

## **PROCEEDINGS**

# **Analysis of Pressure Relief Duct's Effectiveness in a Single-Track Parallel Tunnel for High-Speed Undersea Railway**

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### **ABSTRACT**

This study examines the effectiveness of Pressure Relief Ducts (PRDs) in mitigating pressure fluctuations within single-track parallel tunnels of undersea railways during high-speed train operations. Computational fluid dynamics analysis was conducted under five conditions: without PRDs and with PRDs installed at intervals of 250m, 500m, 750m, and 1,000m. The analysis evaluated internal train travel within the tunnel and calculated both internal and external pressure fluctuations of the train. Safety standards were applied to assess cabin pressure fluctuations. Results revealed a significant reduction of approximately 30% in external cabin pressure fluctuations with PRD application, meeting safety standards. Internally, PRDs led to a decrease of around 10% in cabin pressure fluctuations, satisfying all EN standards. This study highlights the effectiveness of PRDs in enhancing safety and comfort during high-speed train travel in undersea railway tunnels.

### **KEYWORDS**

Undersea railway tunnel; pressure relief duct; high-speed railway; pressure change; numerical analysis

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**Conflicts of Interest:** The authors declare that they have no conflicts of interest to report regarding the present study.



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