SS-37: Innovations in Safety and Reliability of Railway Infrastructures

Gonçalo Ferreira[1], Pedro Montenegro[1], Christoph Adam[2], António Abel Henriques[1], and Diogo Ribeiro[3]

[1] Universidade do Porto, Portugal
[2] University of Innsbruck, Austria
[3] Polytechnic of Porto, Portugal
gcferreira@fe.up.pt; paires@fe.up.pt; christoph.adam@uibk.ac.at; aarh@fe.up.pt; drr@isep.ipp.pt

Description

Rail transport is a cornerstone of sustainable mobility, yet its infrastructure faces growing challenges due to aging assets, increased traffic demand, and exposure to extreme events. Recent advances in monitoring technologies, data analytics, and risk-based decision-making offer new opportunities to enhance safety, reliability, and resilience across rail networks.

Within this framework, this special session aims to bring together the latest research and practical developments related to rail infrastructure management. Theoretical, experimental, and computational investigations (or a combination of these) are welcome. Contributions may address topics such as probabilistic design, predictive maintenance, digital twins, and resilience strategies under uncertainty, fostering dialogue between academia, industry, and infrastructure operators.

Topics of Interest

- Risk-informed design and maintenance of rail infrastructure
- Probabilistic and time-dependent reliability modeling
- Digital twins and AI for predictive maintenance
- Resilience assessment under climate change and extreme events
- Monitoring technologies and data-driven decision support
- Safety criteria for high-speed and urban rail systems