



ANALYSIS OF FAILURES OF TYPE “E” FREIGHT WAGONS ON SERBIAN RAILWAYS

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Abstract – The aim of this master's thesis is to analyze the failures of type E freight wagons operating on the Serbian railway network, identify the most common causes of wagon withdrawal from service, and propose measures to improve maintenance reliability and operational availability. The study is based on the analysis of maintenance records and technical data collected for wagons excluded from traffic between January 2021 and April 2024. The research examines wagon failures according to inspection location, technical defects, documentation and labeling irregularities, maintenance records, and annual trends. The results indicate that the primary causes of wagon withdrawal are technical malfunctions, inadequate documentation and labeling, and mechanical damage resulting from operation and cargo handling. The most frequently observed technical failures involve the air brake system, brake distributor, draw-and-buffering devices, side slide springs, and wagon doors and flooring. The findings highlight the importance of systematic maintenance, accurate failure recording, and effective information systems in improving the safety, reliability, and availability of freight wagons. The research concludes that implementing preventive and condition-based maintenance strategies, supported by digital maintenance management systems and continuous monitoring of wagon condition, can significantly reduce unexpected failures, shorten downtime, and optimize maintenance planning within the Serbian railway freight sector.

Keywords – type “e” freight wagons, failure analysis, preventive maintenance, reliability, railway transport.

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