Abstract:
The paper presents a computational method to help in automating the generation of time schedules for bridge construction projects. The method is based on the simulation of the construction works, taking into account the available resources and the interdependencies between the individual tasks. The simulation is realized by means of the discrete-event based simulation software originally created for plant layout in the manufacturing industry. Since the fixed process chains provided there are too rigid to model the more spontaneous task sequences of construction projects, a constraint module that selects the next task dynamically has been incorporated. The input data of the constraint module is formed by work packages of atomic activities. The description of a work package comprises the building element affected, the required material, machine and manpower resources, as well as the technological pre-requisites of the task to be performed. These input data are created with the help of a 3D model-based application that enables to assign process patterns to individual building elements. A process pattern consists of a sequence of work packages for realizing standard bridge parts, thus describing a construction method which in turn represents a higher level of abstraction in the scheduling process. In the last step, the user specifies the available resources. The system uses all the given information to automatically create a proposal for the construction schedule, which may then be refined using standard scheduling software.