

A Structure-Based Approach for Adaptable Building System

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Abstract : Existing buildings are permanently subjected to change, continuously renovated and repaired in their long service life. Old buildings are destroyed and their material and components are recycled or reused for constructing new ones. In this process, importance of sustainability principles for building construction is obviously known and great significance must be attached to consumption of resources, resulting effects on the environment and economic costs. Utilization strategies for extending buildings service life and delay in destroying have positive effect on environment protection. In addition, simpler alterability or expandability of buildings' structures and reducing energy and natural resources consumption have benefits for users, producers and environment. To solve these problems, by applying theories of open building, structural components of some conventional building systems have been analyzed and then, a new geometry adaptive building system is developed which can transform and support different imposed loads. In order to achieve this goal, various research methods and tools such as professional and scientific literatures review, comparative analysis, case study and computer simulation were applied and data interpretation was implemented using descriptive statistics and logical arguments. Therefore, hypothesis and proposed strategies were evaluated and an adaptable and reusable 2-dimensional building system was presented which can respond appropriately to dwellers and end-users needs and provide reusability of structural components of building system in new construction or function. Investigations showed that this incremental building system can be successfully applied in achieving the architectural design objectives and by small modifications on components and joints, it is easy to obtain different and adaptable load-optimized component alternatives for flexible spaces.

Keywords : adaptability, durability, open building, service life, structural building system

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