



Winning on the Track With Hendrick Motorsports

"Consistency is a key objective in machining, as is meeting a tight delivery schedule, since engines must be ready by race time. Using CAM, we eliminated about 80% of the production time, and we achieved consistency and predictability which provides us flexibility in changing engines without compromising performance."

- Randy Dorton
Director of
Hendrick Motorsports
Engine Program

SITUATION

Hendrick Motorsports is in the business of winning races, but only secondarily to the bigger challenge of gaining market share for its sponsors. By fielding competitive race cars and marketable drivers, Hendrick can provide a successful marketing arena for these sponsors. Driving experience and finesse are paramount, however, it's engine performance that produces the "report card every Monday."

Automotive races are won by a critical few seconds over the nearest opponent. Regulating bodies, such as NASCAR (governs Winston Cup racing), establish many requirements and restrictions on racing teams which limit the opportunities to gain competitive advantage through differences in engine manufacturing. Being able to predict performance based on consistency records often provides the slight edge needed to win races.

OBJECTIVES

- ✓ Field in races, and market to other teams, powerful and reliable engines.
- ✓ Gain competitive advantage through the use of computer-aided technology tools to machine specialized engine components.
- ✓ Gain efficiencies in machining time and costs, while at the same time increasing quality and establishing total consistency from engine to engine.

PROCESS VISION

- ✓ Provide an environment in which a proven prototype can move rapidly and consistently through manufacturing.



Get
There
Faster™

- ✓ Reduce costs and the possibility of error in the manufacturing of components by reducing human intervention.

ACTIONS

- ✓ Hendrick Motorsports initially implemented SmartCAM® software, gaining ease of use, strong editing functions, the ability to program general and 3-axis surface machining, as well as an entry into five-axis positioning.
- ✓ Subsequently acquired Camand® software for the ability to use surface modeling and machining capabilities geared specifically for geometrically complex parts and simultaneous five-axis machining. The company is now also expanding its software application to include I-DEAS™ software as well.
- ✓ Utilizing Coordinate Measuring Machine (CMM) data collection and CAD modeling technology, proven data was captured on the CMM, fed into CAD for generation of a soft prototype, then transferred to either SmartCAM or Camand for manufacturing.
- ✓ Produce engine blocks and cylinder heads on a five-axis machine which permits access to multiple sides of the parts in a single setup.

RESULTS

- ✓ With the use of SmartCAM, Hendrick witnessed a dramatic reduction from 17 setups and 60 hours of machining and set-up time to 2 setups and 8 hours of machining and set-up time on each cylinder block.
- ✓ Camand eliminated 80% of the production time to manufacture cylinder heads. This reduced costs from \$20K per pair to just \$6K.
- ✓ Gains in consistency were so significant that current inspection technologies could not measure differences among like engine components. Additionally, completed engines measured within 1% of each other for horsepower and torque consistency. Consistency directly relates to predictability of overall performance – key on race day!
- ✓ Impressive track performance. The first appearance of engines machined with SmartCAM and Camand finished one, two, and three at the Purolator 500 race in Atlanta, Georgia.
- ✓ Hendrick driver Jeff Gordon won the 1995 NASCAR points championship (calculated on points received for finishing races). Reliability of the engine assures completing as many races as possible. Consistency of performance gains more points when capturing one of the top 5-10 places. Winning races is optimal, finishing is critical.
- ✓ Since 1995, Hendrick engines won 26 poles, were on the front row 52 times, and won a third of all races.

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