Diamond Pistons/Trend

by Sam Logan

In the world of racing engine components, Michigan native Bob Fox has had several memorable moments. His pioneering efforts include the perfecting of the one-piece, double-tapered, 7/16-inch competition pushrod; tool steel flat tappets that operate on cast-iron camshafts, giving four to five times longer life than the originals; the Spintron, a racing engine test rig; and billet-aluminum racing pistons.

Fox's motivation for piston-making is readily understood: This former racer, when in his 20s, manned the tech lines at Diamond Pistons. "But when I purchased Diamond over a decade ago," commented Fox, "I became immediately aware of my rivals. I felt I was surrounded by giants, multimillion dollar corporations, and I needed a competent plan to ensure the company's survival. While our competitors wooed the Cup teams, I decided to focus our efforts entirely on the grassroots racer."

Diamond-forged pistons are suitable for most competition uses. Billet pistons are used when design changes are frequent or when specific designs are unavailable in forgings. Anodizing, crown, and skirt coatings combat heat and frictional loses, which is especially valuable on power-adder engines.

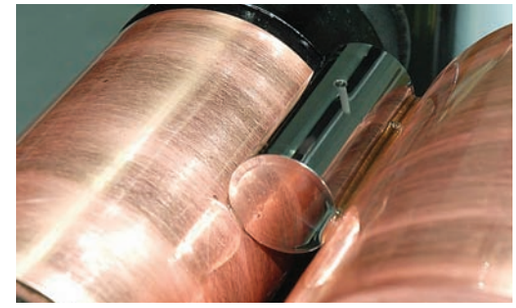
Ironically, Fox had access to the restricted areas of most Cup garages because the leading teams were already using his pushrods and also his Spintron, a device particularly adept at tracing valve-gear irregularities. But it was to the grassroots racer, the average working guy, that Diamond devoted its efforts.

It may seem peculiar now that Diamond, who has enjoyed immense influence with NHRA's leading Pro Stock teams for almost a decade, is still pledged to the average working guy who goes racing. "It's not so peculiar," insisted Fox. "What we learn from Pro Stock racing we pass along to the grassroots guys and the semi-professional guys, for it is they who enable us to pay the bills, not Pro Stock."

From the outset, Fox instigated a knowledgeable technical staff, a team that understood pistons and could talk to and be of value to the average racer. During his tenure at Diamond in the '80s, he became aware of troubling quality issues in pushrod manufacture. Their lengths varied and their ends failed — both ends. Manufacturers would reduce the material thickness of the cup ends in order to form them and, as a consequence, they would crack. Moreover, their lengths were so inconsistent that each pushrod had to be inspected and graded accordingly. It was these observations that impelled Fox to enter the pushrod business, establishing Trend Performance in Warren, Mich., in 1988.

By the end of his first year in business, he had developed two new competition pushrods for Chevrolets: a 5/16-inch series for small-blocks and a 3/8-inch series for big-blocks. Both overcame the defects he had identified earlier, distinguishing themselves with cup ends of consistent material thickness as well as accuracy in their overall lengths.

Committed to further exploration of pushrod and valve-gear performance at high engine speeds, Fox disclosed his plans to develop a valvetrain testing device to Hendrick Motorsport's Randy Dorton, Comp Cams, and Roush Industries. By the early '90s, the first test rig was built. Called the Spintron, it used an AC electric motor to spin the valvetrain via a dummy crankshaft, and it could spin it well in excess of 10,000 rpm. The Spintron confounded all who witnessed the data it recorded because it revealed that regular lightweight 5/16-inch and 3/8-inch pushrods where deflecting severely. Moreover, it demonstrated that tappets were lofting into the air as they traveled over the nose of the camshaft at higher engine speeds.



Trend also produces premium piston pins and flat tappets. Here, a tool steel flat tappet is polished to a mirror finish on barrel and foot. Tool steel flat tappets operate on cast-iron camshafts and last four times longer than cast-iron tappets.

"It took a very long time to convince engine builders that lightweight pushrods should be replaced by heavier wall types that are less prone to deflection," said Fox.

Today, almost two decades later, the Spintron can be found in engine-development facilities from the U.S. to Australia, and pushrods measuring 7/16-inch and greater in diameter — proportions unthinkable in the '90s — are commonplace.

Trend pushrods are stacked in specially constructed stainless-steel racks within 2 degrees of vertical to ensure they remain straight during the heat-treating process, where temperatures reach 1,700 degrees.

Professional race engine builders need to know the exact position of the valves at high engine speeds. Powered by an AC electric motor, the Spintron uses laser tracking to identify valve position and a video camera to observe valvetrain deflection.