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# Optimization of preventive condition-based tamping for railway tracks - DTU Orbit (09/11/2017)

## Optimization of preventive condition-based tamping for railway tracks

This work considers the scheduling of railway preventive condition-based tamping, which is the maintenance operation performed to restore the track irregularities to ensure both safety and comfort for passengers and freight. The problem is to determine when to perform the tamping on which section for given railway tracks over a planning horizon. The objective is to minimize the Net Present Costs (NPC) considering the following technical and economic factors: 1) track quality (the standard deviation of the longitudinal level) degradation over time; 2) track quality thresholds based on train speed limits; 3) the impact of previous tamping operations on the track quality recovery; 4) track geometrical alignment; 5) tamping machine operation factors and finally 6) the discount rate. In this work, a Mixed Integer Linear Programming (MILP) model is formulated and tested on data from the railway corridor between Odense and Fredericia, part of the busiest main line in Denmark. Computational experiments are carried out to compare our model to the existing models in the literature. The results show that taking into consideration these previously overlooked technical and economic factors 3, 5 and 6 can prevent under-estimation of required tamping operations, produce a more economic solution, prevent unnecessary early tamping, and improve the track quality by 2 percent.

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