

Proposal of an intelligent wayside monitoring system for detection of critical ice accumulations on railway vehicles

Frank Michelberger¹, Adrian Wagner¹, Michael Ostermann² and Thomas Maly²

¹Carl Ritter von Ghega Institute for integrated Mobility Research - University of Applied Sciences St. Poelten, Matthias Corvinus-Straße 15, 3100 St. Poelten, Austria

²Vienna University of Technology, Institute of Transportation, Research Center of Railway Engineering, Traffic Economics and Ropeways, Karlsplatz 13/230-2, 1040 Vienna, Austria

E-mail: frank.michelberger@fhstp.ac.at

Abstract. At railway lines with ballasted tracks, under unfavourable conditions, the so-called flying ballast can occur predominantly for trains driving at high speeds. Especially in wintertime, it is highly likely that the causes are adhered snow or ice deposits, which are falling off the vehicle. Due to the high kinetic energy, the impact can lead to the removal of ballast stones from the structure of the ballasted track. If the stones reach the height of vehicles underside, they may be accelerated significantly due to the collision with the vehicle or may detach further ice blocks. In the worst case, a reinforcing effect occurs, which can lead to considerable damage to railway vehicles (under-floor-area, vehicle exteriors, etc.) and infrastructure (signal masts, noise barriers, etc.). Additionally the flying gravel is a significant danger to people in the nearby area of the tracks. With this feasibility study the applicability and meaningfulness of an intelligent monitoring system for identification of the critical ice accumulation to prevent the ballast fly induced by ice dropping was examined. The key findings of the research are that the detection of ice on railway vehicles and the development of an intelligent monitoring seem to be possible with existing technologies, but a proof of concept in terms of field tests is necessary.