

# SIEMENS

*Ingenuity for life*

Automotive and transportation

## Magneti Marelli

Automotive supplier uses Simcenter to enhance strength and durability of suspension structural components

### Product

Simcenter

### Business challenges

Calculate the life expectancy of components and joints rather than utilize just stress analysis

Produce lighter components

Accurately predict the lifespan of components and welded joints

Reduce prototype cost

Enhance correlation between virtual analysis and bench tests for welded components

### Keys to success

Accurately reproduce test environment in CAE simulation

Provide customers with lighter-weight parts that enhance fuel efficiency

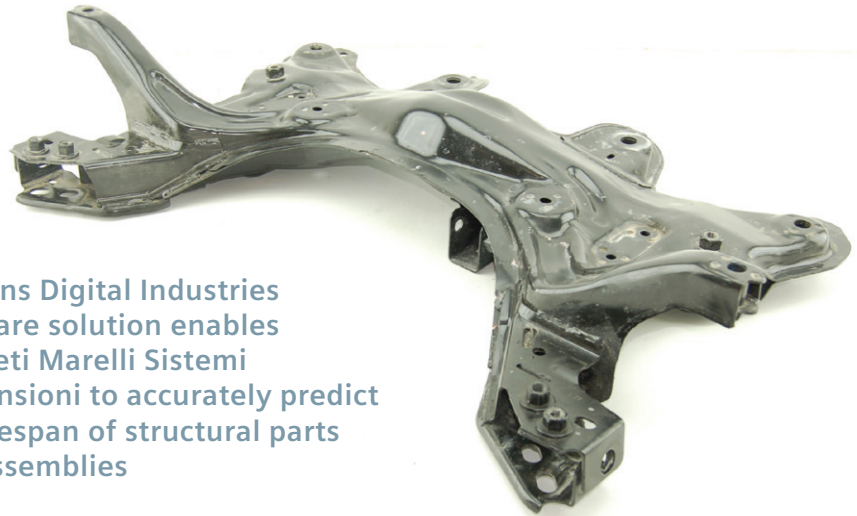
Predict fatigue life for the base material, including spot and seam welds

### Results

Enhanced strength and durability of components

Optimized design before developing a prototype

Enabled company to accurately predict the lifespan of components and assemblies



Siemens Digital Industries Software solution enables Magneti Marelli Sistemi Sospensioni to accurately predict the lifespan of structural parts and assemblies

### Calculating expected lifetime

Magneti Marelli Sistemi Sospensioni (Magneti Marelli) produces advanced systems and components for the automobile industry. With 89 production units, 12 research and development centers and 26 application centers in 19 countries, the company supplies all the major carmakers in Europe, North and South America and the Far East. It has more than 38,000 employees and realized a turnover of €6.5 billion in 2014.

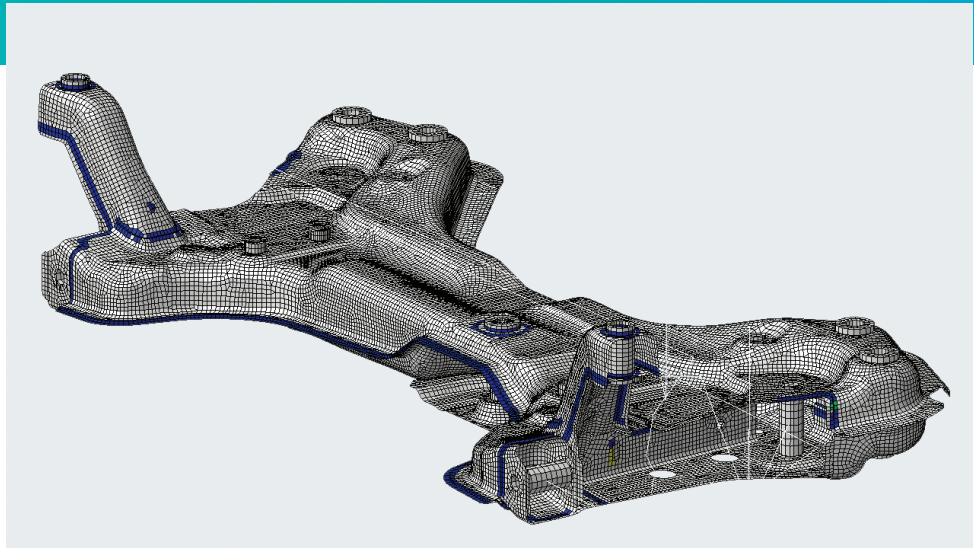
Magneti Marelli's business areas include electronic systems, lighting, motor control, suspension systems/shock absorbers, exhaust systems, aftermarket parts/services, plastic components/modules, and motorsports. The company is part of Fiat Chrysler Automobiles (FCA).

To retain its position as a leading supplier of automotive parts and assemblies, Magneti Marelli was faced with a number of challenges, including producing lighter components to improve fuel efficiency, accurately predicting the lifespan of components and assemblies, reducing prototype cost and improving the correlation between virtual analysis and the bench testing of welded joints.

In fact, a growing number of original equipment manufacturers (OEMs) are asking suppliers to calculate the life expectancy of components and joints rather than just perform the traditional stress analysis.

**“Durability simulation solution from the Simcenter portfolio is now well integrated in our product development process, and it has changed the way Magneti Marelli works.”**

Andrea Santini  
Head of CAE and Innovation  
Magneti Marelli Sistemi  
Sospensioni



#### **Optimizing redesign**

To meet these challenges, Magneti Marelli Sistemi Sospensioni is using the Simcenter portfolio from product lifecycle management (PLM) specialist Siemens Digital Industries Software. It particularly relies on the durability simulation solution from the portfolio, which enables them to execute fast and accurate durability analysis predictions. Dedicated postprocessing capabilities provide immediate feedback regarding all critical durability areas, loads and events so they can:

- Validate more design variants for fatigue life within shorter development cycles
- Use durability analysis to simulate performance of large and complex systems
- Optimize durability performance with lightweight and eco-friendly materials
- Better understand and improve fatigue testing

Magneti Marelli Sistemi Sospensioni found that the durability simulation solution from Simcenter portfolio enabled them to accurately correlate the virtual results with test bench results. The postprocessing features also provided useful information for predicting the lifetime of components and assemblies. As a result, the company was able to optimize the design before producing a physical prototype.

Ultimately, Magneti Marelli Sistemi Sospensioni found that using simulation enhanced the strength and durability of their products.

#### **Providing reliability**

“With the Simcenter solutions, for the first time we were able to accurately correlate with the bench test results,” says Andrea Santini, head of computer-aided engineering (CAE) and innovation for Magneti Marelli Sistemi Sospensioni.

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Head of CAE and Innovation  
Magneti Marelli Sistemi Sospensioni

## Solutions/Services

Simcenter  
siemens.com/simcenter

### Customer's primary business

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www.magnetimarelli.com

### Customer location

Turin  
Italy

**"The durability simulation solution from the Simcenter portfolio is flexible and has been integrated into our product development process to optimize design and ensure that prototypes pass the physical test on the first attempt."**

Andrea Santini  
Head of CAE and Innovation  
Magneti Marelli Sistemi Sospensioni

**"What we appreciate about the Simcenter solutions is the reliability of the results."**

Andrea Santini  
Head of CAE and Innovation  
Magneti Marelli Sistemi Sospensioni



"We used fatigue life prediction for the base material, which included aluminum, cast iron and steel, and the arc weld, seam weld and spot weld durability analysis in our product development process. What we appreciate about the Simcenter solutions is the reliability of the results."

Santini notes, "The durability simulation solution from the Simcenter portfolio is now well integrated in our product development process, and it has changed the way Magneti Marelli works."

For a company such as Magneti Marelli, competitiveness in the green economy is a critical concern, and by conducting the durability analysis it is able to provide the lightest products possible to its original equipment manufacturer (OEMs), which in turn reduces the weight of the car and fuel emissions.

Given the concern in the automotive industry about reaching increasingly stringent regulatory standards for emissions, that represents a real competitive edge for Magneti Marelli.

### Passing the physical test

With the durability simulation solution, typically simulation and experimental measurements match and that enables computing fatigue on thin plates up to two millimeters. "The software is reliable, especially important in computing the fatigue of parts with seam and spot welds," says Santini.

"The durability simulation solution from the Simcenter portfolio is flexible and has been integrated into our product development process to optimize design and ensure that prototypes pass the physical test on the first attempt."

## Siemens Digital Industries Software

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