

Young Railway Professionals' Presentation Competition 2013

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Based at Progress Rail Services, South Queensferry

Manufacture Cast Manganese Crossings (CMX)

Presentation Overview

- Project Outline

- Introduction
- Early Results
- Validation
- Feedback

- Questions

Main Project

*‘Finite Element (FE) Analysis in the Design of
Cast Manganese Crossings’*

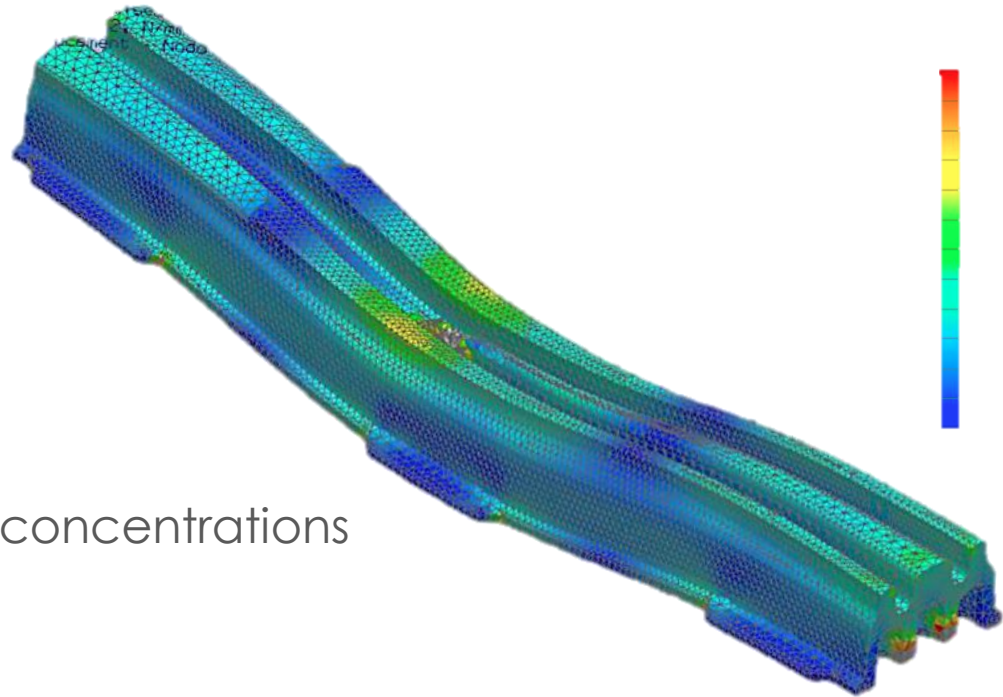
Why?

- Crossings = Safety Critical
- Premature failure
 - Stress concentrations
- Improve design
 - Increase Service Life

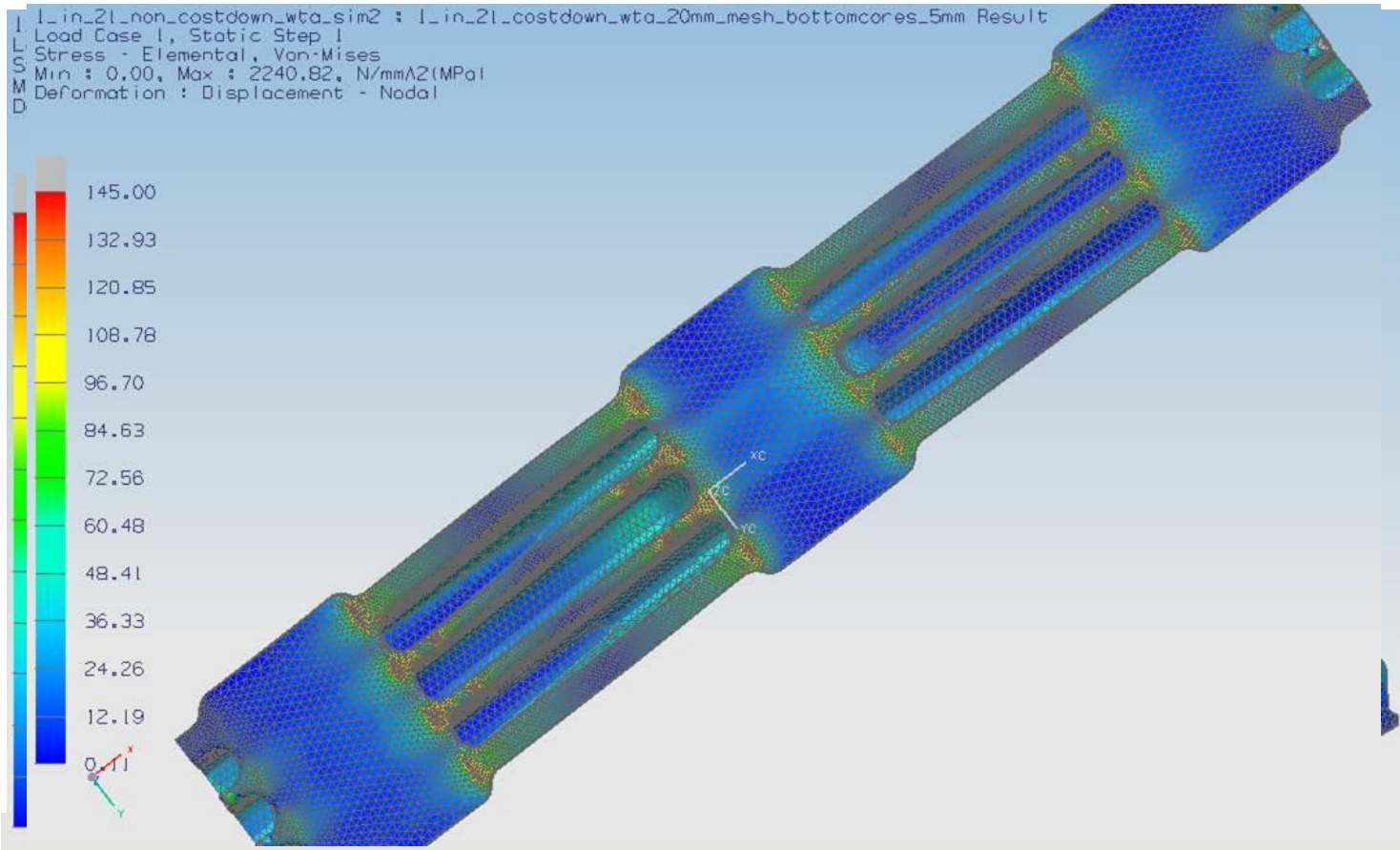


What is FE Analysis?

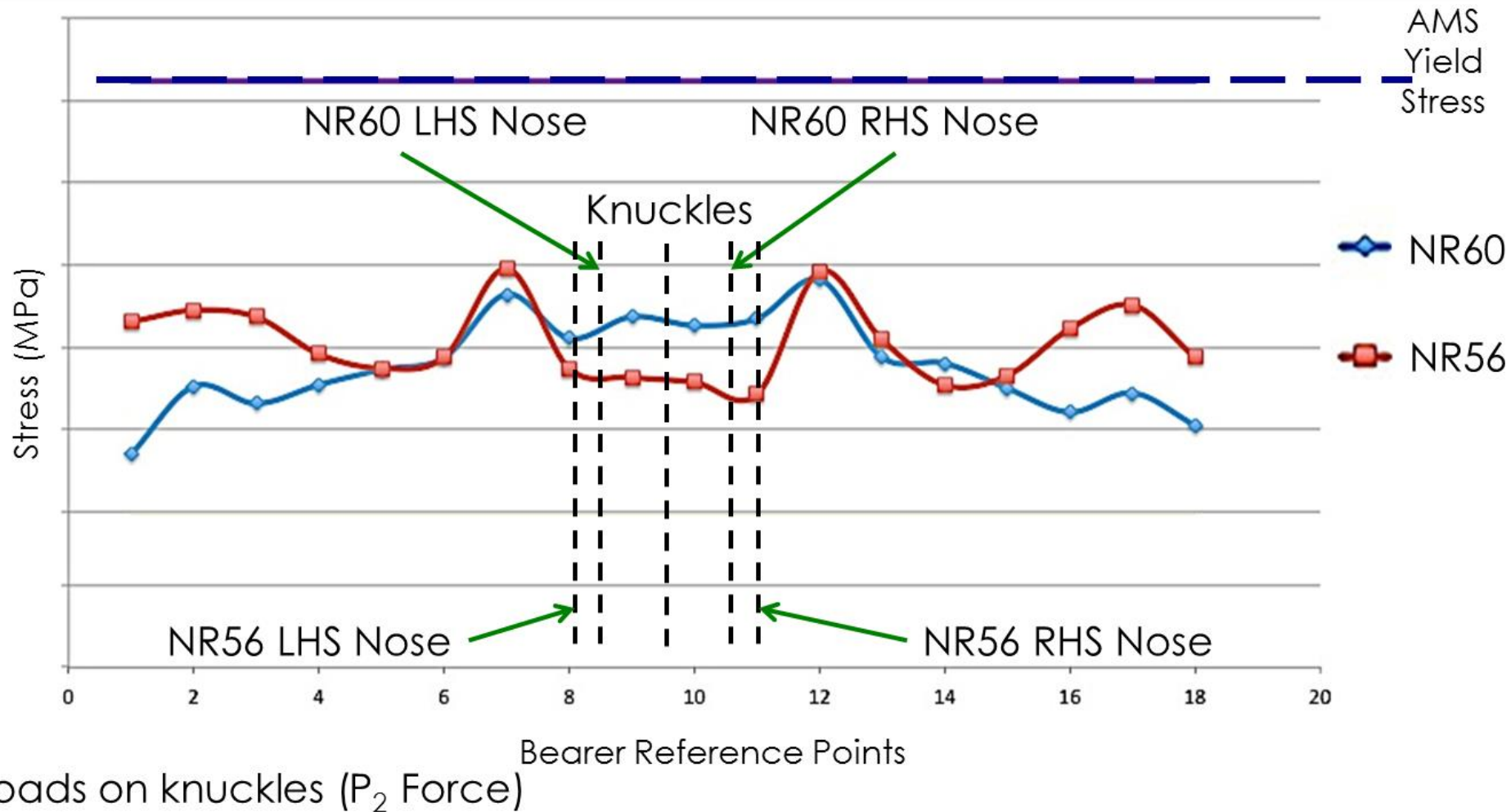
- Dates back to 1970's
- Virtual model
 - Replicate real world
 - Identify areas of stress concentrations



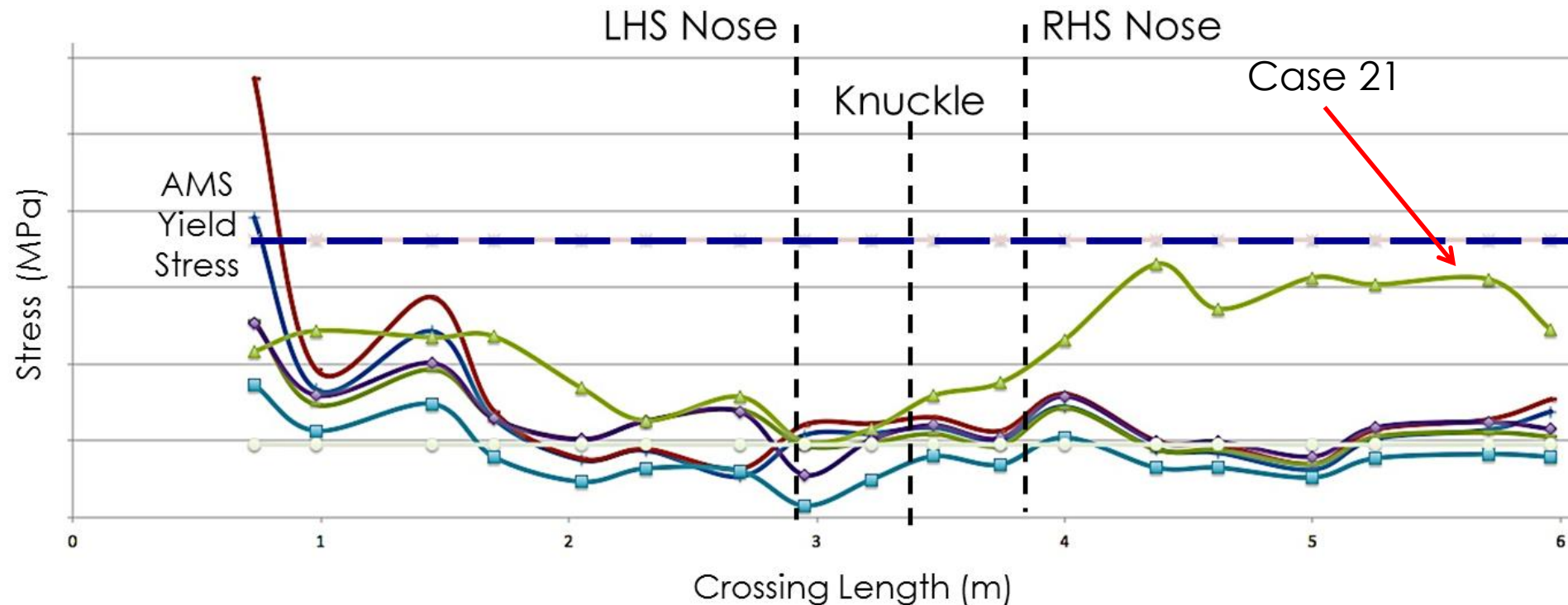
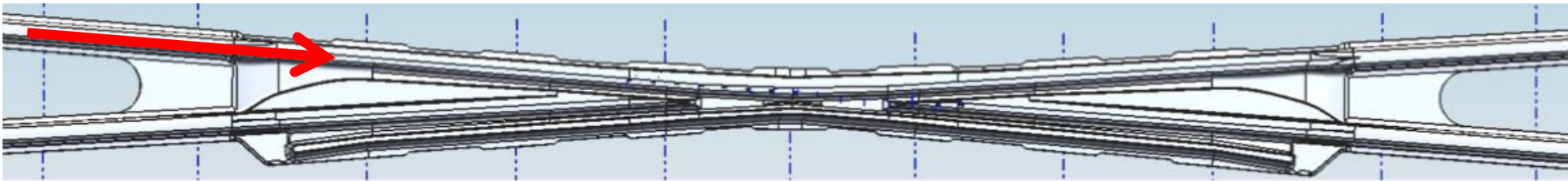
FEA: Initial Results



FEA: Initial Results – NR56/NR60

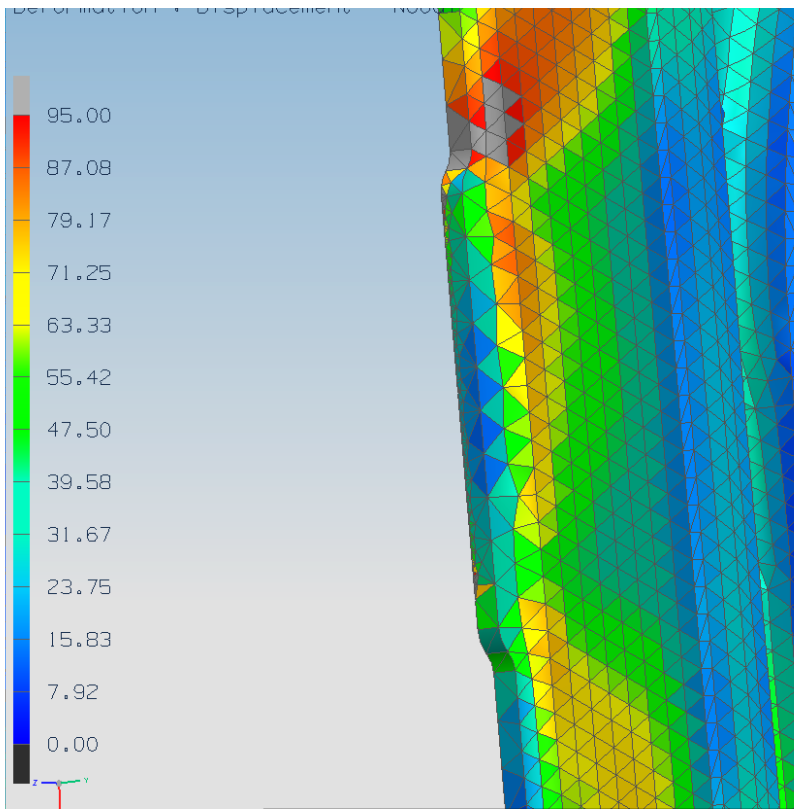


FEA: NR56 – Multiple Wheels

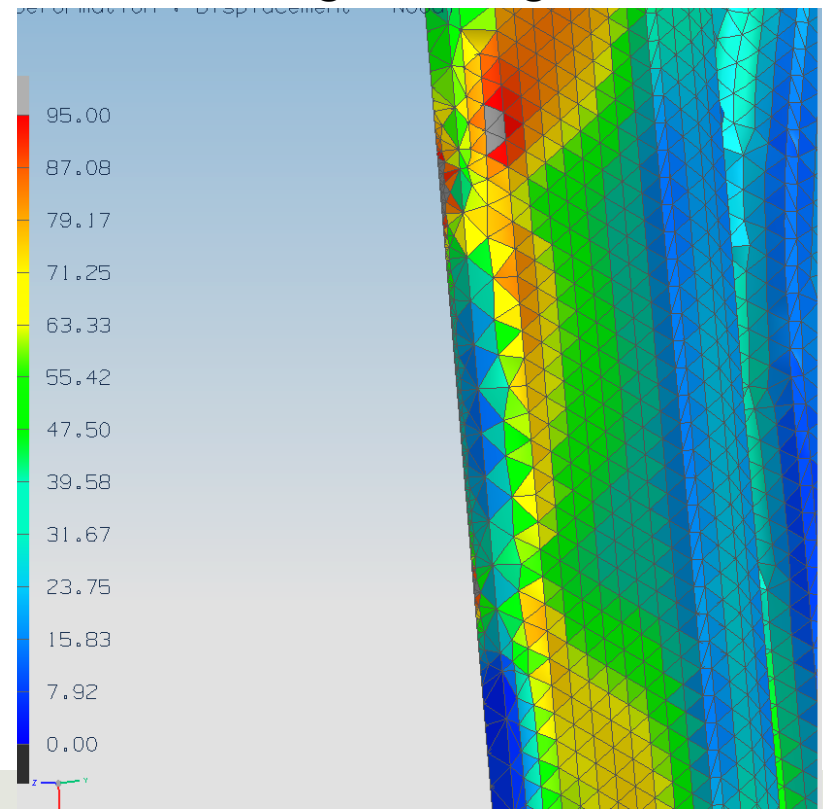


FEA: Design Change – NR56

Traditional Design

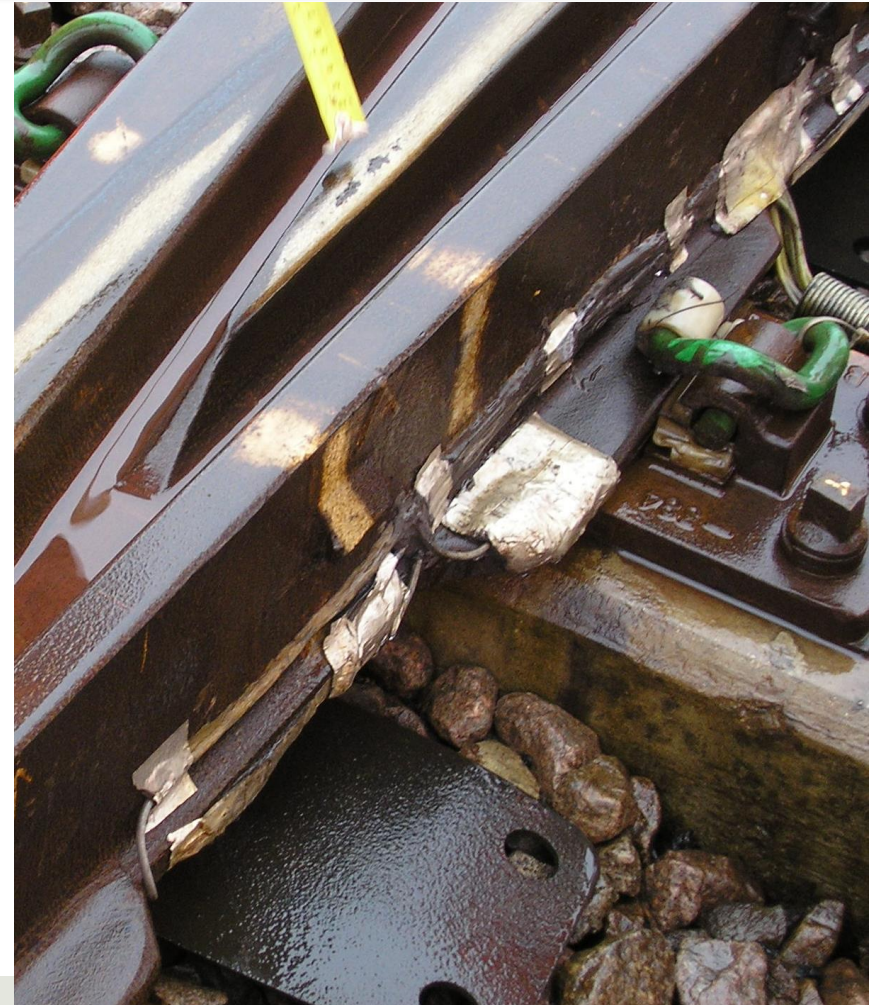


Design Change

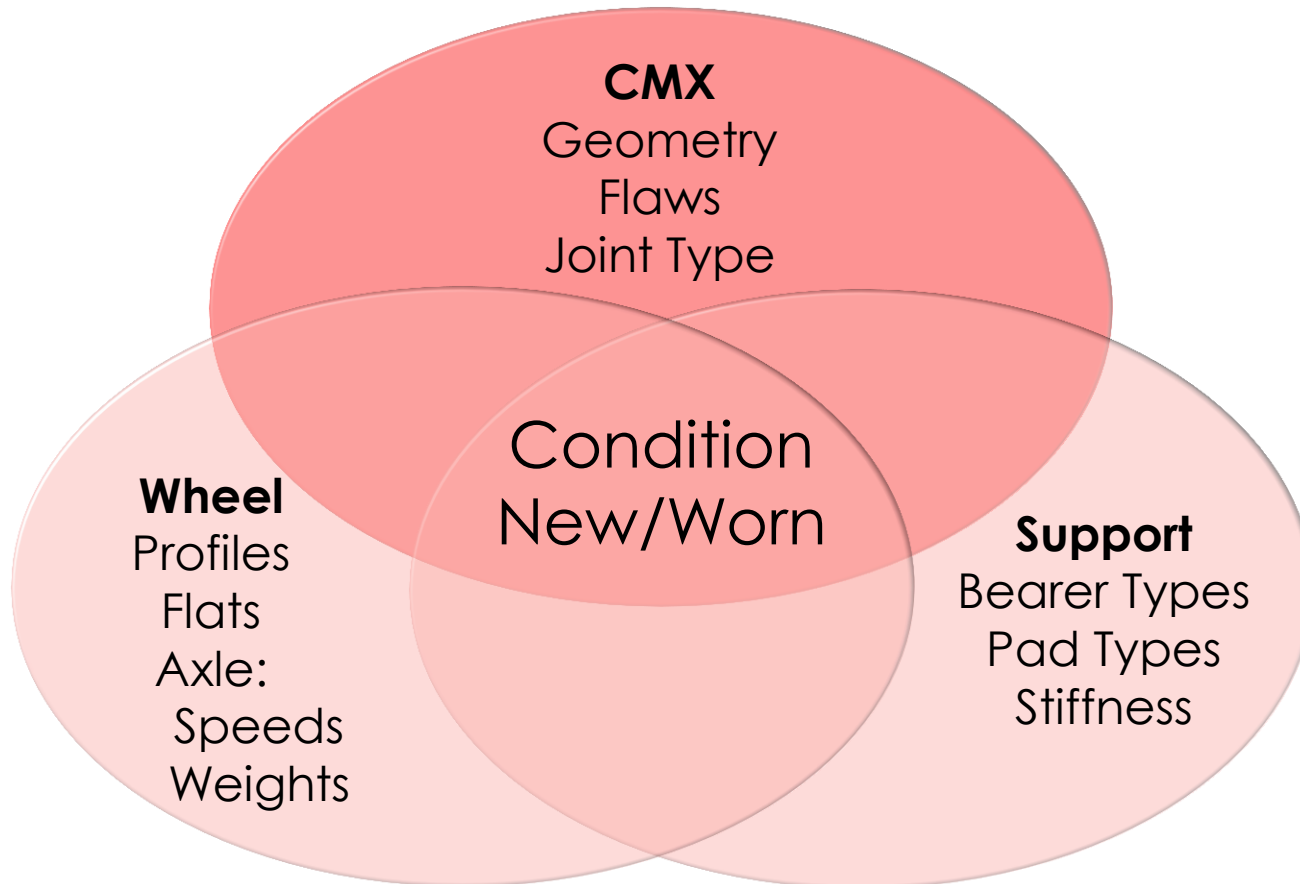


Finite Element Analysis Validation

- Experiments
 - Sheffield – Single Point
- In-Service Data
 - Barnetby Strain Gauges
 - Crossing Failure Reports



Crossing Analysis Variables



Network Rail Response

“promising” [Infrastructure Materials Quality Specialist]

“logical approach” [PhD Student]

“right areas to analyse” [Principal Engineer]

“need to promote the good work”

[Principal Engineer]

“I would like to add how pleased I am with the output so far, and I believe we will all benefit from the changes that can be made as a result of this and other supporting work.”

[Principal Engineer]

Any Questions?

■ Thank you for listening.

