

Construction Time - Cost Trade-Off Analysis Using Fuzzy Set Theory

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Abstract : Time and cost are the two critical objectives of construction project management and are not independent but intricately related. Trade-off between project duration and cost are extensively discussed during project scheduling because of practical relevance. Generally when the project duration is compressed, the project calls for an increase in labor and more productive equipments, which increases the cost. Thus, the construction time-cost optimization is defined as a process to identify suitable construction activities for speeding up to attain the best possible savings in both time and cost. As there is hidden tradeoff relationship between project time and cost, it might be difficult to predict whether the total cost would increase or decrease as a result of compressing the schedule. Different combinations of duration and cost for the activities associated with the project determine the best set in the time-cost optimization. Therefore, the contractors need to select the best combination of time and cost to perform each activity, all of which will ultimately determine the project duration and cost. In this paper, the fuzzy set theory is used to model the uncertainties in the project environment for time-cost trade off analysis.

Keywords : fuzzy sets, uncertainty, qualitative factors, decision making

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