

## ***Assessing Risk of Railway Lines in Colombo Division: Examining Train Accidents Involving People***

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Rail transportation stands as a critical mode for both passenger and freight movement in Sri Lanka, playing an important role in the economy of the nation and connecting diverse regions. Train accidents cause tragic loss of life, injuries, and lead to significant economic and social disruptions. Regrettably, there has been a lack of significant studies conducted on railway accidents in Sri Lanka possibly due to the limited accessibility for such data. Therefore, it is important to prioritise research efforts and gain a deeper understanding of the causes and dynamics of train accidents in the country. This research aims to assess the risk associated with railway lines in Colombo division by analysing train accidents involving people. The Colombo division covers five railway lines and consists of 194 stations. Through segmentation of each railway line based on stations, a numerical assessment of risk is conducted for each segment. Using statistical analysing methods such as bootstrapping and k-means clustering, the numerical risk values are 244otmail244zed into three distinct groups: high, medium, and low. The accuracy of these risk intervals is validated using Kruskal-Wallis rank sum test and Dunn's test with Bonferroni correction. The results reveal that out of the total 194 segments, 165 are classified as low-risk, 10 as medium-risk, and 19 as high-risk segments. The Coastal line has the highest count of high-risk segments, totaling 11, with the Colombo Fort to Moratuwa sub-line identified as the most high-risk area within this line. Although the Northern line and Kelani Valley line exhibit no high-risk segments, Puttalam has one, while the Mainline shows 7 high-risk segments. Future research endeavors could enrich this study by incorporating analysis of train accidents involving vehicles. The outcomes of this research provide valuable insights to guide government efforts in implementing safety precautions for railway operations in Sri Lanka.

**Keywords:** Bonferroni Correction, Bootstrapping, Dunn's Test, K-means Clustering, Kruskal-Wallis Rank Sum Test