Crane Cams Delivers Performance

Located just a short distance away from the undisputed capital of stock car racing—Daytona International Speedway—is Crane Cams, Inc., a company that strongly supports the high performance industry. Its main products, however, are not limited to high-speed NASCAR® or NHRA applications, but are used also by marine, motorcycle, aircraft engine and heavy equipment manufacturers, as well as by backyard automotive enthusiasts. Plating contributes to the quality of Crane camshafts—the number-one product manufactured by the company.

Important Steps* In the Manufacture Of a Camshaft

At Crane Cams, Inc., more than 140 separate manufacturing and quality operations go into the manufacture of a steel cam, and all of them are completed at the manufacturing facility in Daytona Beach, FL. The process starts with long pieces of 8620 steel bar stock.

The bar stock has been cut to the proper length, and the centers and vent holes have been drilled.

In 1953, Harvey J. Crane, Jr. had a dream: to make his personal motorcycle and hotrod run faster and perform more efficiently than any others in their class. He founded Crane Engineering Company, Inc. in a borrowed corner of his father's machine shop in Hallandale, FL. His first project was a camshaft ground for a Henderson four-cyclinder motorcycle. Later, he began regrinding cams for his own flathead Ford V-8 hotroad, quickly gaining favor with South Florida oval track and drag racers.

Camshafts are very important elements in fuel-powered engines, using lobes (called cams) that push against an engine's valves to open them as the camshaft rotates. Springs on the valves return them to their closed position. This push-return action lets the air/fuel mixture into the engine and the exhaust out. There is a direct relationship between the shape of the cam lobes and the way an engine performs at different speeds. There are different engine layouts, too, such as single overhead cam (SOHC) and double overhead cam (DOHC). (For insight into the workings of an engine, including animated views of the cams in action, go to www.howstuffworks.com).

Harvey focused his love of high performance into ever-more sophisticated innovations in camshaft design, commandeering a one-man garage shop into a big business. With the years, Harvey's designs improved and his company grew, building on its successes along the way (see some company milestones in the sidebar). While camshafts are the company's foremost product, other automotive-related components (such as springs, rocker arms, valves) were also developed and are today part of the company's line. In 1986, Crane Cams relocated operations from the original Hallandale site to Daytona Beach, FL. Its corporate headquarters and manufacturing facility encompasses more than 160,000 ft^2 of total manufacturing, testing, R&D, and administrative activity.

The company downsized itself about four years ago, when it also had operations in the Detroit area, serving as OEM for the Big Four automotive manufacturers. Its product line is now highly diversified, and its website offers

**Photos & information courtesy of www.cranecams.com, Crane Cams, Inc., Daytona Beach, FL*

The camshafts shown here are custom-designed, slot hard-faced cams for Winston Cup cars. Crane pioneered this particular design, which includes a weld inside, for NASCAR. In Winston Cup racing, there's a one-engine rule, and all the drivers have to use the same type of camshaft—all manufactured by Crane. Shown left to right with this important product are Mark Campbell, director of Camshaft and Valve Train R&D; Dennis Burgess, executive vice president; and John Highet, plating supervisor.

catalog services for the consumer market, which makes up 70 percent of its sales volume.

At the Daytona plant, one department handles custom requests from consumers, which could include restoration work on vintage automobiles and motorcycles. Crane serves as the OEM for camshafts and other parts for Mercruiser, Harley-Davidson, Ford and Chevrolet. The company is a producer of after-market parts for Harley-Davidson and Yamaha. It also sells its camshafts and components to its competitors.

Whatever the part, the emphasis still remains on quality and workmanship. Racecar drivers don't get to be winners by using engines that have been compromised in any way, and Crane camshafts have a 30-year history of being used by the winners of NHRA drag racing. CEO and Chairman of the Board Eugene Ezzell is proud of the fact that the company adheres to the six sigma standard of quality, which means there are fewer than 44 rejects for every million camshafts produced. "Our reject rate is really substantially lower than that," he states. " We have no rejects in camshafts supplied to the racing industry, and our warranty return rate with general public consumers is .36 percent."

From the top down, the staff at Crane Cams is enthusiastic about its company's leadership in the performance arena, especially Mark Campbell, director of Camshaft and Valve Train R&D: "Playing with the design of the camshafts and all the variables is like a Rubik's Cube. An automobile is a rolling case of applied physics. Everyone involved in the racing industry is continually trying to do something better—to find their own unique niche. That's what makes it exciting."

Good Neighbors; Community Service

Crane Cams, Inc. is a large manufacturing facility, but it demonstrates a lot of heart. It's employee-owned with an empowerment-oriented management team. Perhaps that's the reason the company is involved in a number of activities that help support others in the Daytona Beach community:

- The Association for Retarded Citizens (ARC) shelter workshop for the mentally handicapped is used for some assembly and packaging of the company's products.
- For the past 14 years at Christmastime, working initially in response to a request from United Way, the company hosts a party for underprivileged children. Employees may choose a child's name from a list of more than 100 children, with an age range of nine months to 12 years. They buy gifts

Manufacture Of a Camshaft

Initial cleaning steps render the steel bright and shiny.

The journals (on which the camshafts sit) and lobes are cut and spaced, then the shaft is cyanide-copper-plated. The entire cleaning/pretreatment/plating process (cleaning, acid pickling, rinsing, plating and more rinsing) takes approximately 100 min; 60 of those minutes are devoted to copper plating. About 160 - 200 camshafts are produced in one 8-hr shift.

Manufacture Of a Camshaft

The camshafts are heat-treated to strengthen the steel. The copper plating serves to mask certain non-critical areas from the heat treatment process, enabling the camshafts to be straightened after heat treating, to keep them from becoming brittle. Copper is removed off the journals by milling.

Next comes the rough shaping of the lobes. Using proprietary milling technology, Crane personnel can turn a round lobe camshaft into a lobe-shaped cam in minutes. Camshafts produced by the company's competitors may require hours of grinding.

After heat treating, the journals are finished ground.

Next, the lobes get finished ground. After a few more steps, including more quality checking, the camshaft is finished. Quality checks are performed on the cams at various times throughout the entire manufacturing process—not just at the end.

Like Sam Walton, CEO and Chairman of the Board Eugene Ezzell is a firm believer in the philosophy of "management by walking around." He tours the production area several times daily, talking with all employees on a first-name basis, encouraging feedback on their jobs and how to improve the product line. The number of employees ranges from 270 during slower times (which are never really very slow), gearing up to about 330 during the peak of racing season.

(no dollar limit specified) for the children and present them at a party held on company grounds, complete with Santa and his "elves." Each child has his picture taken with Santa as a special memento.

- The company collects and donates books to the Veterans' Administration hospital located nearby.
- For every dollar donated by employees to the United Way, the corporation matches it.

Some Important Milestones* In Crane Cams' 50-year History

1955

The Chevrolet "Small-Block" 265 OHV V-8 was introduced. This engine rapidly became the most successful and widely used racing engine platform in motorsports history. Harvey Crane responded by designing and grinding hydraulic and mechanical lifter racing cams for Small-Block Chevy engines.

1962

"Dragmaster Dart" won the NHRA Winternationals in Pomona, CA. A supercharged 413 Dodge "B" V-8 engine used a Crane roller camshaft.

1965

Crane Cams moved to the forefront of the hugely popular "Funny Car" drag racing movement as supercharged, nitro-burning funny car fever swept the nation's drag strips.

1967

Crane Cams opened its first Horsepower Sales retail speed equipment store in Hallandale, FL.

1972

Crane introduced the first Crane Fireball® Cams. The product line provided Crane race cam design and quality for low-priced, street performance applications.

1977

Crane Cams became actively involved in NASCAR Grand National Racing Series. A.J. Foyt won the Indianapolis 500 using Crane cams in a Ford DOHC V-8.

1997

Crane Cams designed and built the first dual-optical trigger ignition distributor targeted specifically at NASCAR® Winston Cup and Busch Series Racing.

2000

2000—Crane Cams, Inc. completed auditing procedures and received QS 9000 and ISO 9000 certification for manufacturing processes of cams, valve train and ignition components.

2003

2003—Crane Cams, Inc. begins its second half-century of producing the world's most accurate, powerful camshafts, components and ignitions.

**The company can count many milestones in various product developments, as well as those that have really made an impact on the entire racing industry. Crane's long list of accomplishments has been edited here to illustrate major highlights.*

Manufacture Of a Camshaft

A finished steel cam.