Optimal Maintenance Clustering for Rail Track Components Subject to Possession Capacity Constraints

Authors : Cuong D. Dao, Rob J.I. Basten, Andreas Hartmann

Abstract : This paper studies the optimal maintenance planning of preventive maintenance and renewal activities for components in a single railway track when the available time for maintenance is limited. The rail-track system consists of several types of components, such as rail, ballast, and switches with different preventive maintenance and renewal intervals. To perform maintenance or renewal on the track, a train free period for maintenance, called a possession, is required. Since a major possession directly affects the regular train schedule, maintenance and renewal activities are clustered as much as possible. In a highly dense and utilized railway network, the possession time on the track is critical since the demand for train operations is very high and a long possession has a severe impact on the regular train schedule. We present an optimization model and investigate the maintenance schedules with and without the possession capacity constraint. In addition, we also integrate the social-economic cost related to the effects of the maintenance time to the variable possession cost into the optimization model. A numerical example is provided to illustrate the model.

Keywords : rail-track components, maintenance, optimal clustering, possession capacity
Conference Title : ICREM 2017 : International Conference on Railway Engineering and Management
Conference Location : Copenhagen, Denmark
Conference Dates : June 11-12, 2017