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Ngigi, R. W., Pislaru, Crinela, Ball, Andrew and Gu, Fengshou

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REVIEW OF CONTROL STRATEGIES USED IN MODERN RAILWAY VEHICLES

R. W. Ngigi, C. Pislaru, A. Ball and F. Gu
University of Huddersfield, Queensgate, Huddersfield HD1 3DH, UK

ABSTRACT

The study of rail vehicle dynamics requires a comprehensive understanding of electrical, mechanical, control engineering aspects of various interactions between the different sub-systems. This paper is an attempt to collate and critically appraise the recent advances in control strategies used to solve challenges related to railway vehicles. These strategies concentrated on stability of solid axle-wheelsets, guidance for wheelsets to provide the function of track following and curving to reduce all unnecessary creep forces and associated wear/noise. The studied methods refer to the control of active primary and secondary suspensions, adhesion, tilt and steer. Suspension, braking, propulsion and guidance force acting on the railway vehicle are related to the wheel and rail contact point. These aspects should be taken into consideration because control systems are conceivably being developed in the railway industry to aid drivers maintain good steering and stability, in addition to providing good comfort to the passengers.

Keywords: railway vehicle; tilt; active control; stability; integrated control