

Study on Improvement the Performance of Construction Project Using Lean Principles

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Abstract : The productivity of the construction industry has faced numerous challenges, rising costs, and scarce resources over the past forty years; therefore, one approach for improving and enhancing the framework is the use of lean techniques. Lean method outcomes from the use of a brand-form of manufacturing control in production. At a time when sustainability and efficiency are essential, lean offers a clear path to make the construction industry fit for the future. An excessive number of construction professionals and experts have efficiently optimised development initiatives using lean construction (LC) techniques to reduce waste, maximise value creation, and focus on the process that creates real added value and continuous improvement, strengthening flexibility and adaptability. The present research has been undertaken to study the improvement in the performance of construction projects using lean principles. The study work is divided into three stages. Initially, a questionnaire survey was conducted on visual management techniques to improve the performance of the construction projects. The questionnaire was distributed to civil engineers, architects, site managers, project managers, and full-time executives, with nearly 100 questionnaires shared with respondents. A total of 83 responses were received to determine the reliability of the data, and analysis was done using SPSS software. In the second stage, the impact of value stream mapping on the real-time project is determined and its performance in the form of time and cost reduction is evaluated. The case study examines a bunker-building project located in Kabul Afghanistan; the project was planned conventionally without considering the lean concepts. To reduce overall kinds of waste in the project, a plan was developed using the Vico Control software to visualize the value stream of the project. Finally, the impact of value stream mapping on the project's total cash flow is evaluated and compared by plotting the total cash flow curve using Vico software. As a result, labour costs were reduced by 33%. The duration of the project was reduced by 17% reducing the duration of the project also improved the cash flow of the entire project by 14% and increased the cash flow from negative 67% to negative 44%.

Keywords : lean construction, cost and time overrun, value stream mapping, construction efficiency

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