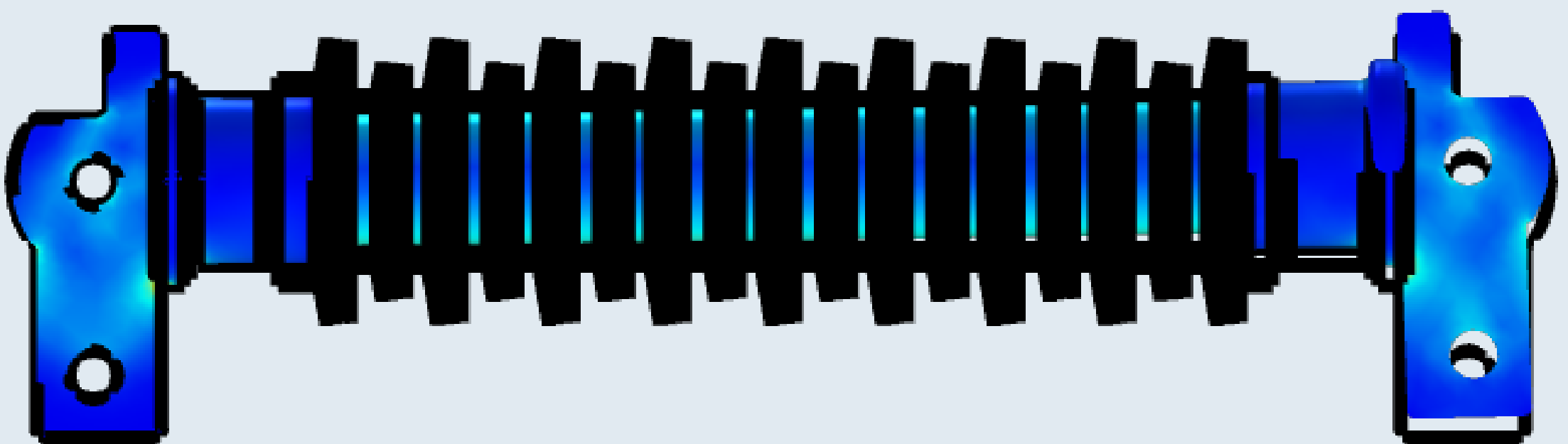


Section Insulators in Overhead Railway Line.

Analysis of Mechanical and Electrical Performance of Section Insulators in Overhead Railway Line.

Vishal Shah, Ishant Jain
Raychem Innovation Center, Raychem RPG Private Limited, Halol, GJ, India.



Abstract

Section insulators are crucial components in overhead railway lines for ensuring the safe and efficient operation of electrified railway systems. This paper presents a comprehensive study aimed at investigating the mechanical forces acting upon section insulators and evaluating their electrical creepage distance in the context of a 25 KV overhead traction line phase change.

By combining mechanical and electrical analyses, this research contributes to the improved understanding and design of section insulators in overhead railway lines. The findings will be instrumental in enhancing the reliability, safety, and efficiency of electrified railway systems, benefiting both operators and passengers.

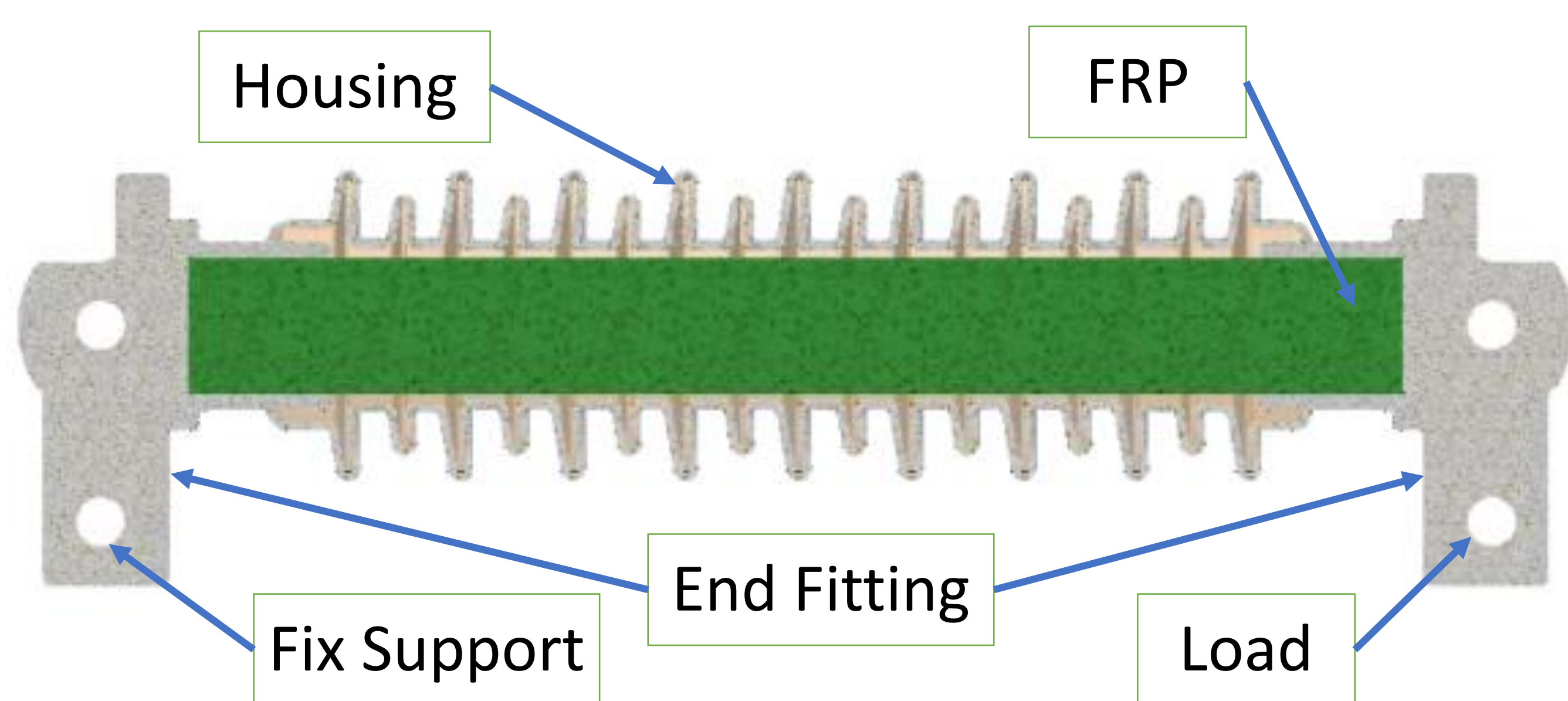


FIGURE 1. Eccentric Load in Section Insulator as per railway OHE configurations

Methodology

- This study focuses on the significance of section insulators in maintaining the safety of overhead railway lines. The research employs COMSOL Multiphysics to conduct a thorough investigation of mechanical forces and electrical creepage distance.
- The analysis of mechanical stability and electrical performance enhances the understanding of section insulator behavior during phase changes in electrified railway systems. This improved understanding contributes to the development of safer, more reliable, and efficient railway systems.

Results

- The Based on our investigation, it is evident that section insulators are well-suited for resisting eccentric tensile forces up to 50 kN, while insulators featuring a specified creepage distance of 1050 mm seem to be particularly well-matched for applications involving a test voltage of 35 kV, aligning with the provided specifications.

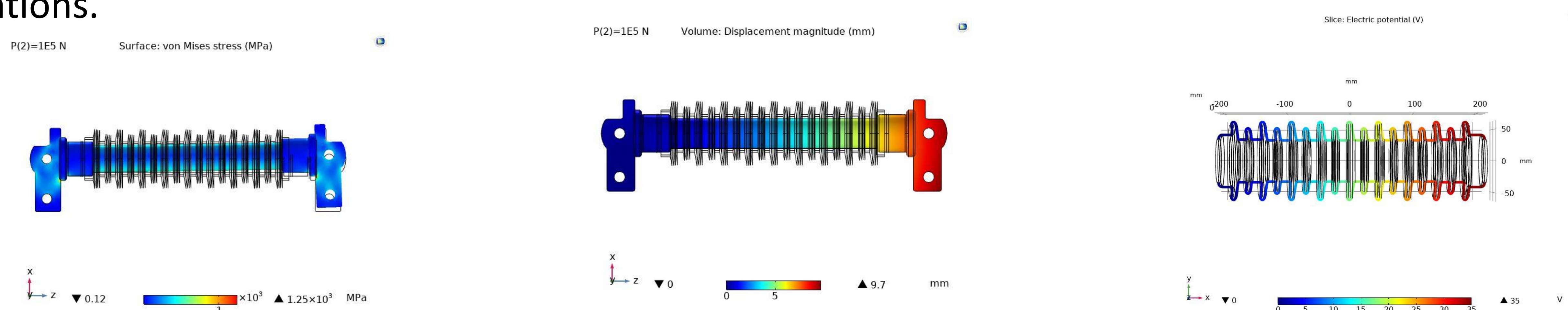


FIGURE 2. Von Mises stresses, deformation, electric potential of the Section insulator

REFERENCES

- [1] RDSO Specification No TI-SPC-OHE-INSCOM-1072
- [2] Optimization and Analysis of Modular Cantilever using Finite Element Approach. - COMSOL Paper presented in 2018
- [3] Over Head Equipment
<https://irien.in.dianrailways.gov.in/uploads/files/1302522225045-OHE.pdf>