

# **Towards Assessment of Human Reliability in Railway Applications by Analysis of Human-Barrier-Interaction**

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**Abstract:** European railway standards request the integration of human factors into dependability assessments. Nevertheless, the assessment of human reliability in railway engineering practice still follows traditional approaches, in continental Europe. Classic methods of Human Reliability Analysis, used in other industries, have weaknesses, too. This paper presents a new approach to assess the human influence on railway operation and safety. Findings in human-machine interaction research and in terms of safety barriers are used to develop a method for the analysis of so-called human-barrier-interaction. Safety barriers are decomposed concerning the process of their barrier function and corresponding characteristics. The results can be used to assess barrier quality and to obtain semi-quantitative values for human reliability. Due to the proximity to fault trees and the straight-forward and still holistic procedure, the approach represents a contribution for probabilistic risk assessments in railways. The development is part of railway safety research at the Institute of Transportation Systems in the German Aerospace Center.

*Keywords:* Railways, Driver, Train control, Human reliability, Human-machine interface, Safety, Barriers, Probabilistic Risk Assessment

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