



Richard Petty Motorsports Speeds New Designs to the Track 50% Faster with Dassault Systèmes PLM

DELMIA, CATIA, and ENOVIA SmarTeam Help Drive Benefits

AN ENGINEERING-CENTRIC PHILOSOPHY

In the competitive world of NASCAR, the difference between first and last place is only fractions of a second per lap. Even minor improvements in the race car can make the difference at the finish line. But these improvements must be made at lightning speed, so there is no time for trial and error in the shop.

Officials at Richard Petty Motorsports therefore believe mechanical prowess, the sport's traditional source of advantage, is being surpassed by engineering excellence. The company, created in 2008 from Gillett Evernham Motorsports and Petty Holdings, is one of the sport's most engineering-centric organizations.

"I have an 'open-wheel' mindset that constantly pushes our teams, whether racing or engineering, to go further, faster, with better technology," said Mark McArdle, vice president and managing director of competition, Richard Petty Motorsports. "Dassault Systèmes Product Lifecycle Management (PLM), including CATIA, ENOVIA SmarTeam, and DELMIA, is an important part of our win-through-engineering strategy."

The Petty organization owns 268 Sprint Cup victories since its first race in 1949, while Gillett Evernham Motorsports tallied 15 victories since 2001, when the team ushered in Dodge's return to NASCAR under the leadership of Ray Evernham. Richard Petty Motorsports, owned by George Gillett and Richard Petty, has four Sprint Cup teams, with drivers Kasey Kahne, Elliott Sadler, Reed Sorenson, and AJ Allmendinger, along with many world-class sponsors.

AN INTEGRATED SOLUTION FOR AN INTEGRATED STRATEGY

In NASCAR, the need for speed on the track is rivaled only by the need for speed in engineering. Kellen Brown, senior project engineer, Richard Petty Motorsports, said the engine development team turns out a minimum of ten engines each week. Body configurations change rapidly, too, lasting no more than two months each. "The only certainty in our sport is change—and it's fast, it's real-time," said Tommy Wheeler, director of engineering services, Richard Petty Motorsports.

The team chose CATIA and ENOVIA SmarTeam in 2002 to replace a mismatched set of engineering tools. Richard Petty Motorsports now uses CATIA for virtual 3D modeling of every aspect of car development and production, from engine and car design to tooling and manufacturing. ENOVIA SmarTeam intelligently stores and tracks all of the



A DELMIA Robotics simulation for the design of welding fixtures.



◀ Team 19 driver Elliott Sadler rounds the track in a NASCAR Sprint Cup Series race.

team's CATIA product designs and related engineering data for quick access and reuse.

In 2008, the team added DELMIA Robotics as its 3D welding and simulation solution. DELMIA allows the team to capture best practices and automate the repetitive work of robot programming, accelerating the speed at which it moves new designs onto the track.

CATIA IS WHERE ENGINEERING EXCELLENCE BEGINS

Steve Oliver, deputy technical director of design and engineering, Richard Petty Motorsports, said his team designs nearly all the components of a new engine using CATIA—down to nuts, bolts, and o-rings. "We're using it to be sure we have good fits and good documentation of all the components. CATIA is cutting about 50% off our development time."

KNOWING WHAT YOU KNOW

Oliver said that the use of CATIA carries over to manufacturing. "The designs of all the accessory components that are now manufactured in-house, and a lot

that are manufactured outside, are based on CATIA models."

"One of the big reasons we chose CATIA is that it allows you to do CNC programming within the same software we use for design and engineering," said design manager Eric Kominek. "Before CATIA, if we had to make changes on the shop floor we didn't have a way to reverse engineer and that knowledge would be lost. Now, that's all captured automatically in real time."

Once a part has been designed, getting it to manufacturing is simple and efficient. With ENOVIA SmarTeam's built-in revision control and management, everyone on the team is assured of having the most up-to-date copy of part drawings.

"When we save a design model in ENOVIA SmarTeam, the machine shop can pull that same part file into their software and create tool paths on the model we actually designed," said Kelton Sprinkle, the team's design/manufacturing engineer. "Accuracy just doesn't get much better."

The team also relies on ENOVIA SmarTeam to track its ongoing design projects.

DELMIA MAKES ROBOTIC CONTROL A SNAP—VIRTUALLY

Richard Petty Motorsports is using DELMIA's Robotic simulation capabilities to save time and cut costs in the design of welding fixtures. DELMIA allows the team to program its robot virtually and visualize their motion to check for collisions or space restrictions before anything is built in the physical world.

"Before we machine a fixture or work on a holding part, we can simulate the tool path of the welder and avoid any interference issues," Sprinkle said. "We can try a new part, check the fit, change the design on the fly, check all our motion ratios and sizes, and know it's going to work dimensionally before we ever machine the first piece."

Virtual modeling eliminates scrap and re-machining of parts while avoiding time-consuming programming. "No machinist time is wasted, and no CNC time is used," Sprinkle said. "All reconfiguring and iterations can be done in the virtual environment."

Creating a program in DELMIA Robotics and downloading it to the robot, versus manually programming the robot, is another notable savings. For a 100-step program, it can take ten hours to physically teach, tweak, maneuver, and adjust the robot. Utilizing DELMIA Robotics, Sprinkle estimates programming time has been cut 40-50%, and could even increase to 60%.

THE NUTS AND BOLTS

"The reality is we compete against a lot of race teams that are probably equal to us in terms of talent," Wheeler said. "What it comes down to is this: the one who makes the best choices and does it in the least amount of time wins." ■

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