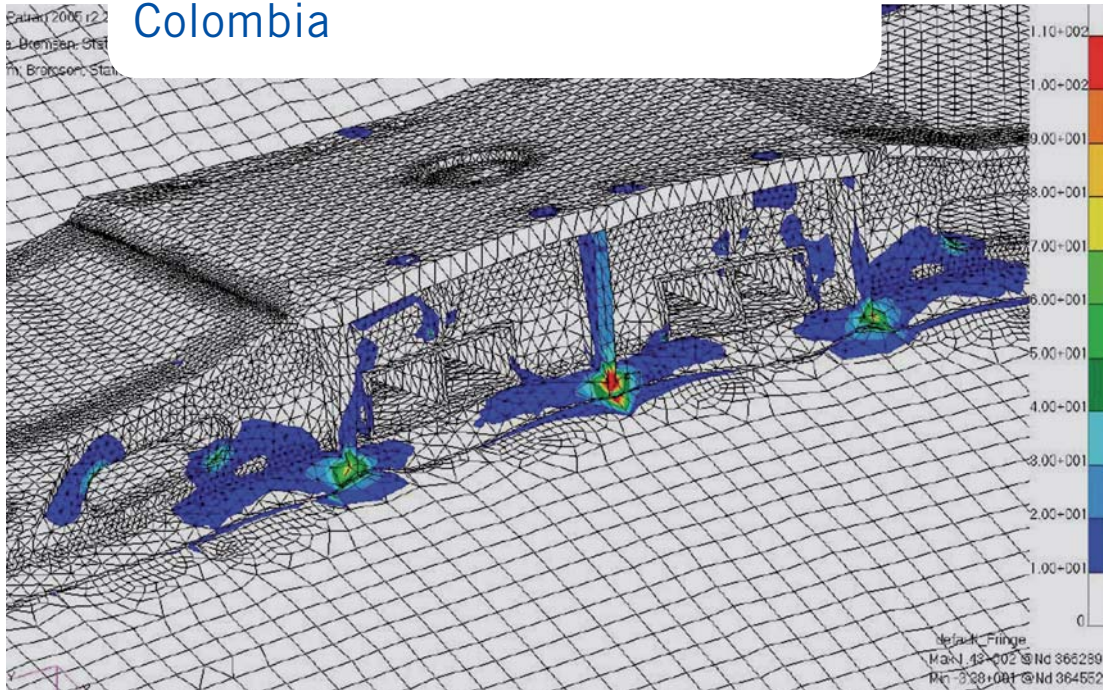


Damage analysis and repair design of cracked aluminium car-bodies of the Metro de Medellín, Colombia



Stress distribution in the carbody bolster beam

Factsheet 4.00041

Detailed Information

Information on the Project

- Customer / Carrier: Empresa de Transporte Masivo del Valle de Aburrá Limitada Metro de Medellín Ltda., Colombia

Project schedule

2008–2009

Technical Data

- Speed: 80 km/h
- Lines: 2 (+3 Metrocable lines)
- Stations: 25 (+6 of Metrocable)
- Daily ridership: >400'000
- System length: 32 km

Project Responsibility

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Customer Requirement

The Metro de Medellín is the first modern mass transportation system in Colombia. It started revenue service in 1995. After 12 years of service cracks were found in the aluminium car body bolster beam. These cracks, which are present especially on the motor coaches, have been repaired by the Metro maintenance personnel. PROSE was commissioned to assess the situation and to propose definitive remedial actions in order to guarantee the life of the carbody structure for the remaining life of the vehicles until 2025.

Realisation

In a first phase the PROSE Engineers endeavoured to get a clear picture on the damages on the vehicles. They studied the available documents like FE-Analysis and drawings of the manufacturer and actual investigation documents and performed an investigation of failures. Because of its know-how, PROSE was able to do a preliminary FE-Analysis to detect the main reason for the cracks and presented to the client various concepts to improve the situation.

In a second step, PROSE made an accurate analysis which showed the possibility to make further design improvements. In addition to a steel bracket which can be easily mounted, there were various improvements to achieve the required remaining life of 17 years.

The client was an important partner during the prototyping. The close collaboration between the client and PROSE made it possible to problems in spite of the big distance between Switzerland and Colombia.

Customer Advantage

PROSE – a specialist in engineering and analysis of railway rolling stock – was able to elaborate rapidly a cost-efficient repair solution which can be implemented by the maintenance organisation of the Metro de Medellín. The direct contact with the client was also important for PROSE. The project was accelerated because of the flat hierarchy and an efficient project team in PROSE.

Not to forget is the fact, that the vehicles will meet the required remaining life until 2025 after this repair.



A Metro – EMU in the workshop



CAD-model of the steel adapter to reinforce the carbody bolster beam

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