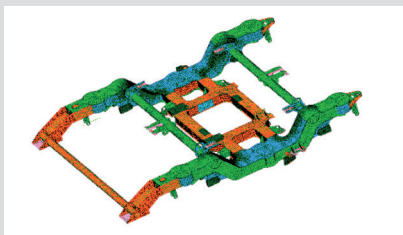


# CORE COMPETENCE

## Analysis and Simulation

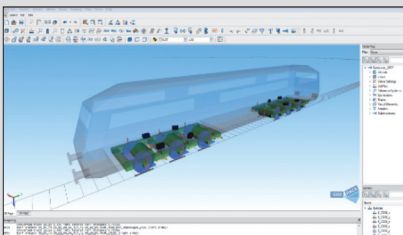
Molinari provides a perfect combination of expert knowledge and calculation tools. Trains and bogies designed by Molinari are the optimum regarding weight, durability, running safety and comfort.

During the design all requirements are solved by an integrated process considering static loads, dynamic forces, running safety and passenger comfort.



## Right tools for a best solution

To achieve the optimal solution within the best time and costs Molinari uses customer and solution oriented tools most suitable for each application.



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## Stress, Fatigue and Dynamics under control

### Overview

The quality, cost efficiency and safety of a railway vehicle and its components can be increased significantly by using analysis and simulation tools during the design stage. We help our customer to prove sufficient safety (e.g., for homologation processes according to any required standards). In addition, we can optimize relevant vehicle properties such as weight, rail-wheel wear or ride comfort. Molinari has the right experts to provide you with a tailored solution.

### Running Dynamics Simulation

- Wheel rail contact analysis
- Wheel rail forces analysis under various conditions
- Wheel rail wear analysis
- Safety against derailment analysis
- Running stability analysis
- Virtual on track test (e.g., according to EN14363)
- Ride comfort analysis
- Determination of forces and accelerations on vehicle and components
- Optimization of running behaviour, determination of the globally best solution by balancing the constraints

### FE Analysis

- Linear and non-linear analysis
- Static and dynamic analysis
- Vibration analysis
- Crash analysis

### FE Fatigue Analysis

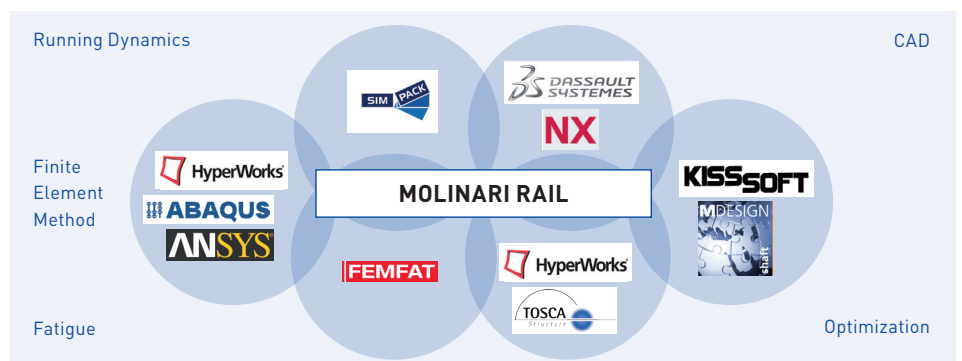
- Synthesis of load collectives from standards or measurement
- Classification of structural features according to various standards
- Fatigue analysis according to various standards using commercial or internal software

### Weld evaluation

- Classification and fatigue analysis of welds according to various standards (e.g., Eurocode, DVS, IIW)
- Definition of weld type and degree of NDT (non destructive testing) to achieve required durability of steel and aluminum structures

### Optimization

- Parametric optimization
- Topology and shape optimization
- Sensitivity analyses
- Conceptual and pre-development studies



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