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Pre-Cast Concrete, a Key Option for the Reconstruction Phase after War

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Abstract

These days Syria is concerned in the development of integrated strategy, starting with a provision of regional, structural and organizational planning for the affected areas, followed by the architectural and construction and environmental studies, etc. This strategy is achieved through the preparation of detailed plans and programs necessary for the implementation of public and private projects that achieve the objective of development and reconstruction. This study includes a range of plans that must overlap and integrates with each other to produce reconstruction operations. Work team must be involved in the implementation of these plans. The work team composed of officials and experts, technicians and consultants, and bound together through a flexible structure consisted of a group of sub-committees that are related to a higher body for reconstruction. In the stage of the housing plan, researches were done in order to assess the reality of the construction of buildings in Syria, and compared with the concepts and the construction industry characteristics (IBS), and determine the Syrian experiment site regarding to these concepts, as well as evaluating the factors affecting this industry, and proposals to apply it in reconstruction stage. Cast-in-place concrete in the case of the reinforced walls, got 13.1%, while in the case of the framework structure was 34%, and templates tunnelling was 64%, composite order (pre-cast and Cast-in-place concrete) was 61%, composite order (concrete and metallic) was 67.25% , and the pre-cast concrete was from 82% up to 86%. The questionnaire also shows that the trend towards a modern building industry faces significant challenges in spite of its inevitability as a strategic decision in finding solutions to the problems of housing and reconstruction. The research arranged the priority use of technical systems in construction in Syria, using the method of AHP. The advanced technology system (pre-cast concrete) had the first place with 39.4%.

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1. Introduction

Construction industry forms an evolutionary orientation for construction sector, which is considered one of the important economic sectors, in terms of its role in the formation of fixed capital and gross national product, and the magnitude of its employees [1]. The world has seen a significant expansion in the field of building and construction in the aspects of technology and productivity, but this industry is currently facing unprecedented developmental pressures in our country as a result of the lack of resources and the rising prices of raw material and the instability of environmental factors surrounding it. This is what prompts us to think about the system to frame the industry in order to evaluate it and make advancement towards the best, in order to achieve the requirements of sustainable development. The advancement of the construction sector towards the foundations of the construction industry requires the use of developed technological and administrative systems, compatible and in harmony with the architectural and constructional and technical systems for buildings so that they can get the product within sophisticated modern standards. Therefore, due to the magnitude of the housing crisis and the deficit in securing the required modules, speed factor becomes an urgent need [2].

2. Research methodology:

- Review of previous studies about the construction industry and modern techniques used.
- Assessment of the reality of the Syrian construction experience and measurement of the IBS degree for the Syrian construction projects.
- Using a questionnaire to find out the most important factors affecting the construction industry and the extent of the current application and the importance of development in the future and analysing the results of the questionnaire using the SPSS program.
- Determination of the priority to choose one of the technical systems used for construction in Syria using the Expert Choice program.

3. Previous studies:

The terminology used in the construction industry could hardly be defined, and definitions rely heavily on user experience and the amount of understand, which vary from one country to another, but also there are several definitions developed by some researchers in this field, defined [8] IBS as the components' manufacturing, assembling, transporting, and placement construction using minimum additional work possible inside or outside the site. While the Construction Industry Development Board (CIDB) in Malaysia defined IBS as a building system where components being manufactured in the factory or off-site, then developed and assembled into a structure with a minimum of extra work at the site [10]. [14] Defined the IBS as an integrated manufacturing and building process, organized and planned well to achieve efficiency in the management, setup and control of resources used and support the activities and results using sophisticated components. There are different classifications of IBS according to [4] depends on: materials, processes and systems. It is important to develop a clear vision for different types of construction systems and modern techniques used that contribute to get the IBS and are an integral part of it. Generally, there are four types of building regulations in accordance with the Badir-Razali Building System Classification which are: traditional building systems, cast in place, pre-made, and composite [15]. Each of the construction systems is represented in accordance to their own construction methodology, and its advantages in additions in construction technology, and the engineering and functional composition [5] as shown in Figure 1.

The different templates systems offer a wide range of concrete construction solutions that can be selected to suit the required development needs [16]. In Syria reconstruction requirements impose significant challenges on this sector, in terms of the need for the introduction of modern technology systems and following the designing solutions and management decisions that fit these challenges in addition to the production of buildings within time and economic constraints.

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