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Document Version
Peer reviewed version

Citation for published version (Harvard):

Link to publication on Research at Birmingham portal

Publisher Rights Statement:
Checked for eligibility: 21/06/2019

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HYBRID APPROACH TO PREDICT THE TRACK DETERIORATION IN A RAILWAY IN-SERVICE: A CONCEPTUAL DESIGN
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ABSTRACT

The track supports the loads of the railway vehicles and guides their movements. Its excellence determines the permissible wheel load, speed, safety and reliability of the rail operation. None railway can expect to survive in a competitive economy if its track is an obstacle to safety, reliability and proper service. The effects of all adverse features on the track are cumulative and track components require a routine of attention and renewal at frequent intervals. If the permanent way is not perfectly levelled and aligned, irregularities cause oscillations or vibrations of the train, which can cause discomfort to the passenger and damage to the freight, and the worst: a catastrophic accident. In planning a new track or improving one in-service, it is important to be able to predict the probable asset deterioration rate as a function of the variables related to the train and its periodicity. This may contribute significantly in planning, engineering, operational, and maintenance activities. The aim of this paper is to present a conceptual design of a hybrid numerical and experimental approach to predict the track deterioration in a railway in-service based on empirical-mechanistic and probabilistic theories.

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