

Laying the Proto-Ontological Conditions for Floating Architecture as a Climate Adaptation Solution for Rising Sea Levels: Conceptual Framework and Definition of a Performance Based Design

Authors : L. Calcagni, A. Battisti, M. Hensel, D. S. Hensel

Abstract : Since the beginning of the 21st century, we have seen a dynamic growth of water-based (WB) architecture, mainly due to the increasing threat of floods caused by sea level rise and heavy rains, all correlated with climate change. At the same time, the shortage of land available for urban development also led architects, engineers, and policymakers to reclaim the seabed or to build floating structures. Furthermore, the drive to produce energy from renewable resources has expanded the sector of offshore research, mining, and energy industry which seeks new types of WB structures. In light of these considerations, the time is ripe to consider floating architecture as a full-fledged building typology. Currently, there is no universally recognized academic definition of a floating building. Research on floating architecture lacks a proper, commonly shared vocabulary and typology distinction. Moreover, there is no global international legal framework for urban development on water, and there is no structured performance based building design (PBBB) approach for floating architecture in most countries, let alone national regulatory systems. Thus, first of all, the research intends to overcome the semantic and typological issues through the conceptualization of floating architecture, laying the proto-ontological conditions for floating development, and secondly to identify the parameters to be considered in the definition of a specific PBBB framework, setting the scene for national planning strategies. The theoretical overview and re-semanticization process involve the attribution of a new meaning to the term floating architecture. This terminological work of semantic redetermination is carried out through a systematic literature review and involves quantitative and historical research as well as logical argumentation methods. As it is expected that floating urban development is most likely to take place as an extension of coastal areas, the needs and design criteria are definitely more similar to those of the urban environment than to those of the offshore industry. Therefore, the identification and categorization of parameters -looking towards the potential formation of a PBBB framework for floating development- takes the urban and architectural guidelines and regulations as the starting point, taking the missing aspects, such as hydrodynamics (i.e. stability and buoyancy) from the offshore and shipping regulatory frameworks. This study is carried out through an evidence-based assessment of regulatory systems that are effective in different countries around the world, addressing on-land and on-water architecture as well as offshore and shipping industries. It involves evidence-based research and logical argumentation methods. Overall, inhabiting water is proposed not only as a viable response to the problem of rising sea levels, thus as a resilient frontier for urban development, but also as a response to energy insecurity, clean water, and food shortages, environmental concerns, and urbanization, in line with Blue Economy principles and the Agenda 2030. This review shows how floating architecture is to all intents and purposes, an urban adaptation measure and a solution towards self-sufficiency and energy-saving objectives. Moreover, the adopted methodology is, to all extents, open to further improvements and integrations, thus not rigid and already completely determined. Along with new designs and functions that will come into play in the practice field, eventually, life on water will seem no more unusual than life on land, especially by virtue of the multiple advantages it provides not only to users but also to the environment.

Keywords : adaptation measures, building typology, floating architecture, performance based building design, rising sea levels

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