

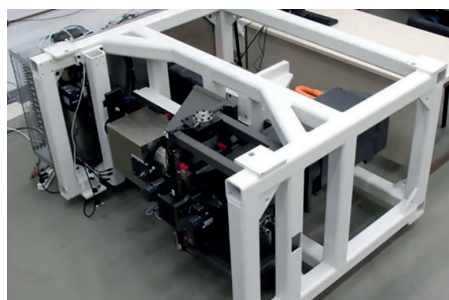


## ANALYSIS OF THE DYNAMIC BEHAVIOR OF THE RAILWAY SYSTEM

The interaction between vehicles and infrastructure is a complex scenario. Vehicle performance must comply with applicable standards and regulations while maintaining the required stability, ride quality, derailment prevention, comfort, etc. Our expertise in railway dynamics is the cornerstone of our railway-based capabilities.

## AD-HOC SOLUTIONS

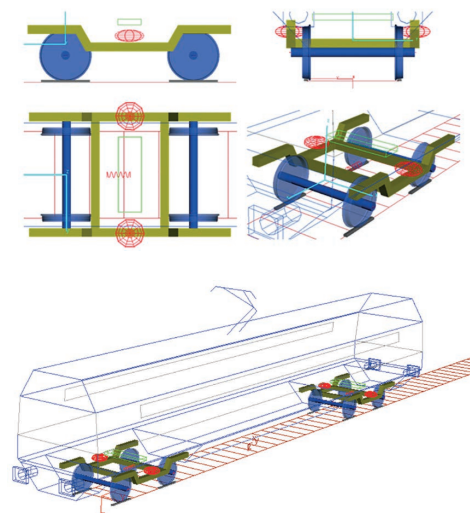
- Vehicle-infrastructure interaction analysis. By means of MultiBody simulations (e.g. Simpack, Vampire, etc.), FE modelling and on-board instrumentation, we analyze different aspects of railway systems, such as:
  - Verification of vehicles running dynamics according to EN 14363.
  - Stability of new vehicles on a given infrastructure.
  - Impact of new vehicles and/or operations infrastructure damage and aging (e.g. corrugation, excessive wear, etc.).
  - Analysis of noise emissions and ride comfort.
- Noise and vibrations analysis to assess the impact of the vehicle operations on adjacent installations.
- Wheel-to-rail contact analysis.
- Friction coefficient analysis for friction modifiers.
- Track dynamic response measurements and safety analysis.
- Asset degradation modeling.
- Component analysis and characterization (modelling, design, characterization and LCC assessment), e.g. suspension components, rubber-metal elements, etc.





## KNOWLEDGE AND EXPERTISE

- Multi-Body Simulations.
- System modeling (analytical, numerical, Multi-Body, Finite Elements).
- Vehicle & infrastructure instrumentation.
- Running dynamics testing.
- Vehicle-infrastructure interaction (wheel-rail and pantograph-catenary interfaces).
- Test-bench design.
- Vibration & noise analysis.
- Component modeling and characterization.



## PARTNERS & CUSTOMERS



metro bilbao



## PROJECTS

