

Making the Best-in-Class Even Better

For decades, ANSYS Mechanical has been the industry standard for structural analysis — the tool of choice for solving complex problems including fracture and fatigue. Over the years, the software has steadily evolved to meet our customers' needs to solve ever-larger and more complex engineering challenges. Today, this best-in-class solution has reached a new level of performance and user friendliness, capable of solving tens of millions of degrees of freedom quickly. Welcome to a new era of structural simulation.

When the technology underlying ANSYS Mechanical made its debut in 1969, it was nothing short of revolutionary. For the first time, engineers could conduct finite element analysis (FEA) and other mechanical studies in an engineering-centric environment, making predictions about how products would perform before physical prototypes were ever constructed. It significantly reduced the time and financial investments needed to develop products, while also increasing engineers' confidence in their designs. The technology was nothing short of a game changer.

While early analysts had to define and construct their own FEA studies by hand — which required a deep understanding of physics, meshing and numerical FEA calculations — in the 1990s all that changed. I was part of a team that reimagined the software so that it could do more of the heavy lifting while also designing a more user-friendly interface.

Automating processes like FEA abstraction, contact specification and meshing significantly accelerated product development while supporting creativity and risk-taking. In nearly every industry, ANSYS Mechanical helped fuel a new level of speed and design exploration, resulting in many product innovations that changed our world.

Throughout the 2000s and 2010s, growing concerns about fuel efficiency and product lightweighting forced engineers to work with razor-thin material margins while still ensuring uncompromising safety in mission-critical applications. Simulations became ever more complex as engineers began to conduct

multiphysics analyses, apply more operating parameters, and investigate both new materials and new manufacturing processes. And they had to accomplish all this with lower budgets, fewer engineers and tighter launch deadlines.

ANSYS responded by capitalizing on advancements in hardware, data management and processing, analytics, and high-performance computing to make ANSYS Mechanical equal to these challenges — faster and stronger than ever.

Extreme Power with Extreme Ease

Backed by decades of experience and world-leading technical expertise, ANSYS remains at the forefront of the next era of structural simulation.

Some recent revolutionary changes make ANSYS Mechanical even more powerful — with new capabilities in fracture and acoustics analysis — while also making it more accessible via a new user interface. More of the heavy lifting in ANSYS Mechanical happens behind the scenes, which means more members of any product development team will be able to fully utilize the software without the need for lengthy or extended training. This expands the use of simulation beyond traditional analysts and amplifies our customers' human resources.

This issue of *ANSYS Advantage* is packed with impressive examples of ANSYS Mechanical at work in the real world. These customer stories demonstrate how ANSYS Mechanical continues to deliver the extreme degree of accuracy and fidelity needed to ensure performance in the most demanding, mission-critical applications.



By **Al Hancq**
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Ongoing Innovation: Our Commitment

The original users of ANSYS Mechanical would be stunned by the degree of complexity encountered by today's product development teams — and the way ANSYS software has evolved to meet these challenges. While early users of ANSYS Mechanical were solving models on the order of 10,000 nodes, now solving 10 million nodes is routine — and our solvers and algorithms are simply unmatched in their ability to handle these numerically large, incredibly complex structural problems.

Looking ahead, there's no limit to what can be achieved via simulation. In collaboration with other ANSYS solutions, ANSYS Mechanical enables the increasing adoption of system-level studies, additive manufacturing, digital twins and other forward-looking engineering practices. With its ability to gather and analyze millions of data points, ANSYS Mechanical will surely also support the future use of artificial intelligence and machine learning.

As new technology trends emerge and industry needs evolve, ANSYS Mechanical will remain the world's most innovative mechanical simulation solution and the industry standard for years to come. **A**