Thesis project: Planning infrastructure maintenance possessions in railway networks

Description

A growing transport demand increases the need for the infrastructure maintenance which induces a range of additional planning challenges. Conducting infrastructure maintenance requires multiple possessions (closures during a given period) of open tracks, station tracks, complete stations as well as individual switches. The reduced available capacity often makes the original timetable impossible to operate. The consequence is that adjusted timetables become necessary that do not fully meet customers' requirements generating strong inconvenience to passengers and freight operators and leading to somewhat reduced use of railway services. This project has the objective of developing models and tools to automatically schedule maintenance possessions to create more attractive services during infrastructure works. This tool shall consider the requirement of maintenance work (type of maintenance, duration and cost) and the demand of railway service.

Assignment

- Literature study of existing articles
- Data preparation
- Develop a new mathematical approach for customer-centric planning possessions that considers level of service during maintenance possessions
- Perform experiments on real life instances in Germany
- Write a report

Background

The student should have a strong background in transportation engineering, preferably rail operations and scheduling. A solid knowledge and/or interest in mathematical optimization, data analysis, and programming is welcome. The research topic can be suitable as research work (Studienarbeit), MSc thesis project or a diploma.

Background

Van Aken S., Bešinović, N., Goverde, R.M.P. (2017). Designing alternative railway timetables under infrastructure maintenance possessions. *Transportation Research Part B: Methodological*, 98, 224-238.

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