



# INDMAR PRODUCTS, INC. INCREASING INNOVATION IN MARINE ENGINE PRODUCTS WITH SOLIDWORKS SOLUTIONS

Case Study



Indmar Marine Engines relies on SOLIDWORKS design, simulation, flow simulation, technical communication, and product data management (PDM) solutions to more efficiently convert automobile engines for use as marine inboard engines, which are used on jetboats and high-performance towboats for wakeboarding and waterskiing.



### **Challenge:**

Streamline workflows to shorten product development cycles, make customer interactions more efficient, and support increased throughput.

### **Solution:**

Implement SOLIDWORKS Professional design, SOLIDWORKS Premium design and analysis, SOLIDWORKS Flow Simulation computational fluid dynamics (CFD) analysis, SOLIDWORKS Composer technical communication, and SOLIDWORKS PDM Professional product data management software solutions.

### **Results:**

- Cut design cycles by 40 percent
- Eliminated two rounds of physical prototyping
- Improved data exchange, interaction with customers
- Replaced high-cost photography with renderings

Indmar Products, Inc. manufactures inboard marine engines for use in high-performance towboats for wakeboarding and waterskiing and jetboats for traveling up and down white water. Founded in 1971 in Millington, Tenn., by U.S. Marine Corps veteran Dick Rowe, Indmar converts automobile engines for use as marine inboards by marinizing them. Marinization—equipping the engine for use on a boat—is an involved process and entails redesigning everything but the basic engine block to meet the performance requirements of the intended boat and the regulatory requirements of the U.S. Coast Guard.

Under the leadership of Chuck Rowe, Dick's son, Indmar has introduced numerous innovations in the marine industry and has grown to become the largest privately held manufacturer of gasoline-powered inboard marine engines. For example, the company was first to marinize Cadillac's Northstar and Chevrolet's LS-1 Corvette engines. Today, the company's products are variations of the Ford 6.2L 16-valve V-8, which powers the F-250 Super Duty truck.

Until the 1990s, all design work was drawn manually. The company then used AutoCAD® 2D design tools before moving first to the Pro/ENGINEER® and then to the Autodesk® Inventor® 3D design packages. In 2014, Indmar management decided to re-evaluate its 3D design environment with the goals of making it easier to share data with customers and partners and streamlining workflows to shorten design cycles, increase throughput, and accelerate time-to-market.

According to Vice President of Engineering Jason Stimmel, Indmar decided to migrate to the integrated SOLIDWORKS® 3D product development platform—implementing SOLIDWORKS Professional design, SOLIDWORKS Premium design and analysis, SOLIDWORKS Flow Simulation computational fluid dynamics (CFD) analysis, SOLIDWORKS Composer™ technical communication, and SOLIDWORKS PDM Professional product data management (PDM) software solutions—because its

applications are easier to use and are more affordable, and they make it easier to interface with boat manufacturing customers to collaborate on engine design.

"Almost all our customers have some version of SOLIDWORKS, and a lot of our vendors do too," Stimmel notes. "Moving to SOLIDWORKS put us on a more common platform, which makes it easier to share data and interact with customers as we collaborate on inboard engine design."

### **SHORTER DESIGN CYCLES, MANDATORY CERTIFICATIONS**

The move to the SOLIDWORKS platform has also allowed Indmar to shorten its design cycles in support of expanded throughput by automating and streamlining design and engineering workflows through the implementation of the SOLIDWORKS PDM Professional system. "We've realized a 40 percent drop in design time, primarily because our engineering processes are more efficient," Stimmel says.

"Due to our success in increasing efficiencies using the SOLIDWORKS platform, we've now made it mandatory for all of our designers to pass either the Certified SOLIDWORKS Professional [CSWP] or Certified SOLIDWORKS Expert [CSWE] exam," Stimmel continues. "We made these certifications a requirement because we believe we can increase efficiency further by raising the level of our designers' SOLIDWORKS skills."



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**— Jason Stimmel, Vice President of Engineering**

## SIMULATION CUTS PROTOTYPING, IMPROVES EXHAUST AND COOLING SYSTEMS

Indmar is not only benefiting from SOLIDWORKS design solutions, but is also realizing productivity gains from using the structural simulation tools included with SOLIDWORKS Premium software to validate component performance and the CFD analysis capabilities of SOLIDWORKS Flow Simulation software to optimize fluid flows and thermal behavior in engine exhaust and cooling systems. "With integrated simulation tools, we've been able to eliminate a couple rounds of prototyping, which, in addition to helping shorten development cycles, helps us cut costs.

"We're also pleased with the results that we get from SOLIDWORKS Flow Simulation software, which we've correlated against the results of physical testing," Stimmel adds. "We initially thought that we might need a higher-end flow package. However, based on our testing, we have confidence that SOLIDWORKS Flow Simulation provides accurate results, and the fact that the software is seamlessly integrated within the SOLIDWORKS modeling environment saves additional time."

## ADDING ANOTHER MARINE INNOVATION

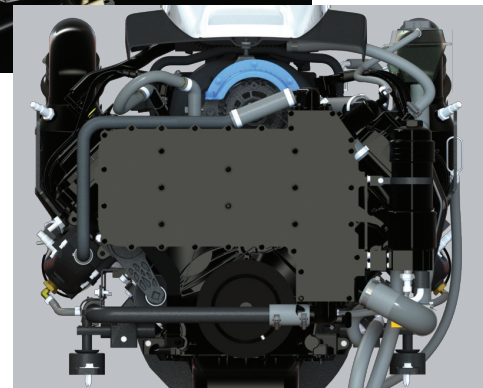
Since standardizing on the SOLIDWORKS platform, Indmar has introduced another industry innovation: the Strainer Pro, a water intake straining accessory with a built-in flush kit for flushing inboard engines. The Strainer Pro has integrated two products into one unit, incorporating an easy garden hose connection to simplify engine flushing and enabling boat owners to protect their engines from debris and simplify aquatic invasive species flushing and maintenance with one easy-to-use product.

"The Strainer Pro, which was developed completely in SOLIDWORKS, is innovative because it combines two products into one and makes inspections and aquatic invasive species decontaminations faster, giving our customers more time on the water," Stimmel explains. "We're also becoming more innovative in developing our user manuals by replacing high-cost photography with renderings created with SOLIDWORKS Composer software in our user manuals and parts catalogs."

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The SOLIDWORKS product development system not only helps Indmar marinize (make suitable for use in a boat on water) automobile engines in 40 percent less time, it also enables the company's designers and engineers to communicate and exchange data more effectively with customers and partners.

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