



## FAILURE ANALYSIS OF H-SERIES FREIGHT WAGONS ON THE RAILWAY NETWORK OF THE REPUBLIC OF SERBIA

Student: Milica ANDRIĆ<sup>1</sup>

Mentor: Jovan TANASKOVIĆ<sup>2</sup> [0000-0002-2936-5535]

**Abstract** – The aim of this thesis is an analysis of failures and the reasons for the withdrawal of H-series freight wagons from service on the territory of the Republic of Serbia, based on maintenance records provided by Serbia Cargo for the period from 2021 to 2023. H-series freight wagons are primarily intended for the transportation of weather-sensitive cargo, such as grain and paper products, which require protection from atmospheric influences. Their sliding doors are made of aluminum, allowing for efficient loading and unloading of goods. Analysis of available data show that the most common reasons leading to the withdrawal of this type of freight wagon from service are related to brake system malfunctions and damage to the wheel tread surface. This indicates that regular brake maintenance is essential for the safe and reliable operation of freight wagons, as it helps prevent derailments, secures vehicles against unintended movement, and ensures effective speed control during operation. However, cargo may occasionally exert pressure on the sliding doors, resulting in damage that prevents proper closing of the doors. Such damage represents another common reason for withdrawing these wagons from service. Due to inadequate maintenance practices and the deteriorated condition of the railway infrastructure in Serbia, freight wagon derailments and service withdrawals occur relatively frequently. This highlights the need for more intensive infrastructure rehabilitation, regular vehicle maintenance, and more comprehensive inspection procedures. Measures such as thorough wagon inspections performed by certified rolling stock inspectors and timely repairs of H-series freight wagons are essential for improving operational safety, reliability, and service availability.

**Keywords:** failure analysis, freight wagons, railway maintenance, h-series wagons, railway safety.

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<sup>1</sup> Brana Komerc DOO Kruševac, Jasički put 15, Kruševac, Serbia, e-mail: [andric.milica98@gmail.com](mailto:andric.milica98@gmail.com)

<sup>2</sup> University of Belgrade Faculty of Mechanical Engineering, Department of Rail Vehicles, Kraljice Marije 16, 11120 Belgrade, Serbia, e-mail: [jtanskovic@mas.bg.ac.rs](mailto:jtanskovic@mas.bg.ac.rs)

