DELAY FORECASTING USING A VULNERABILITY INDEX

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ABSTRACT

Delays are considered to be among the most important issues in the construction industry due to their frequent occurrence and the severity of their impacts. Most studies on delays have focused on after-the-fact analysis because of great interest in financially sensitive and practical subjects such as liability evaluation and damage assessment. On the contrary, forecasting or predicting delays has been treated as a relatively less important research subject despite its potential, due to the difficulty in forecasting possible delays and the lack of a methodology to predict the effects.

In construction, the experience and intuition of experts play an important role in managing delay forecasting. However, the subjectivity of this expert knowledge and the numerous variables due to the variety of conditions and the uniqueness of each project are obstacles to a systematic approach to delay forecasting.

The proposed research suggests the concept of activity vulnerability and a tangible index quantifying the vulnerability characteristic of a construction activity. A systematic framework to quantify the subjective expert knowledge and to assess the criticality of the delay impacts is presented. Experienced opinions on the activity vulnerability, the relationship between the condition of delay factors and their impact on construction activities, are quantified through the proposed fuzzy methodology. Finally, the quantified subjectivity is expressed in the form of a vulnerability index for future management reference. In addition, a method of forecasting the delay risk in construction operations based on the vulnerability index is presented. Application of the vulnerability index in scheduling simulation enables delay risk forecasting in construction operations with delay factor conditions considered.