

Integration of performance indicators and digitalization for the railway assets management



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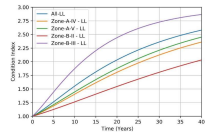
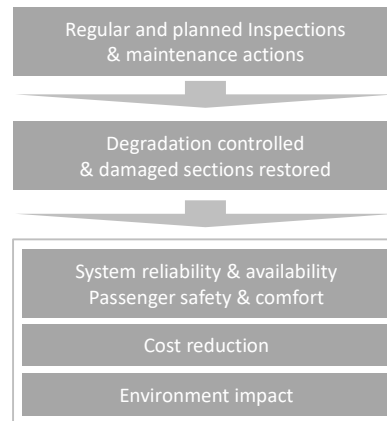
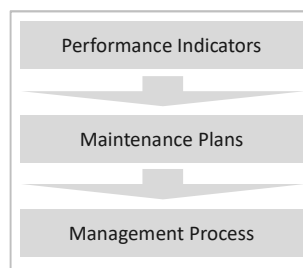
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MIT Portugal 2023 Annual Conference

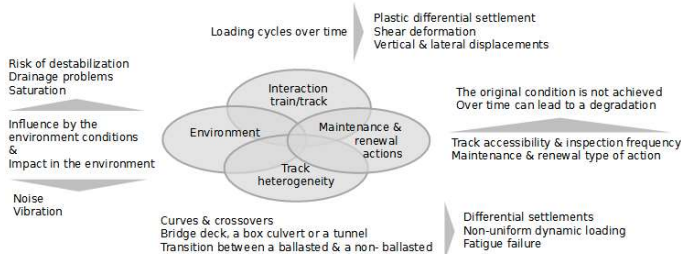
INTRODUCTION

- Most relevant factors affecting the degradation of the railway track
- Performance indicators based in railway standards
- Work developed in the roadway infrastructure
- Overview of predictive models being used in the railway system



(Source: www.theleader.com.au, isise newsletter, 22. biannual, March, 2022)

INFLUENCING VARIABLES

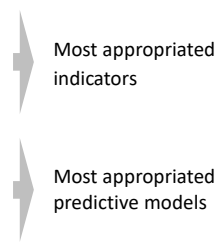


OVERVIEW OF PREDICTIVE MODELS

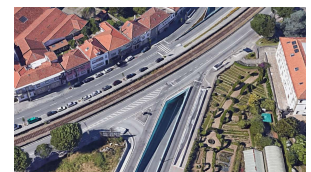
Predictive models	Advantages	Disadvantages
Mechanistic	- Use of few geometrical data - Based on the system's components mechanical behaviour	- Non-consideration of the uncertainty of the track behaviour due to the track heterogeneity - Difficulty in quantifying the track and vehicle properties - Difficulty in understanding the interaction between the track components and properties
Statistical	- Capacity to work with a big quantity of data - Based in real data - Takes use of the distribution pattern to represent the probability of failure or disruption in a time interval	- Not based on the system's components mechanical behaviour
Deterministic	- Easier to use	- Non-consideration of the randomness - Non-consideration of the possible interaction between degraded components
Probabilistic / Stochastic	- Involve randomness - Non-consideration of the uncertainty of the track behaviour due to the heterogeneity of the track - Consideration of the current state of the assets - More realistic	- Need for more statistical and computational ability
Artificial intelligence	- Models trained and tested with a big quantity of data	- Lack of information, once these models are recent - Difficulty in calibrating the parameters

MAIN CONCLUSIONS

- What influences the railway track degradation and its performance
- Experience from other infrastructure fields
- Knowledge of the advantages, disadvantages of the predictive models
- Consideration of the heterogeneity



Forecasting the performance of railway track over time



(Source: www.google.com/maps/)

Funded by:



under the Doctoral Grant PTR/BD/153494/2021 | MPP research area