HONDA CB160/175 RACERS

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STATEMENT OF NON-LIABILITY: Racing a motorcycle is dangerous, and modifying engines can result not only in damaged parts, but damaged people as well. All the information presented here is based on my own experiences - it may not work for you. Any changes you make to your vehicle are at your own risk, and the result of your own decision to make the change. I disclaim any responsibility for your actions, or your accident.

INTRODUCTION

I had a lot of Ducati singles before I switched to my first little Honda twin. I enjoyed riding the Ducks (and was sponsored by a friend on a very nice 350 for a season), but I grew to loathe some of the design "features" that often kept my bikes from running for any appreciable length of time. My friend Henry Deaton had been roadracing a sloper CB175 (all future references to 175s are about the CB160-style sloper, not the late 1969 (1970 model year) vertical cylinder 175) with AFM, and I found myself intrigued by the styling and construction. Horizontally split crankcases, real electrics, and no bevel gears - you could even get parts from your friendly local dealer! It didn't hurt that I already had a 750 Laverda twin, which looked a lot like a Super Hawk, heavy on the steroids/pasta.

After discussing the potential of the engine with Craig Hanson, my favorite race-tuning maven, I bought a 175 rolling chassis with engine from Henry. As the 175 was not terribly effective against full 250s, we decided that we would shoot for building two identical engines that would be competitive in the vintage 250GP class. Henry had Craig modify a 160 chassis for his pumped up motor, and I built a frame to house mine.
When I got my engine assembled and into Henry's modified frame I rushed down to the AMA/AHRMA national at Laguna Seca. I was pleased with the performance of the very roughly tuned engine.

DYNOMOMETER TUNING

My engine received a long evening of tuning on Craig's dyno after the Laguna Seca race. I can not stress too heavily how important dyno tuning is to a race project. When it was first run on the dyno my engine put out the grand amount of 12 bhp at the rear wheel. An evening of dyno tuning which included changes only to jetting, timing, and velocity stack length bumped the horsepower up to just over 20 bhp @ 12,000 rpm. Power was still increasing, but we didn't run any higher on the dyno, although I later used an occasional redline of 13,000 on the track. I might have been able to get half of that increase on my own, but since many of the changes resulted in increases of one-half to one horsepower I would have never realized the full amount. Dyno time is the cheapest horsepower you will ever buy! My Honda is competitive with most 250 singles. In fact, the next year at Laguna Seca (the first AMA national using the extended track) I spent the whole race dicing with (and beating) a 250 Bultaco, which should be one of the faster 250s around.

ENGINE

CYLINDER HEAD

The 175 cylinder head is a much better item than the 160 part. It has bigger ports, valves and finning. It also doesn't use a cast iron skull in the combustion chamber.

1. Porting

    A good port job is needed, and is worth paying a professional to do. However, beware the "sewer pipe" style port - bigger is not always better! At minimum, the area around the exhaust valve guide is very constricted and should be opened up, especially in the 160. Weld should be added to raise the floor of the exhaust port as the stock port has too tight of a radius after the valve seat. It is interesting to note how an exhaust port being tested on a flow bench improves in flow as the bottom of the port is filled in with clay - making the port smaller! In stock configuration the lower half of the port doesn't do anything except promote unwanted turbulence.

    The intake port is better but will benefit from judicious porting. Metal should be removed from the roof of the intake port until it matches the intake manifold. The face of the intake flange can be milled at an angle, tipping the carburetor so that the port and carburetor have a common axis. We milled an additional 15 degrees off the carburetor flange. Check your carburetor first before doing this, as not all carburetors will work at a 45 degree angle (30 degrees in the cylinder tilt plus an extra 15 degrees at the flange).

2. Valves

Be sure to use real Honda valves or racing quality aftermarket valves. I had some very inexpensive replacement valves from Dixie International that had a valve head break off after several hours of running. You will not appreciate what happens then. OEM 175 Honda stock valves work fine, but the 160 valves are much too small. The rough area where the head is welded to the stem is a stress-raiser and must be polished so that there is no abrupt change in diameter. This area on the intake valves can be lightened by reducing the diameter of the part of the stem that is exposed below the guide when on the seat to the same diameter as the collet groove. Standard valves were used during the dyno testing. After the cheap valve broke shortened XL250 valves were used on both sides as they are slightly bigger. The hassle of modifying the XL valves makes me recommend the stock valves, since the valves should probably be replaced periodically. We later discovered that race quality stainless steel valves are not a lot more expensive than valves from the Honda dealer - Honda parts can be pricey. We didn't redyno after changing the valves size so I can't definitely say that the bigger valves make any significant difference in performance.

3. Springs

Racing quality PM valve springs can be obtained, and work with the stock steel retainers which are strong and reasonably light (as well as cheap). Use a 12000 rpm red line, and plan on changing the valve springs at least at the beginning of each season. I've found that a 13000 rpm limit can be used if you really need it to squeeze by someone at the finish line, but continued use of it will result in greatly increased valve train wear. If the engine starts to misfire at the red line (and a fresh battery doesn't cure it) valve float is setting in. Stop the engine and change the springs immediately. Once the springs have weakened they can fail even if the rpm is reduced.

4. Camshaft

Use the Megacycle 122-20 grind cam (they will do the 180 degree cams for another $25-30). Coating the cam lobes and rocker arm pad with KalGard Gear Kote is recommended (as are all of their fine products). I have converted the cam to needle bearings. This isn't that hard, but you can't run the bearings directly on the cast-iron cam. You must turn down the journals, press on an oversize bearing race, and then have it ground back to the stock 20mm dimension. By using the stock journal size the cam can be used, if needed, in the standard endcaps. The outer bearing caps must be bored out to take the needle bearing. This reduces friction (and heat), and stabilizes the cam giving more accurate valve (and ignition if run off the cam) timing. As with the wristpins, the rocker arm spindles should be nitrided to reduce wear (there are no bushings in the rocker arms). The rockers can be lightened by grinding away the end part of the pad that never wipes on the cam. Be sure to carefully smooth all edges after grinding to remove potential stress raising notches.

5. Camchain

Stock cam chains are OK but the master-links aren't. At high rpm the master-link clip is subjected to a very high sideways loading as it goes over the crankshaft sprocket. Eventually the outer leg of the clip will break off, and the master link will fall out. What I have been doing is epoxying the clip to the link plate. This is bothersome, but I have not yet found a rivet-type link for the stock chain. The 450 chain is the same pitch but the pins are about .003" undersize, which makes for a rather wobbly master-link. I intend to go with a 450 cam chain when I replace the stock item, so that I can use a rivet-up master link.

CYLINDER/PISTONS/CAMCHAIN TENSIONER

1. Cylinder and Pistons

There are still some 160/175 oversize piston kits available that will give a displacement around 180-190cc. However the piston crown is usually fairly high. For 200GP I would use either 55mm pistons from the Z500, a 500cc version of the KZ550 that was exported to England, or 108cc big-bore kit pistons for the Honda S90/ATC90 engines. CB200 pistons will not be suitable because of the large dome on top and a bigger wristpin than the 175. The 90 pistons are readily available, cheap, and have the same deck height as stock. The 90 pistons do have a substantial dome that may interfere with flame propogation in the combustion chamber, so I would prefer the Kawasaki pistons if available. This would give a displacement just under 200cc, and the oversizes would be within the 200cc plus .060 overbore rule used by AHRMA. I haven't checked to see if these pistons would bore into the 175 liners, or if replacement liners will be needed. (SEE ADDENDA)

To get the 216cc displacement I used standard size pistons (58mm) from a Kawasaki KZ550. They have the right size of wrist pin, and after minor machining of the top to clear the head they have a fairly flat top that will not restrict combustion-flame propagation. They are also readily available. Remove just enough from the top to clear the head - this creates a squish band and leaves the rest of the piston to take up space in the combustion chamber. Cylinder liners from a CB200 must be installed. They require the cylinder block to be bored out, and the liners must be shortened and the bottom OD reduced. The upper crankcase must also be bored to accept the new liners.

Wiseco makes 61mm pistons for the KZ550 which would give 240cc. I know that some people have taken the cylinders out this far. I haven't, and it looks a bit questionable to me. Proceed at your own risk.

After installing the sleeves have them bored to fit the pistons. I made and recommend using a set of torque plates, which clamp the cylinder assembly and simulate the stresses caused by the cylinder bolts during the cylinder boring. This will ensure that the bores are round when they are installed, not round while on the workbench. The CB200 liners normally take a 55.5mm piston, so undersize liners or oversized pistons might needed.

The deck height of the pistons must be reduced so that they are even with the top of the cylinder at top dead center. The squish band will extend in from the edge of the piston to the outer edge of the combustion chamber. The squish clearance is then set by making a copper head gasket of the appropriate thickness i.e. about .025 - .030 inches. Remember to check all of the squish and valve clearances with thin rosin core solder or clay after assembling the motor.

It is also a good idea to drill holes from the oil ring groove into the wrist pin hole. This helps supply oil to the pin/piston and pin/conrod interfaces. Since the rods do not have bushings at the small end you should have the wrist pins nitrided to harden their surface. When combined with the pin oil holes in the piston pin/conrod wear will not be a problem.

2. Camchain Tensioner

The larger liners require that the hex bolts and washers that hold the cam chain tensioner to the case between the cylinders be exchanged for Allen bolts and smaller OD washers. The mounting flange for the tensioner will also have to be narrowed slightly.

The rubber cam chain rollers are junk. A new one will chunk after several races. Replace the adjustable (small) roller with the upper camchain tensioner sprocket from a Kawasaki Z1. This will give you a steel sprocket of the correct size (it also runs on a needle bearing). Order it from K&L and you will pay about $25 instead of the $50 your Kawasaki dealer wants. Or you can go to your local salvage yard and maybe get one even cheaper. Get the sprocket that uses the 6mm bolt, not the one that uses a pin. Use a 1/4" bolt instead of a 6mm to get a better fit. The head of the bolt and the nut will have to be narrowed so the assembly fits in the cam chain tunnel. The large roller is not so heavily stressed. Put a new one in to start, and plan on replacing it now and then.

The camchain tensioner fixing bolt in the front of the cylinder often strips the soft aluminum threads out of the head. I replaced the 6mm stock bolt with an 8mm rear chain tensioner bolt when the cylinder head finally stripped.

ENGINE CASES

Other than boring the cases for the oversize sleeves no modifications are required. I did remove the part of the case and left side cover that support the electric starter, but this was done mainly for cosmetic reasons. It is also moderately expensive to have plates heliarced on the case in place of the removed electric starter cover.

A worthwhile modification would be modifying an oil filler cap to take a breather hose and check-valve. This will help to reduce pumping losses inside the crankcase by allowing air in the crankcases to be pumped out but not sucked back into the engine. The best valve to use is an automotive PCV valve. There are some nice metal valves that are spring-loaded with a rubber seal. These valves are not position sensitive. Be sure to plug the small useless breather in the rocker cover. You can also remove the steel baffle plate in the cover when this is done.

Remember to plug the clutch cover if the kickstarter is removed.

CRANKSHAFT

The crankshaft in the 160/175s is very nice. It has a good rod length/stroke ratio, lots of bearings, and sturdy rods. Rod kits are still available (I think we used C200 rod kits from Rocky Dist.), and other than magnafluxing and shotpeening the rods no reliability modifications were done.

On our engines we did rephase the crank to 180 degrees to reduce crankcase pumping. This was a good move theoretically, but may prove to be a lot more work than the benefits gained. Don't forget that the cam and ignition must be redone to match the new crankshaft orientation.

The crankshaft was also lightened since it was going to need rebalancing anyway. After cutting the crank down we had to weld metal back on opposite to the crankpins to bring it into balance. It sure does rev quickly. Removal of the alternator and use of a total-loss ignition will also help reduce flywheel effect in the crank assembly.

OIL PUMP

The stock oil pump is bored out to use a CB200 piston, which increases the pump volume by about 18%. Some braze was added to the flat near the top of the piston bore prior to boring to reinforce the thin section of the pump body. Boring the pump to take the bigger piston also allows setting up a tighter clearance between the piston and the pump body, which will increase the pump's efficiency.

Even when running a stock pump you must check the fit of the check valve retaining plug on the side of the pump body. On my pump this plug screwed in (earlier pumps use a push fit with a retainer) far enough to block about 1/2 of the outlet port. Increased pump volume won't help if the oil can't get out of the pump.

The oil pump and crankcase oil system can be ported like a cylinder head. Radius all sharp inside corners where two or more oil passages meet. The engine doesn't circulate much oil, so anything that can be done to reduce friction is worthwhile. Remember, oil is much thicker than air.

I have been using Kendall GT-1 30wt oil and don't see any reason to go to a synthetic. It has occurred to me that running external oil lines from the cases to the head, instead of feeding oil up the cylinder studs would probably reduce the oil temperature. However, it seems to be another of those good but not required modifications.

We have recently fitted up an oil cooler because the 216 tends to run hot, due to the extra power being extracted. We modified the clutch cover to route oil to the cooler before it goes to the oil gallery that feeds the crank and top end. This required a moderate amount of welding. The cooler being used is off of a Kawasaki 900 Ninja since it works well and fell readily to hand. Braided steel hoses are not necessary as the Honda oil pump only makes a couple of pounds of pressure.

CLUTCH/TRANSMISSION

Several different clutch baskets were used on the CB160/175. Some of them can have the gears drilled to reduce the rotating mass. Do be careful that you do not drill into the cush-drive rubbers. I am using Barnett friction discs with stock springs and steel plates. Slippage is not a problem. However, the Barnett plates tend to stick together between race days, and the clutch will not free up until part way through the first practice lap. Also, the Barnett plates need to be carefully inspected, as sometimes the friction material hangs out over the edge of the plate. This will prevent the clutch from releasing properly. The ratios in the 175 5-speed transmission are adequately close for racing. The 5 speed can be fitted to the 160 engine cases with some minor machining in a vertical milling machine.

CARBURATION

When this engine project began the AHRMA carburetor rule allowed updating carburetors as long as the OEM brand was used. 26mm Kei'hin smoothbores were chosen for their historical accuracy as well as their performance and tunability. The carburetors are rubber mounted and use long manifolds and velocity stacks (7.5 inches overall length from head - the longer the intake the more the bhp went up). If 26mm Super Hawk carbs are used the bore can be cleaned up by removing the choke plate and filling the recess with epoxy filler. I haven't checked, but if the Hawk slides and body are big enough it would be possible to bore the carbs out. Make sure that the metal is not removed from the floor, and that the bore is less than the slide diameter. Boring also smooths out the venturi area. Current AHRMA rules prohibit integral float-chamber smoothbore carbs, so we could probably plumb an Amal matchbox remote float-chamber into the CR float bowls to be technically legal. This is a stupid rule! I have been agitating to get this rule changed. There are some specially made float needle/seat sets made for a number of carbs that will do a much better job of sealing at extreme angles than the stock float needle assemblies. The stock CR carburetors do seem to work better at high angles than some other carbs. A 28mm non-smoothbore would be needed to get equivalent flow to a CR. A VM Mikuni or a Kei'hin PE carb could be used. We now think that the engine could likely use a bit more carburetor than now used.

EXHAUST

Since this engine has a 180 degree crankshaft twin exhausts are needed. A stock 360 degree crankshaft can run with a 2 into 1 exhaust which will save some weight and tuck in better. The 360 degree engine will also run better with the 2-1 system. We tried removing the 2-1 tailpipe on my Laverda 750 and slipping megaphones onto the headpipes while running on the dyno. Power immediately dropped from 72 to 50, and the powerband had multiple flat spots.

The header pipes are of 1.0 x .049" tubing (approximately 20.5" in length), and the 4 degree taper megaphones are about 16" long. Do not fall for the common error of sticking giant head pipes on -the smaller size keeps the gas velocity high. The tailpipe and collector assembly on a 2-1 system should be of equal length to the headpipes. If a megaphone is run (recommended) use something similar to the individual pipe dimensions and reduce the length of the tailpipe by one-half the length of the megaphone. Warning: these exhausts are not for street use! When tested with a dB meter at a local race the bike registered 136dB at half throttle. My local club (AFM) at Sears Point requires 104db maximum. We'll be fitting up 3.5" Super Trapp discs (and an airbox to reduce intake noise) to try and cut the noise down to acceptable levels. The open pipes sound neat when out on the track - with the high rpm some people thought it was a two stroke.

IGNITION

The stock points are hopeless. A good ignition should be the first expenditure, since nothing else will work right without the sparks being properly timed. The stock points will bounce and cause the timing to vary, and may well damage your engine.

I recommend running a total loss battery system. It reduces rotating weight on the crankshaft by eliminating the alternator, and is easy to troubleshoot. Take two batteries with you to the track.

Henry has a lightly modified 175 (a 360 degree crankshaft motor still running the alternator) using a single pickup Lucas RITA ignition adapted to run off the end of the cam.

The ignition currently in use on the 216cc engine is a Dyna S Hall-effect trigger unit intended for a Honda 400-4. An adaptor mounts it at the left hand end of the crankshaft (which is vacant due to the removal of the alternator), where it gives each cylinder a spark every revolution. The left crankcase outer cover has been replaced with a flat plate and an oil seal. The adapter mounts to this plate. The end of the crankshaft was turned down to replicate the 400-4 points cam shaft. It is a dual pickup ignition timed to give sparks every 180 degrees, which is needed due to the rephased crankshaft. The ignition is set at a fixed advance of 28 - 29 degrees, a timing that was established on the dynomometer. The old tuning tip of lots advance for lots of power is not true! In fact, once an engine is properly hopped up it usually needs less advance than stock due to increased combustion chamber turbulence and efficiency.

I have had trouble with the Dyna getting hot and going into an intermittent failure mode. This is very discouraging when it occurs after driving 21 hours to Steamboat Springs for the AHRMA national! Dyna did, with some grumbling, replace a pickup which was defective. A RITA dual Hall-effect ignition will be adapted in place of the Dyna ignition. The RITA will not have this overheating problem since all the control electronics are in a separate amplifier unit which is mounted external to the engine.

I have used either Dyna or Andrews coils with good service. A single twin-lead coil can be used on a 360 degree motor and will save the weight of two single lead coils.

FRAME

The frame on my bike is based on the MkIV Seeley design. The major differences are a bracing tube to the bottom of the steering head and a much longer swing arm, which is made possible by the shorter length of the Honda engine when compared to the non-unit British singles and twins that normally are seen in the Seeley. All main frame tubes are 1 x .049" cold rolled electric welded 1018 mild steel. Don't waste your money on seamless (DOM) or 4130 chrome moly. The higher grades of steel will deform a little more before taking a permanent set (more crashable) but are the same stiffness as mild steel. They are also more expensive. Also, the size of the swing arm has been increased from 1.125" to 1.5", while the wall thickness has been decreased to .049". The frame was changed for three main reasons:

1. Greater rigidity than the stock frame or a reinforced stock frame.

2. Increased wheelbase (55") to allow more room for a 6' tall rider and to give a more forward weight distribution.

3. It looks trick.

A stock frame can be strengthened by adding bracing tubes to the outside of the swing arm pivot. These tubes come from the shock mount and the seat tubes under the gas tank. Do one side of the frame at a time. Remove the tube from the shock mount to the engine-mounting box. Make a cup shaped adapter (like a tuna-fish can with no top and a central hole in the bottom) to go outside the swing arm and weld the bracing tubes to this. Use a longer CB77 pivot pin so that it will extend through the cup. Also, fusion weld or braze weld the frame tubes where they enter the sheetmetal gussets (like at the steering head and engine mounting box). These tubes are only spotwelded into the gusset, and do not actually touch the steering head.

Aftermarket taper roller bearing kits are available to replace the stock loose-ball steering head bearings.

It would probably be worthwhile to lengthen the stock swing arm to put more weight on the front end.

I've ridden stock 160 frames, modified 160 frames, and my special frame. They all seem to work fine at the speeds I'm willing to try to ride them around corners.

SUSPENSION

Forks

The stock forks have a heavy cast steel lower triple clamp, an upper clamp that doesn't pinch on the fork, small and heavy stanchion tubes, and very rudimentary damping. Upgrade them if at all possible.

35mm Ceriani road race forks are used on my bike. These are the mid-70's adjustable damping model. However even the lightest damping setting was much to stiff. A new adjuster barrel was made with the stiffest setting lighter than the lightest stock setting, and with the remaining four settings progressively lighter. The lightest setting is used with 5wt KalGard fork oil.

Henry's modified stock frame bike has a pair of 32mm Marzocchi forks. I believe these were originally lightweight short-travel MX forks that were shortened. 32mm Marzocchi street forks are available as well.

Rear Dampers

My bike has Hagon (formerly Gas Girling) rear dampers with 45# springs fully preloaded. The Hagons are a good shock and less expensive than the all too common aluminum body shocks (which are also good). The Hagons also have much lighter springs available. They should be mounted upside down for the best damping.

Don't make the mistake of using stiff springs at either end - you want the tires to follow the bumps, not skip over them. Keep the spring rate down low enough to use all the travel, then jack up the preload to increase the ride height so that the suspension is compressed about 1/3 with the rider aboard. You need to have some downward movement available in the suspension so that the wheels can move down into dips in the pavement.

WHEELS

Brakes

The front wheel is from a CB77, and the rear is from a CB160. Both wheels have been extensively lightened and ventilated. At this time standard brake linings are being used and seem to perform adequately (compared to everyone else's brakes). They sure aren't like discs though! I will probably try some Ferodo linings.

Rims and Spokes

My bike has WM2(1.85”) x 18” flanged DID alloy rims with stock spokes. Alloy rims will each save about 1 pound of unsprung weight. On a bike this size the stock spokes work fine - they are butted (two different diameters) and the mild steel is actually less prone to work hardening than is stainless steel.

Tires

As with modern bikes, many racers get into a "mine is bigger than yours" attitude with tires (and other accoutrements). I used 80/90x18 Avon racing compound tires. These small tires are quite adequate on a low horsepower lightweight. Even though they are tiny by today's standards they are about the same size as used on Hailwood's 250 six (and he had over twice the bhp, much worse compounds, and a whole lot more speed)! Remember, the bigger (and heavier) the tire, the more power it takes to get it rotating or stopped. For use with WM1 rims IRC makes a nice set of 2.75 x 18 tires in a sporting compound that I bring in from Japan. A rider in Colorado (who I've been told is in weighs about 200 pounds) has been using them on his Honda MT125R two-stroke racer and actually prefers them to the Avons, which he thinks get a bit greasy when very hot.

The current tire of choice in F-160 is the 2.50x 18 Bridgestone BT39-SS. By all reports they stick very well, last well, and are very light. The manufacturer’s recommended rim size is WM1 (1.65”) but they appear to be OK on WM0 and WM2. The tires are the original fitment on the Honda 50cc Dream (a modern homage to the CR110) and can be ordered (with the proper sized OEM tubes) from any Honda dealer.

FAIRING/SEAT/TANK/FENDERS

Fairing

A good fairing is highly recommended - it is the second cheapest source of speed you can buy. It will help not only the top speed, but also the rate of acceleration. A good fairing is one that completely hides the rider's body when looked at from the front of the bike. The fairing is there to streamline the rider, not the bike. I use a copy of what I was told was a fairing originally for Ossa racers that looks similar to a smaller XR750 Harley fairing. The XR750 long-track is a good fairing (see above) and was actually designed in a wind tunnel. Fairings like the Honda MT125R and Yamaha TA125 are pretty worthless.

Seat and Tank

I built (with some help) an aluminum gas tank and seat for my bike. There are some copies of CR110 and CR93 tanks and seats available that will fit the stock frame with little or no modification. Since the CR93 used a frame that is almost identical to the 160 frame, it is the closest to a bolt-on unit.

Front Fender

Run a front fender! It eliminates the turbulence that otherwise covers the top of the tire. This turbulence will greatly restrict the amount of air getting to the engine. The Honda twin tends to run hot and needs all the airflow it can get.

BIBLIOGRAPHY OF TECHNICAL BOOKS

I have read these books and recommend them. I have asterisked what I feel are the most informative books.

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John Bradley, Broadland Leisure Publications (available in North America from Euro Spares/Michael Moore)

*MOTORCYCLE HANDLING AND CHASSIS DESIGN – THE ART AND SCIENCE
Tony Foale (available in North America from Euro Spares/Michael Moore)

*THEORY AND PRACTICE OF CYLINDERHEAD MODIFICATION
*TUNING BL'S A-SERIES ENGINE, 2nd Edition
David Vizard, Inter Auto Book Co., Haynes

*RACE & RALLY CAR SOURCE BOOK
Allan Staniforth, Haynes

*METAL FABRICATORS HANDBOOK
*SHEET METAL HANDBOOK
Ron Fournier, HP Books

*ULTIMATE SHEET METAL FABRICATION
*ADVANCED SHEET METAL FABRICATION
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2 STROKE PERFORMANCE TUNING
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*TUNING FOR SPEED
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John Robinson, Haynes

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WEBER CARBURETTORS - TUNING AND MAINENANCE

John Passini, Speedsport

TUNING TWIN CAM FORDS
David Vizard, Speedsport

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R.H. Warring, Argus Books Limited

GLASS FIBER AUTO BODY CONSTRUCTION SIMPLIFIED
John A. Wills, Post Motor Books

BUILD TO WIN
Keith Noakes, Osprey

ROAD RACERS REVEALED
Alan Cathcart, Osprey

TWO-STROKE TUNER'S HANDBOOK
Gordon Jennings, H.P. Books

Most aircraft books from Aircraft Spruce. Classic Motorbooks ,Hoskings Book Works or Walneck's for automotive and motorcycle books

ADDENDA

January 31, 1993

SHIFT DRUM DETENT ROLLER
The roller rides on a 6mm rivet, and the rivet tends to wear a great deal. This is apparently a common problem with all Hondas that use this system. The ensuing slop makes the shift action a bit less precise. Remove the rivet by drilling and/or grinding. NOTE: the back side of the rivet (the peened end) fits into a small countersink on the back of the arm. Take a 6mm Allen bolt (grade 8.8), or a .25 inch bolt if needed to accommodate wear in the roller, and duplicate the rivet shoulder and turned down section that goes through the plate. Remember, the shoulder must have axial and radial clearance for the roller to turn. Heat just the turned down section until red and let cool to soften it. Then reinstall the roller with the new rivet and peen in place. If the roller isn't hardened I am going to try using an 8mm bolt with a drilled out roller so as to increase the surface area under load. This will hopefully reduce the wear. I may also try heating and quenching the roller to see if it can be hardened a bit.

200cc CLASS RULES
Effective 1993 AHRMA has specified that 200GP Honda twins can only have a .060 inch overbore from 175cc, with a maximum displacement of 185cc. Unless you are going to destroke the crank (this would be a **lot** of work!) the KZ500 pistons would no longer be legal. I haven't looked too closely at the 175 standard piston, but since the stock compression ratio is a claimed 9:1 the head will need a combination of welding in the combustion chamber and milling of the gasket face to get the compression up to some reasonable race level. Be sure to check the valve to piston clearance afterwards.

November 26, 1995

A possible piston for use in a 175 with a welded chamber is from, I believe, an XR100. It has a flat top and is for a 53mm bore. The piston rings are reasonably narrow as well. I bought a set of these for use in a CB160 vintage trials project, as they are not only flat topped but have a top thick enough to dish slightly to reduce the compression for trials. We haven't looked closely at the 175 roadrace use, but Craig Hanson thinks they may be the ticket.

Piston	13101-436-000
Ring set	13011-KB4-305
Pin	13111-028-000
Circlip	94601-14000

October 15, 1996

Valve Springs

R/D Spring Corporation is now making modern-specification valve spring sets with titanium retainers. A set will be going in my bike.

December 9, 1996

Ignitions: I'm going to need to build a 360 degree crank RITA ignition for my CB160 trials bike project in the not too distant future. I'll plan on doing a batch of them when I do, as the same ignition would be used on a road racer with 360 degree cam.

December 7, 1998

I've finally figured out what to do on the cam-mounted RITA and can supply them. I have no idea at this time if the stock points cover will fit back on (haven't found one in the garage yet to check).

NOTE: there are two different sizes of snout on the end of the cam and I will need to know which one you have to ensure the correct internal diameter on the ignition reluctor.

You can contact Craig Hanson for exhaust pipe kits etc at:

Craig Hanson
Hanson Racing Technology
4950 Cohasset Road #4
Chico, CA 95973-9000
530-342-8049

May 25, 2004

I'm out of the Rita business (the major electrical component has gone out of production) so I'll not be able to supply the conversion for the 160/175 engine (or any other parts).

There is a Yahoo group for people who vintage race the 160/175s:
http://autos.groups.yahoo.com/group/F-160/

Michael Bateman (from the Seattle area) has been very active in 160s for a long time and offers various services and parts: http://www.batemanracing.com/