A Decision Model for the Investment in Technology to Reduce Concrete Rework

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Abstract

Developments in technology allow for improved processes in construction. Often, project teams face the option of acquiring new technologies, but it is not clear if the expenses merit the benefits. This paper presents a method to choose technology that can reduce rework in structural concrete caused by poor construction quality. The technologies considered are identified as those that can be used to improve quality monitoring during construction. The scope of the investigation was limited to structural elements, such as beams, columns, slabs and concrete walls. The research questions for this study were as follows: (i) what are the causes that lead to poor construction quality of structural concrete; (ii) how can technology be used to improve the construction quality and how effective would it be and (iii) can a decision model be developed to assist a contractor to invest in such technology. A decision model was developed, based on risk and cost, to assist the user in the investment decision of acquiring technology to reduce rework. The approach applies to mega project and smaller projects alike, all to the benefit if improved processes.

Keywords: concrete rework, quality control, construction risk

1 Introduction and background

Developments in technology allow for improved processes in construction. Often, project teams face the option of acquiring new technologies, but it is not clear if the expenses merit the benefits. This problem applies to both mega projects and smaller projects.

The paper presents a model to decide if it is beneficial to acquire technology that can improve the quality control during construction of structural concrete elements such as beams, columns, slabs and reinforced concrete walls. The construction quality of structural concrete is often poor and leads to excessive rework, resulting in turn to additional cost and loss of construction progress. Various technology systems are available to assist a contractor in managing execution of the works. The proposed method helps with the decision to investment in the technology or not.

Transfer mechanisms, such as diffusion, absorption and permeability, lead to concrete deterioration. These mechanisms are catalysed by the poor construction of structural concrete [1]. Various barriers have been identified which prevent good quality of structural concrete. Smallwood [2]

https://doi.org/10.2749/nantes.2018.s3-53
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