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APPLICATION OF FMECA AND RCM METHODOLOGIES TO FREIGHT TRANSPORT WAGONS

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Summary: The maintenance of equipment has progressively become increasingly important, keeping pace with the growing demands of industry. In this context, the RCM (Reliability Centred Maintenance) methodology focuses on the reliability of equipment, with the aim of identifying and assessing the risks associated with the failure modes presented, as well as developing appropriate strategies for their management and mitigation.The RCM analysis was applied to the wagon developed as part of the SMARTWAGONS project, which was conducted at the MEDWAY Maintenance & Repair facilities at Entroncamento. This analysis was based on historical data from wagons of Series 443, 455, and, in particular, Series 496, which shares significant similarities with the wagon developed in the SMARTWAGONS project. The results obtained indicated that four failure modes had their risks mitigated, while one critical failure mode remained unchanged due to factors external to MEDWAY Maintenance & Repair. Additionally, maintenance tasks were proposed based on condition monitoring, with a focus on predictive maintenance, facilitated by the installation of sensors on the wagon under examination. By utilizing BlockSim2024 software, it was possible to determine the ”optimum point” for implementing preventive maintenance on the ”brake shoe” equipment, based on the Mean Time Between Failures (MTBF), which enabled more efficient and thorough management of the respective maintenance interventions.

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