind of regeneration, based on matrices that sustain the conventional family's traditional model and are founded on rigid, impenetrable compartmentalization. Adaptability and flexibility in housing are, and always have been, necessities and key components of architecture. People today need to constantly adapt to their surroundings and themselves because of the fast-paced, disposable, and quickly obsolescent nature of modern items. Migrations on a global scale, different kinds of co-housing, or even personal changes are some of the new questions that buildings have to answer. Designing with the reversibility of construction systems and materials in mind not only allows for the concept of "looping" in construction, with environmental advantages that enable the development of a circular economy in the sector but also unleashes multiple social benefits. In this sense, it is imperative to develop prefabricated and modular construction systems able to address the formalization of a reversible proposition that adjusts to the scale of time and its multiple reformulations, many of which are unpredictable. We must allow buildings to change, grow, or shrink over their lifetime, respecting their nature and, finally, the nature of the people living in them. It´s the ability to anticipate the unexpected, adapt to social factors, and take account of demographic shifts in society to stabilize communities, the foundation of real innovative sustainability.

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