

Design better machines

Simulation solutions for the lifting and handling Industry

Virtual prototyping at the forefront of design

Lifting and handling equipment share common engineering challenges. Machines deal with heavy loads which can cause problems with stability, fatigue, range of motion, and noise.

Having a working virtual test machine to validate new designs before building the first prototype saves companies significant amounts of money, drastically reduces the development time of new products, and leads to quieter, safer and better designs.

With MSC Software solutions, engineers model and simulate a range of engineering problems in a fraction of the time and money compared to traditional “build and test” methods.

Virtual test solutions:

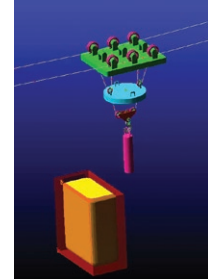
System and sub-system level analysis

- System and sub-system level analysis
- Perform system analysis using functional virtual prototyping
- Leverage System-Level Analysis to identify issues early in the design cycle
- Identify performance issues in subsystems, like chain drive (slip) for forklifts, cables in elevators, gear trains, latches, motor drives, and so on.

Safety and stability analysis

As a result of carrying various loads at varying speed and in different types of terrains,

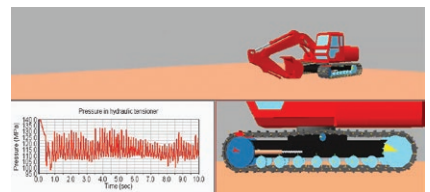
- Conduct Tip-Over Stability Analysis
- Bring more insight into the stability of the equipment to improve future design
- Perform Stability Evaluation and Accident Reconstruction in the virtual test machine to save cost and reduce development cycle
- Study the effects of loading, wheelbase size, vehicle speed, top-heaviness and inclination on the stability of equipment



System and sub-system level analysis



Safety and stability analysis



Controls and hydraulics integrated dynamic analysis

Controls and hydraulics integrated dynamic analysis

- Improve both mechanical and control system designs by applying co-simulation
- Get an accurate picture of your mechanism's real-world operational behavior, with the effects of control systems fully represented

Stress and structural analysis

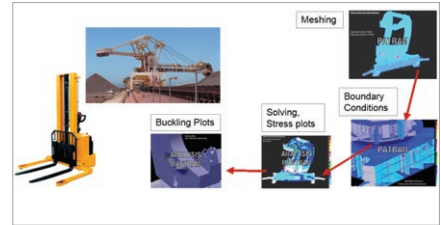
- Conduct FEA analysis of lifting and handling equipment
- Prevent structural failure and reduce risk associated with equipment operation

Fatigue and durability analysis

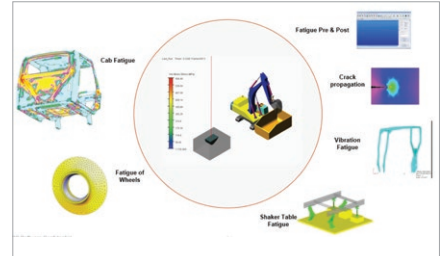
- Conduct failure analysis to address field problems through simulation, such as cracking or vibration fatigue
- Leverage fully featured Stress and Strain-Life solvers
- Calculate damage tolerance using crack growth methods

Elastomer seal analysis

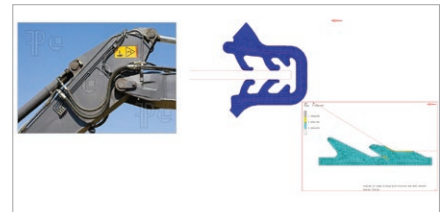
- Use non-linear FEA to simulate the installation of window seals or O rings
- Improve sealing effectiveness by analyzing and optimizing installation forces
- Analyze seal performance with in-service loads
- Study frequency response of seals and mounts
- Analyze flexibility and performance of boots and seals



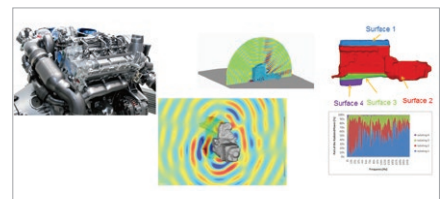
Stress and structural analysis



Fatigue and durability analysis



Elastomer seal analysis



Noise and acoustics analysis



Marc Nonlinear FEA overcame problems seen with other finite element software packages such as non-convergence and provided reliable and results that matched experimental measurements”

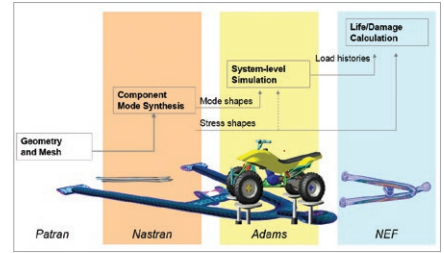
Dr. Martin English,
Design & Dev. Manager, Hadley Industries

Noise and acoustics analysis

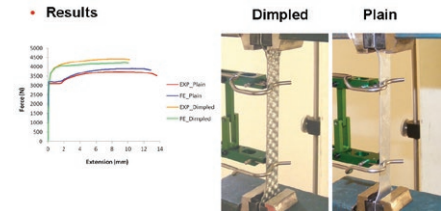
- Address your engine noise issues using numerical Acoustics simulations
- Study intake/exhaust noise issues
- Analyze cooling fan noise issues
- Improve cabin noise insulation
- Reduce high speed elevator noise

Multidiscipline engineering

- Integrate multibody dynamics and finite element analysis methods for more accurate dynamic loading and stress analysis
- Perform more efficient and higher-fidelity fatigue and durability analysis
- Leverage integrated multibody-acoustics simulations to analyze radiation noise from gear transmission case



Multidiscipline engineering



Results correlation (virtual to physical)



Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

MSC Software, part of Hexagon's Manufacturing Intelligence division, is one of the ten original software companies and a global leader in helping product manufacturers to advance their engineering methods with simulation software and services. Learn more at [mscsoftware.com](https://www.mscsoftware.com). Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter.

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