



Assessment of safety management information systems for general contractors

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Abstract

The purpose of this paper is to propose a methodology that evaluates safety management information systems (SMIS) for general contractors mainly in terms of managerial effectiveness. Characteristics and variables of safety management assessments were investigated first, and several assessment techniques were then developed. A single index system measuring safety management performance of projects is also proposed for practical application. The assessments of safety management tasks are performed by several different variables including measures, project lifecycle, organization, etc. The assessment result from a case-company shows that a limited number of safety tasks can effectively represent the overall safety performance of a project. Among these tasks, managing the “daily safety meeting minutes” through the information systems was found to be the most important task. Details and implications of a case are outlined.

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1. Introduction

Safety is a critical measure for successful construction projects, and general contractors are vigorously utilizing safety management information systems (SMIS) to effectively

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improve their safety performance. However, there has been no systematic and quantitative effort to evaluate comprehensive appropriateness of SMIS for construction organizations. In this context, the purpose of this paper is to propose a methodology that evaluates SMIS for general contractors mainly in terms of managerial effectiveness. This paper consists of two phases where the first part is a development of the methodology and the second part is a test of this methodology by using a case-company.

Characteristics and variables of safety management assessments were investigated first in this paper. The major variables for evaluating safety control tasks include the ‘importance within a safety management procedure’, ‘importance as a consequential impact’, ‘frequency of occurrence’, ‘user satisfaction’ and so forth. Several assessment techniques using a set of questionnaires and a series of workshops were developed. A single index system measuring safety management performance of construction projects was also proposed for practical application.

By applying the proposed methodology to a case-company, the safety management tasks were classified and listed under a hierarchy, and each task was evaluated based on the pre-defined variables. ‘As-is’ as well as ‘to-be’ systems were separately analyzed so as to clearly identify the areas to be improved. Details and implications of the case are outlined. Practical issues and lessons learned are briefly discussed as well.

For the purpose of clarifying the research objectives and identifying issues to be addressed in this study, research questions can be described as follows: (1) What are the most ‘important safety tasks’ those can enhance the overall safety performance of an organization with optimized managerial effort? (2) How can the head office safety experts or managers ‘monitor and support each project’, in terms of safety control, according to priority? Is there any indicator for this priority? (3) How can an organization develop ‘safety management information systems’ in order to meet these requirements?

2. Integrated perspective of safety management systems

The general role of information systems (IS) has changed in organizations. The traditional role of IS had been to support business functions by replacing labor-intensive transactions. However, as the use of information systems has become widespread and deeply integrated with business processes, the role has expanded to include support for or even shaping of corporate strategy (Bakos and Treacy, 1986; Jung and Gibson, 1999; Jung et al., 2004). Therefore, the assessment process of safety information systems should incorporate the ‘comprehensiveness of IS related issues’ and the distinct ‘characteristics of the construction safety tasks’ as well.

The information systems assessment (ISA) issues in the construction industry were discussed in several studies as summarized in Table 1, all of which stressed the uniqueness of the construction industry. Betts (1995) developed a five-level conceptual framework for strategic IS from an ‘industry-level perspective’. The five levels include the national construction industry, professional institutions, construction enterprises, construction projects, and construction products. Stewart and Mohamed (2004) and Jung et al. (2004) developed two independent ‘comprehensive and detailed frameworks’ from the industry-level perspective by analyzing the survey responses from general contractors. Even though the research objectives and measures are different, these two studies commonly attempted to quantitatively evaluate the major factors affecting effective IT utilization in the industry.

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