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Urban Rehabilitation Assessment: Buildings' Integrity and Embodied Energy

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Abstract : Transition to a low carbon economy requires changes in consumption and production patterns, including the improvement of existing buildings' environmental performance. Urban rehabilitation is a top policy priority in Europe, creating an opportunity to increase this performance. However, urban rehabilitation comprises different typologies of interventions with distinct levels of consideration for cultural urban heritage values and for environmental values, thus with different impacts. Cities rely on both material and non-material forms of heritage that are deep-rooted and resilient. One of the most relevant parts of that urban heritage is the historical pre-industrial housing stock, with an extensive presence in many European cities, as Lisbon. This stock is rehabilitated and transformed at the framework of urban management and local governance traditions, as well as the framework of the global economy, and in that context, faces opportunities and threats that need evaluation and control. The scope of this article is to define methodological bases and research lines for the assessment of impacts that urban rehabilitation initiatives set on the vulnerable and historical pre-industrial urban housing stock, considering it as an environmental and cultural unreplaceable material value and resource. As a framework, this article reviews the concepts of urban regeneration, urban renewal, current buildings conservation and refurbishment, and energy refurbishment of buildings, seeking to define key typologies of urban rehabilitation that represent different approaches to the urban fabric, in terms of scope, actors, and priorities. Moreover, main types of interventions - basing on a case-study in a XVIII century neighborhood in Lisbon - are defined and analyzed in terms of the elements lost in each type of intervention, and relating those to urbanistic, architectonic and constructive values of urban heritage, as well as to environmental and energy efficiency. Further, the article overviews environmental cultural heritage assessment and life-cycle assessment tools, selecting relevant and feasible impact assessment criteria for urban buildings rehabilitation regulation, focusing on multi-level urban heritage integrity. Urbanistic, architectonic, constructive and energetic integrity are studied as criteria for impact assessment and specific indicators are proposed. The role of these criteria in sustainable urban management is discussed. Throughout this article, the key challenges for urban rehabilitation planning and management, concerning urban built heritage as a resource for sustainability, are discussed and clarified.

Keywords : urban rehabilitation, impact assessment criteria, buildings integrity, embodied energy
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