



Assessment of Operability and Maintainability Success Factors in Provision of Extended Constructability Principles

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Abstract

The concept of constructability integrates individual construction functions and experiences through suitable and timely inputs into early stages of project planning and design. It aims to ease construction processes for a more effective and efficient achievement of overall project objectives. Similarly, the concepts of operability and maintainability integrate the functions and experiences of Operation and Maintenance (O&M) into project planning and design. Various studies suggested that these concepts have been implemented in isolation of each other and thus preventing optimum result in delivering infrastructure projects. This paper explores the integration of these three concepts in order to maximize the benefits of their implementation. It reviews the literature to identify the main O&M concerns, and assesses their association with constructability principles. This provides a structure to develop an extended constructability model that includes O&M concerns. It is anticipated that an extended constructability model that include O&M considerations can lead to a more efficient and effective delivery of infrastructure projects.

Keywords: Constructability, Operability, Maintainability, Infrastructure Projects, Success Factors

1. INTRODUCTION

Successful delivery of an infrastructure project requires project stakeholders' involvement in the whole project life cycle from planning, designing and constructing, as well as operating and maintaining. Constructability concept plays an important role in minimising construction related issues and problems; whilst different models have been proposed to optimize Operation and Maintenance (O&M) issues [1-6]. A well designed project should result in meeting all project stakeholders' needs during construction stage, as well as O&M stages [7]. Plockmeyer [8] suggested that it is more important for owners to conduct post-occupancy assessments into planning and design phases in order to increase effectiveness of their construction programs. However, current operability and maintainability models have not explicitly addressed and integrated all the issues during the O&M phases. To address the concerns of project stakeholders, there is a need to explore an integrated model that considers issues throughout the whole project life cycle. This paper aims to extend the concept of constructability and develop an integrated model that includes operability and maintainability. Following this introduction, this paper is organized in the following manner: Next section will examine the need to extend the constructability principles. This is followed by the identification of the O&M issues and development of a preliminary extended constructability model. These issues form the basis for the development of proposed extended constructability model that can be used in infrastructure projects.

2. CONSTRUCTABILITY PRINCIPLES: THE NEED FOR EXTENSION

Constructability/Buildability is a term widely used in many construction projects around the world. Various definitions have been given in the literature [e.g. see 9, 10-21]. Construction Industry Institute [22], the pioneer of this concept, defines it as "the optimum use of construction knowledge and experience in the conceptual planning, detailed engineering, procurement and field operations phases to achieve the overall project objectives".

Research has shown that improved constructability can lead to considerable savings in both cost and time, as well as significant improvements in quality and safety, which are the keys for successful delivery of the projects