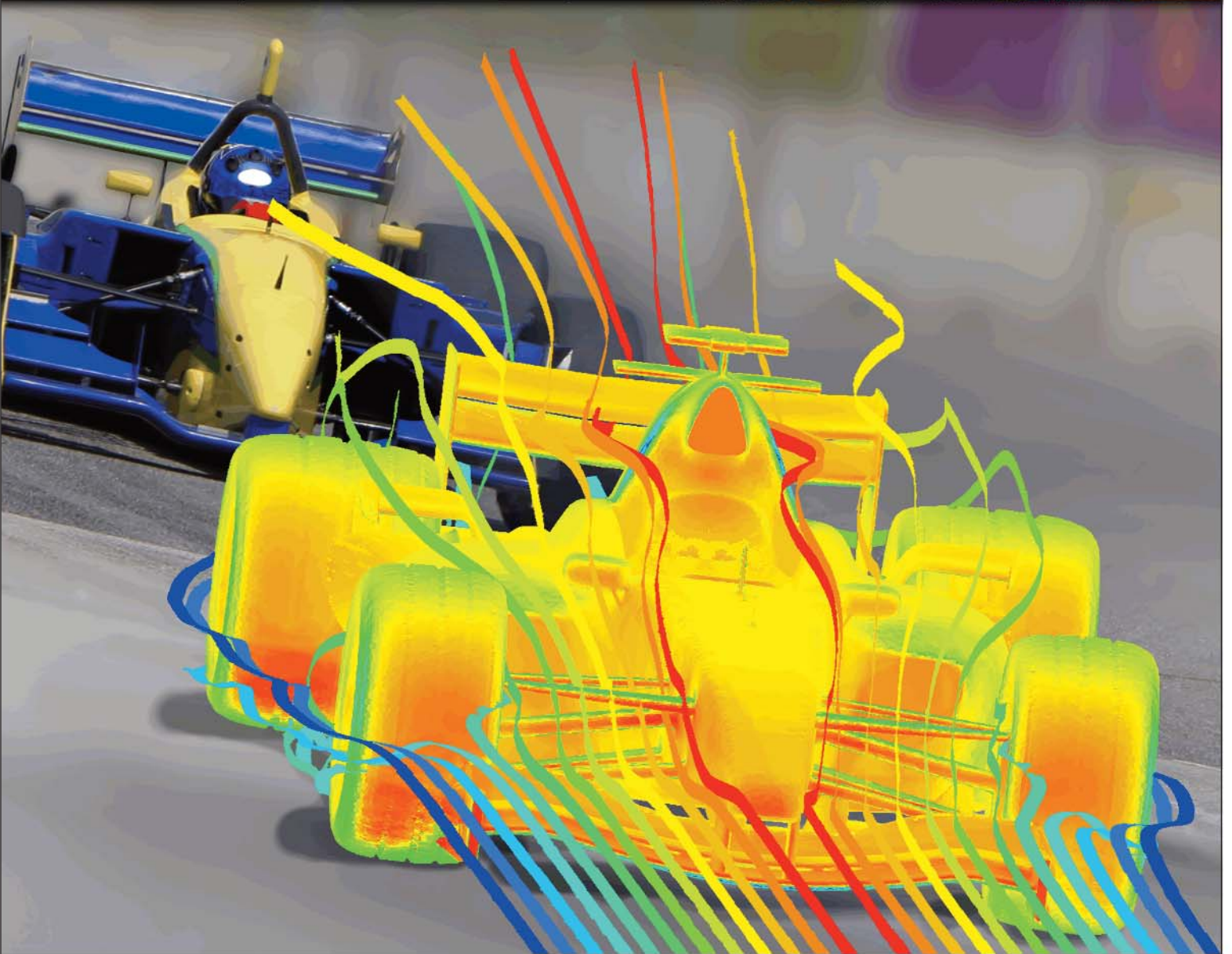
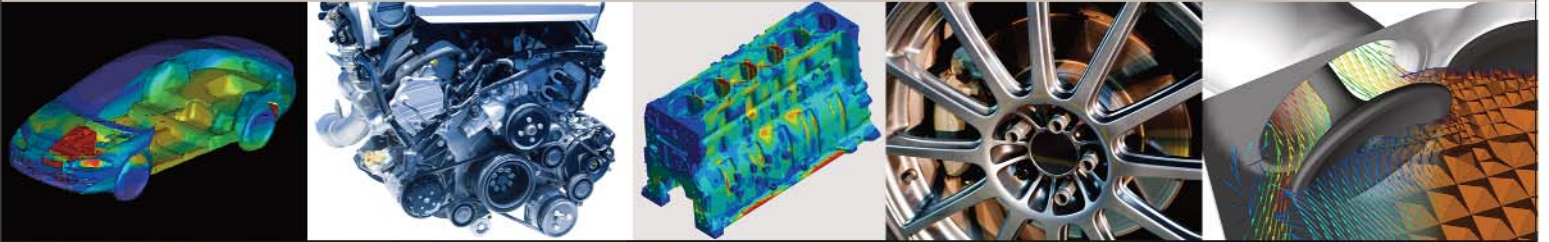




Engineering Simulation Solutions for the
automotive Industry



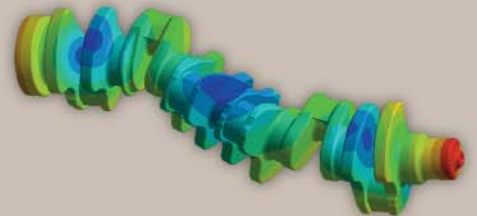


With the unequalled depth and unparalleled breadth of engineering simulation solutions from ANSYS, companies in the automotive industry are transforming their leading-edge design concepts into innovative products and processes that work. Today, 97 of the top 100 industrial companies on the "FORTUNE Global 500" invest in engineering simulation as a key strategy to win in a globally competitive environment. They choose ANSYS as their simulation partner, deploying the world's most comprehensive multiphysics solutions to solve their complex engineering challenges. The engineered scalability of our solutions delivers the flexibility customers need, within an architecture that is adaptable to the processes and design systems of their choice. No wonder the world's most successful companies turn to ANSYS — with a track record of almost 40 years as the industry leader — for the best in engineering simulation.



Challenges and Solutions

Growing scrutiny of pollution caused by vehicles, compounded by the rise in oil prices, has increased the emphasis on product innovation in the highly competitive global automotive industry. The most successful companies differentiate themselves by employing simulation technologies in the earliest stages of design to reduce development cycles and lower costs. As a provider of Simulation Driven Product Development™ tools, ANSYS, Inc. is helping the industry's leading companies master the integration of simulation in order to transform design concepts into top-selling products.



Advanced Simulations

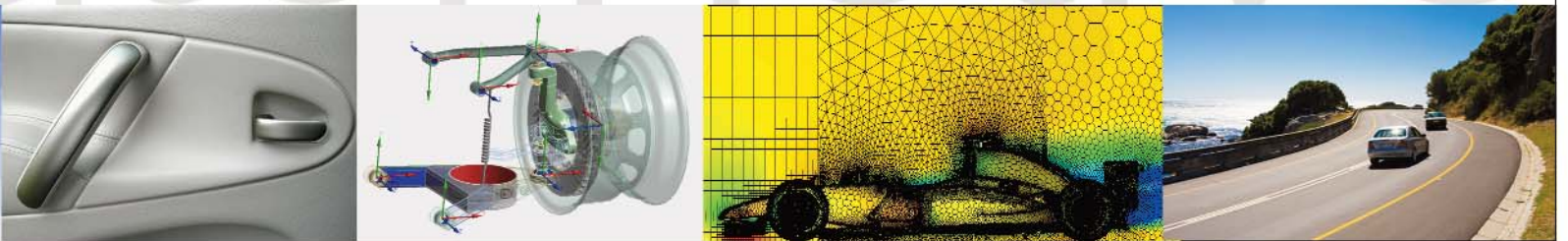
The geometric complexity and advanced physics involved in the modern automobile present some of the most challenging simulation problems faced by engineers today. Market pressures to create innovative products in less time emphasize the need to carry out more advanced simulations, faster than ever before. ANSYS provides fast, accurate solutions for the automotive community with the most comprehensive set of automated CAD-associative meshing tools. These are fully integrated with advanced physical modeling capabilities in all of the major analysis disciplines including structural, thermal, electromagnetics and fluids. From aerodynamics and thermal management to engine design, durability and NVH, products and application knowledge from ANSYS are helping companies to understand product performance and optimize designs long before a prototype is ever built.

Comprehensive Multiphysics Modeling

The automotive industry was one of the earliest adopters of simulation technology, and now the most innovative companies in the industry continue to look for ways to bring simulation closer to reality. To accurately assess product performance, the design must be analyzed in its working environment and simultaneously account for the multiple physics. The ANSYS® Workbench™ platform provides a unified environment that hosts all advanced technologies, easily allowing for multiple physics to be analyzed at one time. ANSYS Workbench technology stores the design concept in a virtual environment linked directly to the CAD model, allowing engineers to move toward true multiphysics design optimization.



Automotive



“The Cummins Analysis Led Design strategy is a corporate-wide initiative to change the prevalent test-first culture; it has had a major impact at the company, with significant benefits that include shorter development time, lower costs and improved products. The group partners with key software vendors in efforts to develop improved simulation tools, and one of the primary relationships is with ANSYS, Inc. In fact, the relationship has been the benchmark set for subsequent partnerships. Technology from ANSYS has become the primary finite element tool within all Cummins business units for conducting static structural, thermal, transient thermal, modal, harmonic and other analyses.”

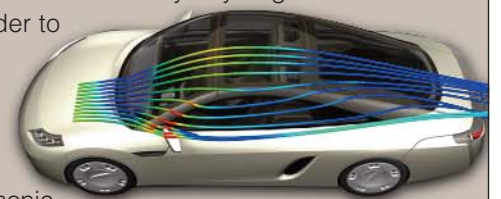
Bob Tickel
Director of Structural and
Dynamic Analysis
Cummins, Inc.

Adaptive Architecture for Engineering Knowledge Management

With the substantial investments that companies are making in simulation technology, auto companies are turning their focus to improved integration into the design environment as well as knowledge capture and data management. Tools from ANSYS are engineered to easily capture and manage simulation processes so that automated workflows can be established and wider deployment of simulation is achievable. The open and adaptive architecture of the ANSYS Workbench platform enables easy data and process sharing as well as efficient handling of legacy data, coupling to third-party CAE tools, and integration with a variety of CAD and PLM systems. Fully customizable architecture allows deployment in virtually any engineering environment with any specifications in order to gain maximum value from CAE investments.

Capabilities

- ▶ **Mechanical Solutions:** Static, modal and harmonic analysis; transient and spectrum analysis; buckling and fatigue; nonlinear materials; automated contact detection; composites; rigid and flexible multi-body dynamics; topological optimization; variational sensitivities; customizable loads and other analysis capabilities for mechanical and materials systems
- ▶ **Fluid Simulation Solutions:** Steady and unsteady; laminar, turbulent and transitional flow; LES/DES/SAS; moving and deforming geometry; convective, conductive, radiative and conjugate heat transfer; aero-acoustics; species transport and reactions; spray and combustion; phase change including boiling, cavitation, melting and solidification; rotating machinery; solid-fluid interaction analysis
- ▶ **Pre-Processing Solutions:** Bi-directional CAD connectivity; 3-D parametric modeling; surface-wrapping technology; structured, unstructured, hex-dominant and polyhedral meshing; automation and scripts; legacy data handling



aerodynamics • aeroacoustics • airbags • air filter •

brakes • chassis • climate control • defog and defrost •

durability • electronics cooling • emissions control •

engine flow and combustion • exhaust systems •

fatigue • fluid structure interaction • fuel cells • hybrid electric

drives • hydraulics • transmission • **automotive**

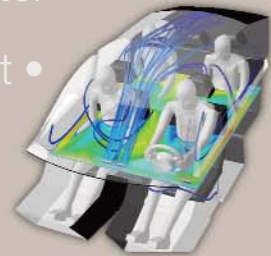
manufacturing parts and components • noise, vibration and

harshness • lighting equipment • painting and

drying process • rain water and soiling •

solar load • suspension • tank filling and sloshing • turbo

charger and torque converter • underhood thermal management •



About ANSYS, Inc.

ANSYS, Inc., founded in 1970, develops and globally markets engineering simulation software and technologies widely used by engineers and designers across a broad spectrum of industries. The Company focuses on the development of open and flexible solutions that enable users to analyze designs directly on the desktop, providing a common platform for fast, efficient and cost-effective product development, from design concept to final-stage testing, validation and production. The Company and its global network of channel partners provide sales, support and training for customers. Headquartered in Canonsburg, Pennsylvania, U.S.A., with more than 60 strategic sales locations throughout the world, ANSYS, Inc. and its subsidiaries employ approximately 1,700 people and distribute ANSYS products through a network of channel partners in over 40 countries.

Visit www.ansys.com for more information.

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