A trade-off between time and cost in scheduling repetitive construction projects.

Summary: The discrete time/cost trade-off problem (DTCTP) is commonly encountered in repetitive project scheduling. The current models for this problem assume that logical sequences of activities cannot be changed in different units. However, logical sequences are often changed to shorten the project time and minimize project total cost in many practical situations. This characteristic of repetitive activities is referred to as the soft logic. This paper presents a mixed integer nonlinear programming model that combines the general DTCTP and the concept of soft logic. The execution modes of an activity in different units are also considered. The DTCTP is known to be strongly NP-hard, and the introduction of soft logic makes it even more complex. A genetic algorithm (GA) is proposed to resolve the problem. The effectiveness of the proposed GA is verified using the example of a bridge construction project presented in the previous literature. The model proposed in this paper provides more flexibility to reduce the total cost and time of a repetitive project for the planners.

Keywords: soft logic; repetitive construction projects; time/cost trade-off; scheduling
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