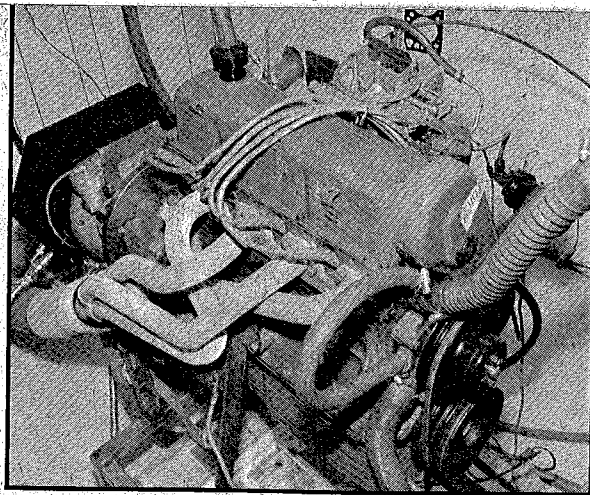


pinto ponies

tangs and Capris. While the turbo engine can be made to run quite well, we were interested in obtaining as much power as possible from a normally aspirated version. Would it respond to traditional hot rodding techniques as well as the larger engines we're all used to?

To find out, we visited Ken Moe at Gap Engines in Livonia, Michigan. Ken was engaged in developing a three-stage performance package for the 2.3L Ford, designed for both improved street performance and all-out road-racing/sprint car use. The results of each stage of modification were tested on the Gap Engines' dyno, along with a stock, unmodified engine for baseline comparisons. The results were more than satisfactory.



Baseline

The basic test "mule" was a 2.3L motor with turbo bottom-end and normally aspirated induction system consisting of the stock Ford 2-barrel intake and 230-cfm progressive 2-barrel Holley-Weber carburetor. Any 2.3L engine could have been used, since the only major difference between the turbo and regular engines is the forged pistons used to withstand the turbo boost. These forged pistons aren't necessary for the first two streetable stages, and the Stage Three motor utilized higher compression ratio pistons anyway.

All emissions equipment was removed and the Ford electronic ignition distributor was reworked to operate on good gas with 36-38 degrees total advance. The curve begins at 1800 rpm and is all in by 3000. Initial timing is set at 12-14 degrees.

Synthetic 20W-50 AMS/Oil was used for all tests, as Ken feels its special formulation reduces cam follower friction, a potential problem with stock 2.3 followers. Whatever brand you use, it should at least meet the SAE "SF" standard. For all tests, a 10-quart dyno oil pan was used. In the "real world," the stock pan can be used until Stage Two when oil capacity should be increased to 6 quarts. For Stage Three, a minimum of 7 quarts is required. Gap Engines will custom-fabricate a pan on request, since no larger-than-stock pans are currently offered from Ford. The stock turbo oil pan holds 5½ quarts (with filter), an increase of ½ quart over the standard-performance pans.

As can be seen from the graphs, the baseline power band covered approximately the 2000-5000 rpm range. Slightly over 100 hp was produced at 5000 rpm. As befits a good economy engine, the torque curve was broad and flat,

hovering between 118 and 119 ft.-lbs. from 3000 to 4000 rpm.

Stage One (Bolt-Ons)

"The first stage was just your average basic hopup," said Ken. It consisted of an out-of-the-box Offenhauser dual-port intake manifold, Holley 0-6299 390-cfm 4-barrel vacuum secondary carb and hydraulic camshaft ground on 108 lobe centers by Reed Cams (as were all the cams used in these tests). The grind (No. 4H 286) has .468-inch lift with 216 degrees duration (measured at .050-inch tappet lift, as are all other specs).

Also added were Hooker headers with 24-inch long, 1½-inch-diameter primaries that feed into 2½-inch-o.d. collectors 8 inches in length. Several different sets with these dimensions are offered by Hooker: Part Nos. 6703 and 6704 both fit the '74-'77 Mustang, Pinto and Bobcat; while part No. 6708 fits '78 Mustangs and '78-'80 Pintos and Bobcats. For the '79 Futura/Fairmont/Zephyr/Z-7 and '79-'80 Mustang/Capri there's a set with slightly longer 26-inch primary tubes listed as part No. 6123.

These simple bolt-ons helped all across the board. On the bottom end, power increased to 41 hp and 107 ft.-lbs. of torque at 2000 rpm. Horsepower really began to leave the stocker in the dust past 3000 rpm; by 5000, it was up over 30 hp from stock and wasn't done yet. It would continue to rise through 5500 rpm, where a peak of nearly 150 hp was observed. As for the torque peak, it was now at 3500 rpm, 500 rpm lower than stock, and there were now 152 ft.-lbs. instead of the stock 119. Obviously, lowering the torque peak while simultaneously raising the maximum rpm where horsepower occurs was like having your cake and eating it too. This engine should be able to do the job in town, off the line and on the highway.

Stage Two (Hotter Cam, Milled Head)

The next step was to remove the cylinder head, mill it .060 inch and treat it to a competition valve job. With the stock pistons retained, the compression was now increased from the stock 9:1 to around 10:1. A Reed mechanical cam (part No. 4S 280/525), rated at .525-inch lift with 245 degrees duration, replaced the milder hydraulic bumpstick. To enable the mechanical grind to be installed in the previously hydraulic-cammed 2.3, the stock lifter bosses had to be machined .200 inch to accept a pressed-in plug threaded for a Pinto 2000cc mechanical cam follower ball stud assembly. The stock cam follower contact surfaces were Tufftrided to withstand the greater valvetrain friction loads. New, stiffer valve springs were also needed by the hotter cam, so Reed No. 2208 springs that offer 90 pounds of seat pressure and 195 pounds open at their installed height of 1.530 inches were used with the stock Ford turbo valves, multigroove keepers and steel retainers.

To compensate for the milled heads and to restore correct cam timing on this overhead cam motor, Ken designed a multi-index cam sprocket that allows the timing to be easily advanced or retarded. This device (part No. MOE-6256-A) also allows the cam timing to be altered quickly if track conditions warrant it. So far, all cams on the engines have been run straight up.

Although the Offenhauser dual-port intake was retained, the runners dividing the dual ports were cut back ¾ inch at the head mounting face for improved top-end performance. The carburetor jets also had to be richened up to No. 61 primaries and No. 67 secondaries.

The addition of the hotter cam, combined with the other mods, caused the loss of some bottom-end power; now the engine didn't "come on" the cam until 3000 rpm, so steep rearend gears would be required. By 4000 rpm, when 136 hp and 178 ft.-lbs. of torque were being produced, it was really pulling away from the Stage One mods. Torque

