Estimation of train derailment probability using rail profile alterations

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Abstract

Investigation of train derailment is a complicated job that occurs in special points with special characteristics. It depends on several variables so for successful predication, exact estimation of all effective parameters is required. Instead of this complicated job, usually a time history of variables and statistic distribution can be used. According to statistic distributions, exact determination of train derailment is practically impossible and therefore a probability function should be utilised. Angle of wheel flange, friction coefficient, axle load and train speed are effective parameters in investigation of train derailment probability. In this paper, by using statistical distributions, aforementioned parameters are investigated and derailment probability is calculated using reliability theory. To describe extra capabilities of model, derailment probability is calculated in three different curves of railway network considering real geometrical specifications of curves, amount of wear in rail profiles measured by EM۱۲۰ track recording cars, axle load and operation speed.
Keywords: reliability theory; second class method; rail wear; equivalent conicity

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