

Implementation of IPD in the Middle East and Its Challenges

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Abstract

The traditional delivery approach in construction has proven to contain many flaws which have become more apparent with the increasing level of project complexity. Integrated Project Delivery (IPD) was therefore initiated as a response to the deficiencies encountered in the traditional approach. Although it is being increasingly adopted in the United States and other parts of the world, its application in the Middle East has not commenced yet. Despite the numerous advantages this new method provides, no sign of IPD implementation can be detected in the region today. After taking a close look at various published works and conducting field surveys, the paper analyses the cultural aspects found in the Middle East which inhibit the application of IPD. We hope that the findings of this study will be used as a foundation for possible future studies that will encourage the construction industry in the Middle East to adapt IPD or other collaborative delivery methods.

Keywords: IPD, FEDIC's RED BOOK, Implementation culture, Middle East

Lessons Learned in Project Execution in Iraq¹

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Abstract

Export of engineering services from Iran to Iraq has a large share (about 70%) in total export of Iran engineering services, and great potential of engineering services export from Iran to Iraq (approximately 10B\$) demonstrates necessity of study of experiences and lessons learned belong to Iranian companies in order to empower and activate these potentials. Boland Payeh Co. as a general contractor has a 5-year experience in engineering and construction projects in Iraq. In this period, diversity of projects, communicating with different stakeholders, working in a wide geographical range and dealing with various problems in Iraq, led Boland Payeh to gain valuable experiences. In this study after a brief introduction of projects awarded to BP in Iraq, experiences and lessons learned are stated in 5 areas of “Management”, “Engineering”, “Procurement”, “Construction” and “Finance”.

Keywords: Engineering Services Export, Iraq, EPC Contractor, Boland Payeh Co.

¹ Lecture by Arash Sadeghi at 10th International Conference on Project Management, February 15th and 16th, 2015, Razi International Conference Hall

A Review of Preparing Delays Report in EPCF Projects - Case Study: Design, Construction, Procurement and Finance Project of Tehran Metro (Parts of Line 3, 4 and 6)

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Abstract

One of important challenges for project managers is optimizing project triangle of cost-quality-time and specially time management of a project. Significance of this topic is more obvious in EPCF projects where processes of absorption and distribution of financial resources are added to project performance cycle. Lack of sufficient knowledge of time management topic and improper definition for impacts of fulfilling obligations on implementation of services would cause to incorrect definition for procedure of absorption and distribution of financial resources and implementation of services and subsequently achievement of project triangle (cost-quality-time) would be considerably inaccessible.

This case study examines updating process for time baseline of sale contract titled “sale of real estate and construction license for station complexes and disbursement of municipal tolls in station complexes” in 5 steps during implementation of services for this sale contract that are design, construction, procurement and finance project of Tehran Metro (some parts of Line 3, 4 and 6). Thus each party of the contract, including Tehran Metro Co. and Mehregan - Boland Payeh Consortium, in different periods of time, play managerial role in updating time baseline of the sale contract. The most important achievement of this case study is identifying considerable impact of definition for updating comprehensive model of sale contract time baseline (delays report) on barter performance and subsequently performance management of various service areas (design, construction, procurement and finance attached to sale contract).

Keywords: Sale Contract, Barter, Finance, Delays Report, EPCF Project

Review of Concrete Design Mix and Construction Method for Exposed Concrete in Atlas Plaza Project (Eastern Part)¹

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Abstract

This study examines technical considerations related to concrete mix design and construction of specific and exposed concrete applied in Atlas Plaza Project by Boland Payeh Co. (as eastern part contractor). In designing concrete mix, required priorities, purposes and workability, are achieved by using contractor's experience and also laboratory trial and error. In Atlas Plaza Project, mix design of concrete is very important because of exposed concrete application in beams, columns, walls and ceilings. Regarding required compressive strength and environmental conditions of the project, concrete class is C25 for pile and is C30 for foundation, with maximum aggregate size of 19mm, maximum water-cement ratio of 0.45 and minimum slump of 17mm. concrete class for exposed concrete is C35, with maximum aggregate size of 19mm, maximum water-cement ratio of 0.4 and minimum slump of 21mm. Transportation of concrete to project site was very critical and carried out by using placing boom and pumping station. Considering required strength for concrete, massive concrete in foundation, high density of reinforcement in foundation and special conditions of exposed concrete, using of additives in concrete mix design was inevitable. By comparing performance of additives based on naphthalene and polycarboxilate, especially in exposed concrete, as well as chemical and physical compatibility of cement and additives, the preferred additive was selected. Due to the importance of water quality on concrete durability and strength, the tests for pH amount, insoluble material amount and chloride and sulphate amount in applied water were carried out periodically. Among the aggregate mine, after experimenting chemical and physical tests, "Metosak" and "Masseh Shoo" were selected as preferred options. Due to great amount of concrete and tight schedule of the project, two sets of batching plant were installed in project site at a lower level than ground level; and because of limited space for equipment movement in site, the materials are unloaded from the above with a concrete ramp into the deposit location. With implementing QA/QC procedures and curing of concrete in site by contractor laboratory, in addition to acquiring required strength, the concrete mix design was optimized several times.

Keywords: Concrete Mix Design, Exposed Concrete, Stone Powder, Mock-up, Atlas Plaza Project

¹ Paper of 7th National Conference on Concrete, October 7, 2015, Research Center of Housing and Urban Development

A Review of Technical and Safety Considerations in Construction Method of Concrete Cooling Tower Using Climbing Formwork

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Abstract

Most cooling towers used in power plants and other related industries, have hyperbolic geometry in their structures which require advanced construction methods in comparison to other conventional structures to fulfill this complex geometry. Application of climbing formworks is one of the important methods for construction of cooling towers. In climbing formworks, form panels and scaffold are connected to the concrete tower body and the system is raised concurrently to the development of concreting until the body of tower is completed. There is a great safety risk during operation of this system, which may cause problem in process of installation, climbing and position adjustment, and may lead to partial failure, collapse, falling objects from high heights, unexpected strike between parts and etc. In addition to these, considering the connection of climbing formwork to newly constructed part of concrete body, any acceleration of construction rate so that existing concrete can't reach required strength can impose a great safety risk to construction operation. Thus it is expected that construction method using climbing formwork is associated with high supervision and monitoring especially on safety aspects of operations. There are some accidents in which collapse of formwork and scaffold has resulted in collapse of tower structure which prove high safety risks of this method. Collapse of an under construction cooling tower at Willow Island West Virginia in April 1978 which was the worst construction accident in American history, and also collapsing of tower under construction at Shirvan power plant in North Khorasan Province in March 2015 are two examples of these accidents. In both of these accidents, lack of observance of technical and safety considerations resulted in fatalities. In this article after reviewing construction method using climbing formwork and its associated risks, details of these two accidents are studied and then construction method using slipform is compared to climbing formwork.

Keywords: Cooling Tower, Climbing Formwork, Construction Method, Safety, Inadequate Concrete Strength

Investigating Effects of the Curing Method on the Compressive Strength of Geopolymer Concrete

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Abstract

Geopolymer concrete is a new material produced without conventional cement- known as Portland Cement- but making use of aluminous-silicate wastes as the binder. Due to its superior mechanical properties, different types of geopolymer concretes have been comprehensively studied on the ground of new construction materials. This study evaluates effects of the curing methods on the geopolymer concrete's comprehensive strength in order to pave a path to its future usage as a green concrete. As an aluminous-silicate material ground slag and low lime fly ash were treated with an alkali solution- water glass + caustic soda- to produce geopolymer. Workability and comprehensive strength were measured parameters. The research findings include:

- Increasing curing temperature, increases comprehensive strength significantly
- Meaningful effect of providing additional curing moisture was not observed
- Increased slag in the mix design, reduces setting time
- In spite of its positive role in increasing comprehensive strength, increased temperature cannot be recommended for full-scale application due to increased energy costs

Keywords: Geopolymer Concrete, Slag, Fly Ash, Comprehensive Strength, Concrete Curing