



Architecture and Engineering Development Optimise Construction Projects

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Introduction

No separation between the fields of Architecture and Engineering existed until the mid-eighteenth century, which emerged with establishment of engineering schools. Since then, the relationship between these two professions has evolved from their complete separation in the nineteenth century to the intense collaboration of today. Interaction between the professions can be characterised by three forms: separate activity, interpenetration of both fields, and close collaboration [1]. During the entire process of building project development, an architect seems to be in a position similar to an orchestra conductor and composer. In times of urgency and war, engineering becomes predominant; while in times of peace, plenty, luxury, and affluence architecture comes to the fore. As generic knowledge in engineering is not sufficient for architects to undertake structural calculations, the expertise of engineers becomes indispensable [2]. Even an annual course on building structures is insufficient for an architect to design the structure of even a small building. If architects were to work without engineers, erroneous and unsound results could follow. Furthermore, engineers make a considerable input into modern construction in terms of finance and technology [3]. As buildings become more complex, the technical part of the design has devolved more and more upon the multidiscipline engineers. Even if architectural solutions suggested by engineers were utilitarian and/or ugly, people would still live in durable, safe and healthy buildings. Over the period of 200 years, construction professionals, differing only in title and performing the same services, eventually began to perform different services in the same project [4]. Services of engineers and architects participating in projects ranged from 'minimal architectural advice whatsoever', through to architect as an artist with the engineer as a helpmate or servant. Both professions have a number of things in common, and a number of common courses in their study programmes. In some designs, the structure of a building is the main aesthetical accent, often termed 'structural art' [5]. There are architects who have good capacities in structural engineering and engineers who have good knowledge of architecture. There have been or are professionals that graduated from one, both, or integrated programmes, who acted or are still acting both as architect and engineer, ignoring professional demarcations and blurring the professional borders. In the collaboration and search for a successful design, the disciplines have actually merged into one another [6]. Both professionals are essential for modern construction projects. All possible factors functional needs of clients, regulatory impacts, technological advances, the use of new materials, innovations in methods and techniques, computerisation of design and construction and so on promote a more intense dialogue and collaboration to bring the two professions closer together [7]. An architect and an engineer need each other in order to develop something that neither could produce alone. Similar to the mediaeval master builder role, it is proposed that architectural and structural engineering responsibilities should no longer be strictly separated, but rather collaboratively integrated. The division between the Architecture and Engineering that took place in the nineteenth century has proved to be wrong for the design and construction process [8]. The lack of

intense collaboration hinders the development of advanced structural and technological construction projects. Architectural engineering is a profession that focuses on close interaction between architecture and engineering throughout the building development process [9]. Failure to ensure intense collaboration between the professions and resolve tasks in an integrated way may result in a danger that a number of tools would remain unused. The design of a structure is an output of architectural tasks, the structural system of a building, selection and calculations of the structural model, its engineering systems, technical and economic efficiency. The essence of architectural and engineering design is the search for an optimal structural solution based on architectural function [10]. The training of Architecture and Engineering professional's helps to diminish the increasing gap between Architecture and Engineering, and guarantees better quality of construction projects. An AE professional, both an architect and engineer, is obliged to act as the leader of a project team due to the greatest possessed knowledge necessary to perceive and produce architectural and engineering design.

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Conflict of Interest

None

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