Vehicle System Dynamics
Volume 45, Issue 4, April 2007, Pages 359-373

ISSN: 00423114
CODEN: VSDYA
DOI: 10.1080/00423110600999912
Document Type: Article
Source Type: Journal

Tangential force variation due to the bogie direction reversal procedure

Lari, A.A.[a], Younesian, D.[a], Schmid, F.[b]
[a] **Iran University of Science and Technology, Railway Engineering School, Tehran 16844, Iran**
[b] **University of Sheffield, Mechanical Engineering Department, Mapping Building, Sheffield, S1 3JD, United Kingdom**

Abstract

A range of tangential forces is generated within the contact patch when a wheelset moves on the rail. These forces are intensified when incorporating curved tracks and motored axle rail vehicles [Arrus, P., de Pater, A.D. and Meyers, P., 2002, The stationary motion of a one-axle vehicle along a circular curve with real rail and wheel profiles. Vehicle System Dynamics, 37 (1), 29-58]. The wheelset is subject to flange contact if an unbalanced force remains in a curve towards the high rail gauge face. The resultant force in the transverse direction includes the lateral force, the radial force, and the creep forces in addition to the effect of the frequent wheelset displacement due to the kinematic oscillation [Iwnicki, S., 2003, Simulation of wheel-rail contact forces. Fatigue Fracture Engineering Material Structure, 26, 887-900]. This article has focused on a potential variation in some of the forces cited when the wheelset is subject to backward and forward movements. A severe wear rate observed within the wheel flange region in Iranian Railways was investigated by operating a test bogie on a curvaceous track. An obvious improvement in the wear rate and wear pattern of the wheels was attained when the second test bogie encountered a bogie direction reversal procedure. This enhancement is considered in this article from the force analysis standpoint.

Language of original document

English

Author keywords

Bogie direction reversal (BDR); Tangential forces; The wheel/rail interface; Wheel flange wear

Index Keywords

Engineering controlled terms: Bogies (railroad rolling stock); Railroad tracks; Vehicle wheels; Vibrations (mechanical); Wear of materials
Engineering uncontrolled terms: Bogie direction reversal (BDR); Contact patch; Vehicle System Dynamics
Engineering main heading: Railroad cars

References (17) View in table layout

1 Ghonem, H., Kalousek, J.
A quantitative model to estimate rail surface failure
(1984) *Wear*, 97 (1), pp. 65-81. Cited 3 times.

View at publisher

2 Smith, R.E., Kalousek, J.
A design methodology for wheel and rail profiles for use on steered railway vehicles
(1991) *Wear*, 144 (1-2), pp. 329-342. Cited 9 times.

View at publisher

3 Garg, V.K., Dukkipati, R.V.
(1984) *Dynamics of Railway Vehicle Systems*. Cited 233 times.
Toronto, Canada: Academic Press

4 Arrus, P., De Pater, A.D., Meyers, P.
The stationary motion of a one-axle vehicle along a circular curve with real rail and wheel profiles
(2002) *Vehicle System Dynamics*, 37 (1), pp. 29-58. Cited 5 times.
doi: 10.1076/vesd.37.1.29.3541

View at publisher

5 Zboiński, K.
Dynamical investigation of railway vehicles on a curved track
(1998) *European Journal of Mechanics, A/Solids*, 17 (6), pp. 1001-1020. Cited 24 times.

View at publisher

6 Asadi Lari, A., Kapoor, A., Schmid, F.
An investigation to the combination effect of contact mechanics and operational aspect on the wheel wear rate and patterns of rail vehicles
(2005) *Railway Engineering Conference*. Cited 2 times.
London, 29-30 June, ISBN 0-947644-56-3

7 Mace, S.E., Pena, R., Wilson, N.G., DiBrito, D.
Effects of wheel-rail contact geometry on wheel set steering forces
(1996) *Wear*, 191 (1-2), pp. 204-209. Cited 6 times.

View at publisher

8 Iwnicki, S.
Simulation of wheel-rail contact forces
(2003) *Fatigue and Fracture of Engineering Materials and Structures*, 26 (10), pp. 887-900. Cited 19 times.
doi: 10.1046/j.1460-2695.2003.00699.x

View at publisher

9 Elkins, J.A., Gostling, R.J.
A general quasi-static curving theory for railway vehicles
(1977) *Paper presented at the Proceedings of the 5th VSD 2nd IUTAM Symposium*
Vienna

10 Kalker, J.J.
(1990) *Three-Dimensional Elastic Bodies in. Rolling Contact*, p. 45. Cited 483 times.
Dordrecht, The Netherlands: Kluwer Academic Publisher, p

11 Johnson, K.L.
Contact mechanics
(1985) . Cited 6740 times.
ISBN: 0521255767; 978-052125576-9

12 Nik Khah-Bahrami, M., 1983, Vector Dynamics (Tehran: Tehran University) (in Persian).

13 SBB report, Eisenbahnamateur, 59, issue 4, 2005, p. 185.

14 Jendel, T., Berg, M.
Prediction of wheel profile wear: Methodology and verification
(2003) *Vehicle System Dynamics*, 37 (SUPPL.), pp. 502-513. Cited 6 times.

15 Fröhling, R.
Strategies to control wheel profile wear
(2003) *Vehicle System Dynamics*, 37 (SUPPL.), pp. 490-501.

16 UIC510-2 leaflet, 1987, International Union of Railways, 2nd edn., 10th Amendment.

17 Asadi Lari, A., Fallah, A.R.
The effect of operational aspect on the rail vehicle wheel wear rate and symmetrical wear with the aids of dynamic simulation
(2006) *Proceedings of ISME2006*
Paper presented at the, Isfahan, Iran in Persian

Lari, A.A.; Iran University of Science and Technology, Railway Engineering School, Tehran 16844, Iran;
email:asadi_l@iust.ac.ir

Vehicle System Dynamics
Volume 45, Issue 4, April 2007, Pages 359-373

View search history | Back to results | < Previous **27 of 40** Next > Top of page

Search Sources Analytics My alerts My list My settings Live Chat Help

About Scopus
What is Scopus
Content coverage
What do users think
Latest
Tutorials
Developers

Contact and Support
Contact and support
Live Chat

About Elsevier
About Elsevier
About SciVerse
About SciVal
Terms and Conditions
Privacy Policy