Optimal Scheduling of Railway Track Possessions in Large-Scale Projects with Multiple Construction Works

This paper addresses the railway track possession scheduling problem (RTPSP), where a large-scale railway infrastructure project consisting of multiple construction works is to be planned. The RTPSP is to determine when to perform the construction works and in which track possessions while satisfying different operational constraints and minimizing the total construction cost. To find an optimal solution of the RTPSP, this paper proposes an approach that, first, transfers the nominal market prices into track-possession-based real prices, and then generates a schedule of the construction works by solving a mixed-integer linear-programming model for the given track blocking proposal. The proposed approach is tested on a real-life case study from the Danish railway infrastructure manager. The results show that, in 2 h of computing time, the approach is able to provide solutions that are within 0.37% of the optimal one for six different blocking proposals and two alternative construction providers, so it can be used as an effective support tool in the primary planning stage to suggest preferable track possessions within the existing railway services. (C) 2017 American Society of Civil Engineers.