Taking a look at the Honda Four's horsepower potential... by Richard Bean

If the big Harley twins can be likened to the Chrysler engine which has dominated automobile drag racing for a decade, then the Honda 750 engine must represent the Chevy V8 of the motorcycle world. With its ability to rev clear out of sight and stay together, it cannot be overlooked as a potential winner in any form of competition. Its appeal as a street engine is as large as its hold over certain classes in both drag and road racing.

The purpose of this article is not to follow the step-by-step construction of any one engine, but to report on the state of the art and inform the engine builder as to what is available in the way of hop-up parts and techniques.

The basic engine is by itself a fine powerplant, capable of giving a good account of itself on the street. It develops considerable power and, for an engine that needs rpm to produce that power, is fairly tractable on the street even in heavy traffic. In its stock form the Honda 750 is able to turn the quarter mile in the high 12's which definitely puts it in the superbike category.

Several riders have written us complaining of the fact that the Honda is a pipey type of bike which comes on quickly at the upper limits of its rpm range, but we haven't found this to be the case. To be sure, the Honda engine doesn't develop much torque at low rpm's, like the Sportster or 74, but it is mostly a matter of getting used to holding the revs up. Another thing is that the engine exhibits very little flywheel effect and revs fall off quickly in between shifts. Again, this is a matter of getting used to the engine and carrying the shift point a little past the point of maximum torque.

For the rider who wants to get additional power out of the engine, two things are immediately apparent. One is that the stock carburetion isn't worth a damn for real high performance operation, the other is that the engine can really benefit from better exhaust.

The 28mm Keihin carb used on the stock Honda 750 is a good, reliable carburetor for a stock engine, but if internal changes are made to the engine to increase the power, the restricted airflow through the carb just about cancel out any gain. In the December issue of HOT BIKE, we ran a story about porting the head on the Honda 750. In the story we pointed out how flow bench testing showed that the stock Keihin restricted the airflow through the intake port to the point where installing a better cam or modifying the port would be almost useless. Honda Four owners are lucky, however, because there are a number of different carburetion setups which can solve the problem.

Probably the best from the standpoint of cost and ease of installation is the Mikuni. In addition to being a better flowing carburetor, the Mikuni offers a substantial number of jets, airbleed correctors, and other tuning parts to get maximum performance. The testing we did on the Honda head used four 32mm units and we feel they are about the right size for racing use, with the smaller 30mm size for street operation. Another good setup which we have seen on several bikes is the constant velocity carbs from the late Honda 450. These can often be found in wrecking yards and will do a good job. These are also a 32mm unit and need little modification to fit.

For the rider interested in maximum performance without worrying too much about the cost, Russ Collins at R.C. Competition Engineering has started production of a manifold which adapts a pair of DCOE -40

Webers to the 750. Russ also has a single Weber manifold for the Honda which is a log type in the works and we should be hearing more about it before too long. Jerry Magnuson, who designed one of the best manifolds on the market for the Weber to Sportster conversion is rumored to be working on a manifold for the Honda, so there is no scarcity of carburetion for the 750. For the all out racing effort, Yoshimura Competition in Waterford, California, sells matched sets of the 31mm GP carbs used on the Honda road racers, and Fuel Injection Engineering is putting the Hilborn injector designed for the Honda LSR bike (see page 52 of this issue), on the market for the drag racer.

Another place where the Honda has a lot going for it is in the area of exhaust systems. A number of manufacturers jumped on the bandwagon early in the game, and there are several good systems available over the counter. Because the Honda 750 is a four cylinder engine, a lot of hard earned design work done by the automotive exhaust system builders can be applied to the Honda in the form of collectors. Basically, the collector uses the pulse from an adjacent cylinder to lower the pressure in side the exhaust, creating a slight scavenging effect. By arranging the exhaust pipes inside the collector, additional effectiveness is gained at certain rpm levels.

The two companies which have the most experience with the collector header on the Honda 750 are Action 4's in Santa Ana, California and R.C. Engineering in Torrance. Both of these companies are active in competition at the dragstrip (against each other), and make a variety of custom exhausts for the 750. Action 4's newest collector header for the Four is a 180-degree tuned system which is just becoming available. Another recent entry into the Honda header market is Jardine Headers, well known for automotive competition exhausts.

In the non-collector field these same companies market make a variety of special exhaust systems for the Honda Four, drag pipes with and without megaphones, and street systems. Yoshimura Competition also offers racing headers with megs for road racing. These pipes tuck in under the engine for maximum cornering ability.

Next, in order of importance, is better internal breathing for the engine. If you add better carburetion and exhaust, probably the first thing that occurs to most builders is to install a better cam. This can be a losing battle in the unmodified Honda engine, because of the fact that the stock head suffers from restricted breathing. Most high performance cams rely on increased lift to get more air/fuel mixture into the cylinders, and this is something that the Honda engine can't make good use of until it has been modified. Our testing on the Honda head pointed out the fact that airflow through the intake reaches a peak at about the .300 lift point, and further increases in lift do not help. If you intend to install a hotter cam in the otherwise stock engine, get a cam which uses somewhat more duration and lifts to only about .350-inch. This is easier on the valve train, as forces increase dramatically with increased lift, and reliability will be increased.

Currently the best cam for competition seems to be the Kenny Harman F grind. This is an all out racing cam and several alterations to the engine, including cutting deeper valve pockets in the pistons are necessary with this cam. Action 4's offers this cam as part of their line and their custom racing pistons are clearanced to handle the extra lift.

If the head is ported and polished, lifts of .400 and above can be used. Valve shape on the Four is excellent and no modifications are necessary. In addition to opening and reshaping the intake port, the

engine will gain considerable power by grinding away much of the shrouding around the spark plug tip in the combustion chamber. When finished, it gives the Honda a hemi-like look and really adds to the engine's horsepower. One word of advice that we should offer is don't do the job yourself unless you have quite a bit of experience in porting. This is one job that's best left to the shops that are equipped to handle it.

Increasing the displacement of the Honda is a sure route to more power. There are several kits on the market to enlarge the cylinders of the Four to as large as 915cc's! The popular sizes are 785cc, 811cc, and 836cc. These big bore kits are not too expensive and require only a minor amount of machining to install. Th two major suppliers of the big bore kits for the Honda 750 are Action 4's and Powroll, who supply all sizes and have a complete line of custom made and modified parts to equip the kits.

Several of the speed equipment suppliers are working on the problem of providing better rods for the 750 and we hear rumors that an entirely new forged rod may be available this year from a southern California designer. At the moment, Action 4's offers a carefully lightened and polished rod as part of their engine packages, and Russ Collins at R.C. Competition Engineering sells a heat treated and shot peened version.

Electrical systems for the Honda are limited to two magneto units, one by R.C. Competition, the other by Yoshimura. Later this year we expect the Joe Hunt Magneto for the 750 to become available. For most street applications, the stock ignition system works well, the magneto being necessary only for competition.

The Honda 750 represents a real challenge to the rest of the big engine field in motorcycle drag racing. It is tough, makes a lot of power for its size, and has the added advantage of having more speed equipment available for it than any other engine except the big Harleys. We've included a list of the major speed equipment suppliers for the Honda to assist you in getting the parts you need to turn your Honda Four into a real screamer.

Action 4's	2621 S. Main Street	Santa Ana, California 92707
Yoshimura Competition	P.O. Box 267	Waterford, California 95836
Powroll Performance	P.O. Box 926	Bend, Oregon 97701
R.C. Competition Engineering	2920 Sepulveda Blvd.	Torrance, California 90505
Branch Flowmetrics	1637 E. Burnett	Long Beach, California
Hunt Magnetos	2600 W. Vernon Avenue	Los Angeles, California
Mikuni K. American Corp.	7923 Gloria Avenue	Van Nuys, California 91406
K-H Cams	2163 S. Hathaway Street	Santa Ana, California 91705