

Title Appropriate Structural System Selection for Buildings in Afghanistan

Year 2014

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Abstract

There are various systems in building envelope, such as structural, electrical, plumbing, mechanical safety, fire and etc. Among all of them structural systems governs the overall characteristics of the building. Structural system of building includes Lateral Load Resisting System L-LRS and Gravity Load Resisting System G-LRS which system is affected by lateral load and gravity load respectively. This thesis is conducted to select and propose appropriate structural system for mid-rise building in conceptual design phase, the selection analysis process were done in three stages. Stage one is based on the limitation and constraints in the use of various structural system in Afghanistan. Forty-two questionnaire surveys were conducted to find-out the limitation and constraints to different criteria of the structural system all over the Afghanistan. Stage two evaluates the limitation and constraints to selected appropriate structural system. Several requirements, criteria and sub criteria of floor systems, lateral load resisting systems and foundation were identified. These features and expert knowledge were combined to get appropriate weights and score for the criteria of system. The approach for suitable structural system by Analytical Hierarchy Process was proposed. Case studies of Hamayoon Residential Tower were conducted in six zones to have clear concept about the system selection process and also to verify the proposed model developed by using Analytical Hierarchy Process in Microsoft Excel. Different scenarios were created by case study between all six cases with different structural properties. Scenario analysis did comparative study of results of all the buildings. Stage three is the review of the current status of various structural systems for building, fourteen interviews were conducted and converted to structure (text based) format to know the current status in the use of various structural system in Afghanistan..

Keywords Structural System, Limitation and Constraints, Selection of Structural System, Analytical Hierarchy Process, Current Status of Various structural systems