SCHENCK
Balancing and Diagnostic Systems

C A S E S T U D Y

Evernham achieves winning performance through the discovery of better balance.

EVERNHAM
MOTORSPORTS™

Evernham Achieves Winning Performance...

In October of 1999, after nearly 23 years of NASCAR absence, Dodge turned to motor sport legend Ray Evernham to bring them back into racing prominence. The deal lead to the formation of Evernham Motorsports and the beginning of an historic 500-day countdown to field two teams for the 2001 Daytona 500.

Evernham Motorsports' Statesville, N.C. complex has three facilities for engineering, administration, fabrication and R&D as well as an adjacent airstrip for their three corporate airplanes.

The building of a dream

Evernham began building the foundation that would eventually become one of NASCAR's premier racing organizations. In March of 2000, Evernham announced that the team would be anchored by driver Bill Elliott in the No.9 Dodge Dealers/UAW Dodge. Shortly thereafter it was revealed that Casey Atwood would be behind the wheel of the No. 19 car. A major turning point for the team then came 330 days into the countdown when NASCAR approved the Evernham Dodge, followed by the Dodge engine 85 days later.

Then on February 11, 2001, history was made as Elliott earned the pole position at the 2001 Daytona 500 - the first for Evernham Motorsports and the first for Dodge in nearly 23 years.

Now in its fifth year, the Evernham empire continues to grow with nearly 300 employees and fielding cars in the Nextel Cup Series and Busch Series, as well as the ARCA and the Dodge Weekly Racing Series. In 2002 Jeremy Mayfield joined the team as the new driver for the No. 19 car. In 2004, Elliott became more involved in the research and development program for Evernham, and turned the wheel of the No. 9 car to Kasey Kahne, who would become the 2004 Raysbestos Rookie-of- the-Year. Since its creation, the team has sent a Dodge Dealers/UAW Dodge to the winners circle each consecutive year.

Building better performance

Led by Evernham's passion for performance and his renowned "20 Points to Success," the team has steadily posted incremental achievements to become the major competitor Evernham envisioned. In 2003, engine builder Mark McArdle joined the team as General Manager of the Evernham Engines Division. McArdle carried an impressive resume having posted victories with legends such as Michael Andretti, Penske's Emerson Fittipaldi and Al Unser Jr. His experience with Formula I also meant that he shared Evernham's engineering-oriented philosophy to go further, faster, with better technology.

As soon as you step close to the team during its 36 week chase for the Nextel Cup, it is clear that the competition extends far beyond the track. Every week the Engine Group in the Concord, N.C. facility meticulously prepares six R5-P7 Dodge Magnum Engines for the two house cars (No. 19 Jeremy Mayfield and No. 9 Kasey Kahne), as well as the engines for their house Busch car. In addition, McArdle's group provides the engines for the two Nextel Cup cars from Petty Enterprises as well as engines for two Busch cars for Aiken Motorsports. On average, the group produces approximately four Dodge Engines a day with an operating speed of 10,000 r.p.m. and capable of delivering more than 800 horsepower. Every engine is custom built based on the type of track, the ambient environment, data from past experience and improvements from the R&D group.

Every week the Concord facility also receives the motors used from the previous week, which are completely disassembled. Every single component is completely evaluated and analyzed for unusual wear, archived and sent to their respective departments to be rebuilt or discarded.

"Everyone here has a passion for making the perfect engine," says Steve Oliver, Deputy Technical Director of Design and Manufacturing Services. "Everybody knows that there are no unimportant jobs and that the smallest detail could affect performance."

Quest for perfect balance

It was in 2003 that Evernham turned to Schenck to help with some frustrating issues within their balancing department and what was becoming a quality problem.

Evernham's Concord, N.C. facility is home for Evernham Engines, LLC., and Evernham Performance Parts.

"We were having a lot of problems with repeatability on our crankshafts," says Oliver. "We were getting inconsistent measurements and conflicting data from our vendors. It also became clear that we needed better sensitivity if we were going to make any improvements to the crankshafts. We really needed something better that we could have some confidence with."

Oliver estimates the life of a crankshaft to be about 10 million cycles, or 6-7 races. Based on the gear ratio, the tire diameter, the track length and the length of the event, the crank is good for about 1.5 to 2 million cycles per weekend. They constantly ran check balances on the cranks and the inconsistent readings were a problem.

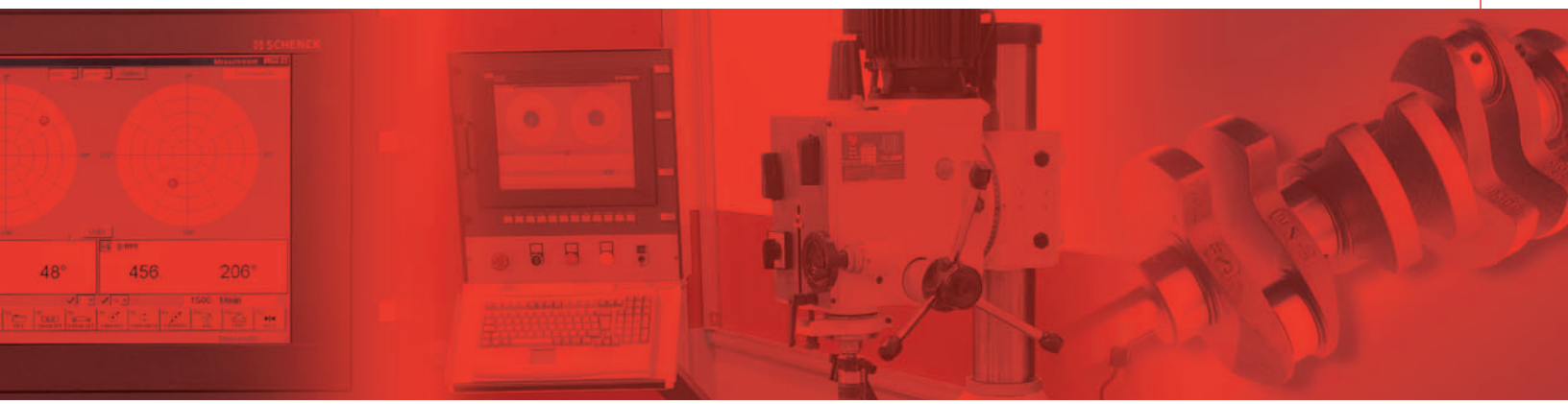
New rotors are custom made to Evernham specifications and later modified at the engine shop. The data from the vendors were sometimes as much as 10 g-in out, and the rejection rate on the modified components was about 30%.

The balancing solution

With over 25 years of high performance engine experience and operating a variety of different balancing machines, Steve Oliver knew there was a better way. In December of 2004 Evernham installed a Schenck CS30 Crankshaft Machine with CAB 803 Instrumentation.

"It's the most accurate and robust machine I've ever used," Oliver says. "The installation was a piece of cake and the instrumentation is very simple to operate. We were balancing in about 10 minutes."

Evernham's machine shop and engine fabrication department.



The Engine Group produces approximately four R5-P7 Dodge engines a day that are capable of more than 800 horsepower.

Since installing the machine in December, the engine shop has developed a new level of confidence in their balancing program. The rejection rate on their modified cranks has gone from 30% to virtually zero. Disputes with vendors have also gone down considerably. "At least now when they do happen we know we can stand behind our measurements," says Oliver. "We even had one vendor concede when he saw that we were using a Schenck." In addition, the expanded speed range has given them greater versatility. The Engine Group has since been able to expand their balancing program to include clutch components, flywheels, fans, water pump impellers and pulleys.

"To win races you need to make precision adjustments and zero mistakes. With the superior accuracy of our Schenck machine, we can do both," says McArdle. "The penalty for error is huge. During the trials, any advancement can mean the difference between pole position, starting position and track position. After the technical inspection – that's it. Our confidence that we can meet those criteria is very high."

Precision accuracy means precision performance

As GM Mark McArdle points out, in a world where NASCAR regulations limit the options for modifications, the battle is won by knowing where you can compromise.

McArdle is especially pleased with the improved sensitivity. After an incident where Mayfield grounded out and caused damage to his flywheel, they were able to work the rotor on the balancing machine and develop a new tolerance threshold that substantially improved its performance.

"It has taken away all the doubt in our post race diagnostics," McArdle points out. "What we can measure is what we can improve and the level of precision that the CS30 provides, let's us know where those improvements can be."

Balancing technician Jim Luce on the CS30 Crankshaft Balancing Machine.

SCHENCK
Balancing and Diagnostic Systems

SCHENCK Trebel Corporation
535 Acorn Street
Deer Park, NY 11729 USA
Tel: (631) 242-4010
Fax: (631) 242-4147
email: sales@schenck-usa.com
www.schenck-usa.com

The DÜRR Group

For more information about Schenck's CS30 Crankshaft balancing machine, please call us at 800-873-2352 or visit us on the web at www.schenck-usa.com