

A FRAMEWORK FOR CONSTRUCTION REQUIREMENTS BASED PLANNING UTILIZING CONSTRAINTS LOGIC PROGRAMMING

David K.H. Chua¹ and K.W. Yeoh²

ABSTRACT

In the lean construction philosophy, the management of constraints is essential to reduce project delays. These constraints can be derived from construction requirements which define the characteristics of the construction project. This paper discusses the evolution and classification of requirements. Additionally, a framework to semantically map the construction requirements to schedule constraints called PDM++ is proposed, which models the schedule impact of such requirements. Finally, an analysis methodology is proposed to identify the criticality of constraints and construction requirements. This allows project managers to subsequently manage these critical requirements. An illustrative example is presented to demonstrate the usage of PDM++ and the proposed analysis methodology.

KEY WORDS

Construction requirements, constraints management, integrated planning and scheduling, computer-aided scheduling.

INTRODUCTION

In the lean construction philosophy, the management of constraints between activities is essential in pre-empting schedule variations and consequently reducing project delays. These constraints define the underlying “physics” of the construction project system, and the effective management of these constraints can lead to minimized variations at the project level (Howell 1999).

In general, these constraints are governed by the project’s requirements. Kamara et al (2000) differentiated project requirements into three main types: Client requirements, design requirements and finally, construction requirements. Client requirements refer to the business needs of the stakeholders in the project, while design requirements include the design specifications and the governing regulatory codes of practice. Construction requirements are described as the concerns and constraints that should be fulfilled for conducting procurement, construction and logistic processes (Song and Chua 2006). As such, construction requirements represent the information flow between processes, key resource interdependencies, product component sequences/interconnections, intermediate function requirements

¹ Associate Professor, Dept of Civil Engineering, National University of Singapore, 10 Kent Ridge Crescent, Singapore 119260, (65) 65162195, FAX (65) 67791635, cvedavid@nus.edu.sg

² Research Scholar, Dept of Civil Engineering, National University of Singapore, 10 Kent Ridge Crescent, Singapore 119260, (65) 65164643, FAX (65) 67791635, g0600355@nus.edu.sg