Abstract:

This paper presents a novel methodology which assists in automating the generation of time schedules for bridge construction projects. The method is based on a simulation of construction works, taking into account the available resources and the interdependencies between individual tasks. The simulation is realized by means of a discrete-event simulation software originally created for plant layout in the manufacturing industry. Due to the fact that the fixed process chains provided are too rigid to model the spontaneous construction task sequences, a constraint module that dynamically selects the following task has been incorporated. Constraint module input data is formed by activity packages comprising of the affected building element, the required material, machine and manpower resources, as well as the technological pre-requisites of the activity to be performed. Since manual creation of the large set of activity packages is laborious and error-prone, a 3D model-based application has been developed which allows the interactive assignment of construction methods to individual building elements. To facilitate this process, a level-of-detail approach has been implemented which allows the user to successively refine both the process model and the corresponding product model. The discrete-event simulation system uses all the given information to create a proposal for the construction schedule automatically, which may then be refined using standard...