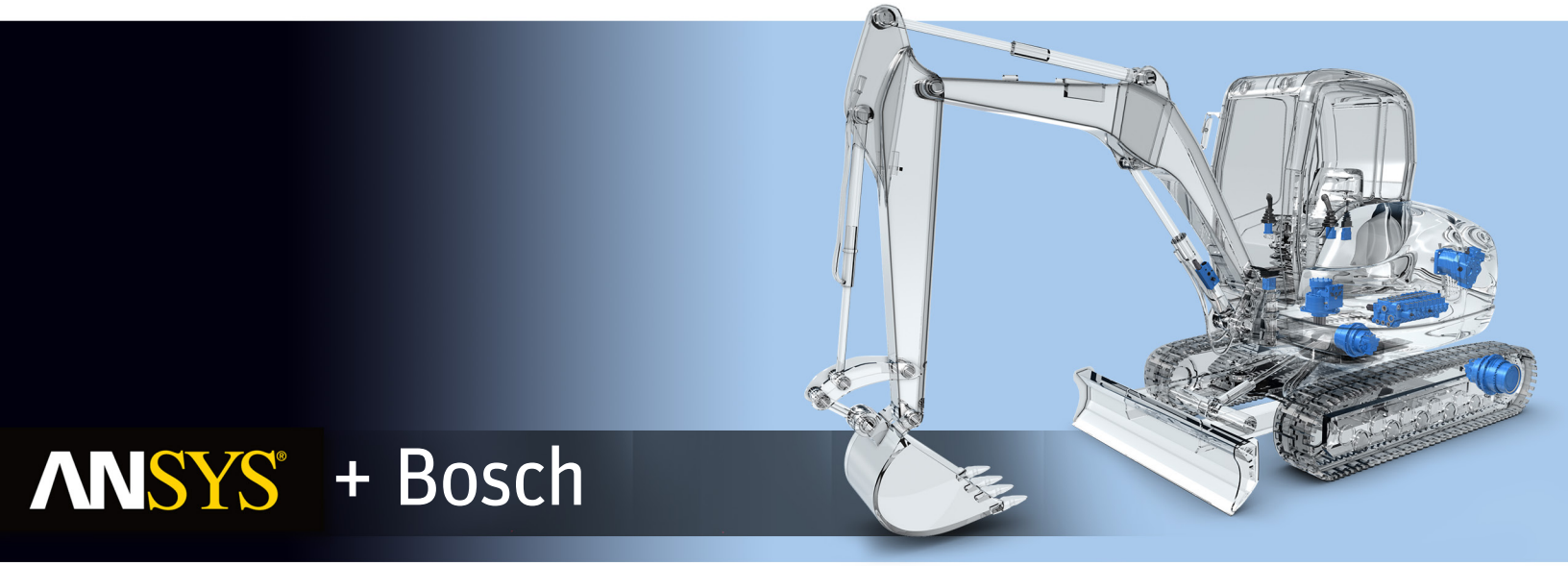
Case Study

ANSYS® + Bosch



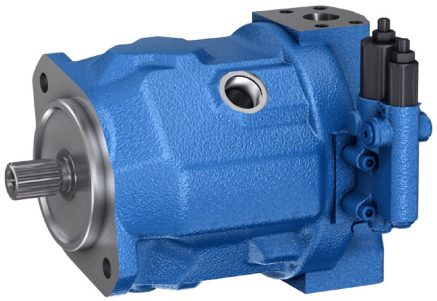
"ANSYS Mechanical helped in the development of axial piston pump parts by strength and contact analysis at various loading conditions, which helped us to improve the pump's strength and endurance."

Devaraj B A
Simulation Engineer
Robert Bosch Engineering and Business Solutions Private Limited

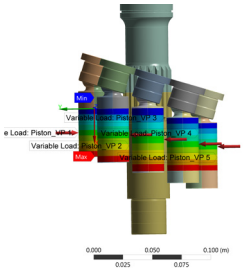
ANSYS

Bosch

Simulation Evaluates Strength and Contact Behavior of Axial Piston Pump



Bosch Rexroth Axial Piston Variable Pump (Type A10VSO series 31)

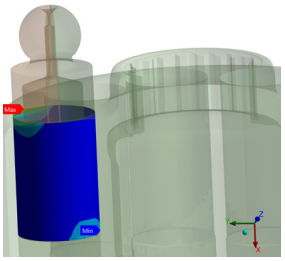


Loading to axial piston pump. Variable pressure is applied to the piston surfaces to match real conditions.

Axial piston pumps are sources of power for many dynamic machines, especially for high-pressure applications. Axial piston pumps from Bosch are designed using the latest state-of-the-art engineering to provide the customer with the highest level of efficiency and reliability. Bosch axial pumps lead their class with high power density, economical design and small size.

Business Challenges

Bosch must constantly develop pumps for new applications and working environments according to customer needs. The main challenges are to maintain the strength of the pump while optimizing the design parameters, and to ensure an optimal safety factor for longer cycles of operation. ANSYS structural simulations, validated by physical testing, were used to meet these challenges.



Contact pressure between a) cylinder and piston, and b) piston and piston shoe

Technology Used

ANSYS® Mechanical®
ANSYS® DesignXplorer®

Engineering Solution

- ANSYS Mechanical was used to perform static structural simulations and check the strength of the pump
- ANSYS DesignXplorer (parametric optimization) was used to optimize the dimensions of the design
- ANSYS engineering simulations optimized the design, predicted critical areas and closely matched the physical test bench results

Benefits

- Bosch saved critical product development time by predicting critical areas of failure using ANSYS engineering simulation solutions
- ANSYS simulations suggested more design changes for optimal pump performance in less time compared to conventional build-and-test methods
- ANSYS engineering simulations reduced product development time by a factor of five, giving Bosch engineers more time for evaluation

Company Description

Robert Bosch GmbH is a German multinational engineering and electronics company headquartered in Stuttgart, Germany. It was established in Stuttgart in 1886. The Company generated sales of 73.1 billion euros in 2016.

Bosch's core products are automotive components (including brakes, controls, electrical drives, electronics, fuel systems, generators, starter motors and steering systems), industrial products (including drives and controls, packaging technology and consumer goods) and building products (including household appliances, power tools, security systems and thermotechnology).

BOSCH
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