

## Developing deterioration probabilistic model on the basis of Weibull distribution for rail wear with case study in Lorestan railway

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### Abstract

The vital part of every overall maintenance system is the “predicting future condition” sector. This sector will receive all data which are “gathered by inspection systems and saved in data base” and predict the future condition by analyzing this information.

In this research, after categorizing the rail situation due to rail wear defect index, the suggested Deterioration Model developing on the basis of Weibull distribution is reviewed. The Deterioration Function is defined by Markov Transition Probabilities Matrix. Generally, for all practical uses in railway track maintenance management, the non homogenous models are used. Since today, in all efforts which has been made in the country, rail condition prediction has been based on homogenous models, and casual parameters in deterioration models have not been applied. On the other hand, the most important influencing casual variable on rail wear is the passing traffic. In this research, for solving the deterioration model, only this variable is applied.

Thereafter, the future rail condition on the basis of ten sections which have 200 meters length in Lorestan track that they are placed in curved track with 250 meters radius is reviewed. In fact, by applying the Deterioration Wear Model, and the two “time and line passing traffic” variables, we can predict the future rail situation on six months periods. In addition, the rail durability, from the wear view, can be predicted by Deterioration Model. In this way we can predict that in the inspected area in Lorestan, regarding the analyzed start point date, after six periods of time (three years) the rails of the curved track in the studied area which had 250 meters radius must be replaced.

*Keywords: Deterioration model, Markov theory, Rail wear, Rail durability*