Abstract ID 465

OPTIMIZING RAILWAY WHEELSET MACHINING

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Keywords: Maintenance, Human-Machine Interaction, Machine-Learning, Reliability

Summary: The maintenance strategy for railway wheelset turning significantly impacts operational efficiency and cost-effectiveness, particularly when comparing in-house maintenance versus outsourced maintenance.

This study aims to develop a decision support system for the life cycle of railway wheelsets maintenance, regarding the logistics and planning, as well as in supporting turning tasks for repairing wheelsets. This tool supports the decision of maintenance operations in view of the criticality of wheelset defects, reducing the downtime of vehicles and maintenance operations, optimizing the maintenance cycle and decreasing the time of human-machine interaction in the activity of turning railway wheelsets due to an assessment based on Machine Learning techniques.

This study also analyzes the effects of in-house versus outsourced maintenance, assessing their impact on performance, cost and reliability of railway wheelset turning. It was carried out a failure analysis of wheelsets, identifying the most critical defects and proposing mitigation strategies to reduce damage and extend component life cycle. The human-machine interaction in wheelset turning was also assessed, highlighting its influence on process reliability and error rates due to human intervention. To address these challenges, a standardized procedure is proposed to minimize or eliminate human-induced impact variability.