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On train speed reduction in circumstances of thermally-induced railway track buckling

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Abstract

Increasing heatwave spells associated with global warming profoundly affect the propensity of continuously-welded railway tracks to buckle laterally in a horizontal plane. Train derailments in the presence of buckled tracks endanger the community and are costly to repair. Track buckling is a localization phenomenon, and the amplitude of the buckle increases in the post-buckling range. Because of this, it may not be possible for a train crew at speed to observe a small buckle, or indeed to stop the train if a larger buckle is encountered. There is, therefore, a need to be able to assess the derailment vulnerability as a train passes over a buckled railway track. This paper proposes a finite element modelling of passenger cars and the required speed reduction in circumstances in which railway buckling has occurred. The model of the passenger car is composed of three parts - a carriage, bogies and wheelsets - being connected by springs and dampers. The response of the passenger car is obtained

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