

Streszczenie rozprawy doktorskiej w języku angielskim

This doctoral dissertation addresses the issues of designing and transforming degraded waterfront areas within the structure of contemporary cities. In the face of global climate change and progressive urbanization, the revitalization of waterfront areas has become a key challenge for architecture and urban planning, requiring an integrated approach that combines aesthetics, functionality, and engineering safety while implementing the imperative of sustainable development.

The primary objective of the work was to develop comprehensive principles and methods for designing complex structures, that form part of the built environment located on urban waterfronts. The author focused on analyzing volumetric objects and non-volumetric spaces, identifying the unique challenges arising from their location in the direct vicinity of inland waters, along shorelines, and directly on the water. A key result of the research was the creation of an original typological classification based on location, divided into three types: building structures (type 1), shoreline and offshore objects (type 2), and floating objects (type 3).

A significant element of the dissertation was the analysis of the technical aspects of the resilience of structures to flood hazards. The work indicates the necessity of departing from the traditional dualism between architecture and urban planning in favor of a holistic "fusion of design scales," which allows for the harmonious integration of individual objects into the context of the urban waterfront tissue and their functional connection with the surroundings. In urban practice, "urban acupuncture" - the introduction of point-based, multi-functional interventions - becomes an effective tool for activating degraded fragments of the city. In this process, the concepts of "glocalization" and "smart regionalism" are also of key significance, as they allow for the reconciliation of global trends with local identity and heritage preservation, protecting the unique beauty of regions from homogenization. The research also highlights the specific role of local urban centers on waterfront areas, which fulfill significant social, cognitive, and cultural functions, and emerge from both top-down planning and bottom-up initiatives.

The dissertation also considers the technological perspective, pointing to the progressive automation of design processes, in the era of artificial intelligence and advanced computer software, it is essential to conduct research based on in situ data, which expand databases and create analytical patterns that cannot be fully replaced by algorithms alone.

Furthermore, the thesis confirms the inseparable link between a building and its surroundings and context, demonstrating that the effectiveness of contemporary revitalization processes for degraded waterfront areas depends directly on a project's ability to create coherent and fluid relations at the land-water interface.

The research questions posed in the study were also addressed, revealing that the relationships between the urban built environment and inland waters are multidimensional and determined by a complex synergy of historical, socio-economic, and physical-natural factors. These factors collectively shape building morphology, technological requirements for water hazard protection, and the dynamics of land-water urban processes. To improve the quality of the urban built environment on degraded waterfront areas, an integrated approach must be applied, combining forms of natural environment restoration - such as renaturation or reclamation - with forms of built environment restoration, including the revitalization, rehabilitation, reconstruction, or expansion of objects. These should be implemented within broad and coherent plans that consider heritage protection, sustainable development principles, and technical safeguards against water hazards. Favorable solutions for connecting land and water areas include applying sustainable design principles and brownfield redevelopment concepts, introducing elements of biophilia and hydrophilia, creating diverse infrastructural

forms such as piers and attractors adapted to functions and nature conservation, replacing impermeable surfaces with biologically active areas, and introducing greenery and water to improve resident well-being and ecosystem protection. The waterfront location context influences building forms through their orientation toward the open water surface and aesthetic inspirations related to water motifs - it influences function by making it dependent on the character of a given city (e.g., tourist, historical, or administrative) - and it influences construction through the necessity of using specialized non-standard foundations, floating structures, or materials with specific properties.

The conclusion of the work is the provision of reliable scientific recommendations in the form of a compendium of design knowledge, which fills the identified research gap. It can serve as a tool for architects and urban planners, facilitating the conscious creation of a built environment that harmoniously integrates social needs with technical capabilities and environmental protection requirements within the urban landscape.

Key words: urban waterside buildings, urban waterfront, hydrophilic architecture, urban acupuncture, architectural benchmarking, inland water ecosystem services, water-based city brand, sustainable development, degraded urban areas, revitalization