

Lessons from Vernacular Architecture for Lightweight Construction

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Abstract : With the gravity load reduction in the structural and non-structural components, the lightweight construction will be achieved as well as the improvement of efficiency and functional specifications. The advantages of lightweight construction can be examined in two levels. The first is the mass reduction of load bearing structure which results in increasing internal useful space and the other one is the mass reduction of building which decreases the effects of seismic load as a result. In order to achieve this goal, the essential building materials specifications and also optimum load bearing geometry of structural systems and elements have to be considered, so lightweight materials selection particularly with lightweight aggregate for building components will be the first step of lightweight construction. In the next step, in addition to selecting the prominent samples of Iran's traditional architecture, the process of these works improvement is analyzed through the viewpoints of structural efficiency and lightweighting and also the practical methods of lightweight construction have been extracted. The optimum design of load bearing geometry of structural system has to be considered not only in the structural system elements, but also in their composition and the selection of dimensions, proportions, forms and optimum orientations, can lead to get a maximum materials efficiency for loads and stresses bearing.

Keywords : gravity load, light-weighting structural system, load bearing geometry, seismic behavior

Conference Title : ICBAU 2015 : International Conference on Building, Architecture and Urbanism

Conference Location : Paris, France

Conference Dates : April 27-28, 2015