

Rail Degradation Modelling Using ARMAX: A Case Study Applied to Melbourne Tram System

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Abstract : There is a necessity among rail transportation authorities for a superior understanding of the rail track degradation overtime and the factors influencing rail degradation. They need an accurate technique to identify the time when rail tracks fail or need maintenance. In turn, this will help to increase the level of safety and comfort of the passengers and the vehicles as well as improve the cost effectiveness of maintenance activities. An accurate model can play a key role in prediction of the long-term behaviour of railroad tracks. An accurate model can decrease the cost of maintenance. In this research, the rail track degradation is predicted using an autoregressive moving average with exogenous input (ARMAX). An ARMAX has been implemented on Melbourne tram data to estimate the values for the tram track degradation. Gauge values and rail usage in Million Gross Tone (MGT) are the main parameters used in the model. The developed model can accurately predict the future status of the tram tracks.

Keywords : ARMAX, dynamic systems, MGT, prediction, rail degradation

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