

Rail Asset Owners

OUR SERVICE FOCUS For Engineering Managers, Designer and Maintenance Engineers concerned about the safe operation of your rolling stock and ancillary equipment, Matrix has over 35 years' experience and knowledge in this area. As New Zealand's most experienced engineering analysis team, we offer world-class Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD) engineering simulation and Fitness for Service (FFS) assessments.

SERVICE / SUMMARY Detailed structural analysis using FEA, including static strength, buckling, vibration, fatigue assessment and fitness for service assessment. Non-linear capability to account for complex effects such as contact and material plasticity. Advanced CFD to understand fluid loads, vibrations, HVAC performance and thermal comfort.

- Specialists in Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD) and Fitness for Service (FFS) assessment
- Fatigue assessment of metallic components
- Flexible and rigid body dynamics simulation
- Explicit dynamics for impact simulation
- Advanced analysis problems, e.g. parts in contact, bolted and bonded connections
- HVAC performance and thermal comfort
- Fluid induced loads, vibrations and aeroacoustics
- Proven seamless collaboration with consulting firms over the years



PROBLEMS / SOLUTIONS Matrix provides solutions for rail asset owners requiring with difficult engineering projects:

| Problem | Solution |
|--|---|
| How can I minimise the risk of failure in ageing rolling stock? | Matrix have the expertise to evaluate the life of your assets using the latest methodologies based on fatigue analyses and crack growth studies |
| How do I avoid paying for costly analysis software, staff training and retainment? | Matrix prides itself on offering value for money and its ability to partner with our customers to achieve results. |
| Does a damaged asset have to be removed from service immediately to be repaired or can it wait until a more convenient time? | Matrix can perform a rapid turn-around fitness for service assessment to help you make those difficult decisions. |
| If a failure occurs in service, how do I identify the root cause and avoid further problems? | Significant expertise in fracture mechanics, fitness for service assessments (analysis of damaged parts) and fatigue assessment. |

- CUSTOMERS / EXPERIENCE**
- Customers in the rail industry, NZ Rail correlating strain gauge and analysis results for fatigue analysis
 - Multiple projects involving both mechanical and thermal cyclic loads
 - Fitness for service assessments including extremely high cycle loadings
 - HVAC simulations to understand thermal comfort including solar loads

OUR TEAM Meet our highly qualified and experienced engineering analysts:

- Don Campbell**, BSc, BE(Hons), PhD, CMEngNZ, CPEng (Mech), IntPE, NAFEMS Adv Reg Analyst, 45 yrs exp
- James Hamilton**, BE(Hons), PhD, CMEngNZ, CPEng (Mech), IntPE, composites & non-linear FEA, 20 yrs exp
- Kava Crosson-Elturan**, BE(Hons), (Mech, Purdue), numerical simulation FEA/CFD, physics-driven design, 18 yrs exp
- Guido Quesada**, MSME, ASME, FEA, advanced Abaqus instructor, pipe joints, product development, 23 yrs exp
- James Cheng**, BE(Mech), ME(Mech), fracture mech, press vessel design, plastic injection moulding, 18 yrs exp

ABOUT MATRIX Matrix provides solutions for engineering design and information management. New Zealand's first and largest team dedicated to engineering computing, supporting the process of innovation for over 35 years. Visit www.matrix.co.nz.