K-TECH NEWS

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THE MAKING OF A CHAMPIONSHIP MOTORCYCLE

The Bikes Behind the Championships

Part II

by John Griffin
Instructional
Designer/Instructor

This issue, we look at Doug Chandler's 1996 AMA Superbike Championship-winning Ninja® ZX-7RR. (In the Winter edition we featured Jeff Emig's factory KX250). Doug Chandler and the Muzzy Kawasaki team came to grips with a totally revised ZX-7RR in 1996.

With each race the team gained ground on the competition and by the last race in Las Vegas, the bike and rider became the class of the field. Rob Muzzy helped us understand the bike development and important factors that led to victory.

The 1996 ZX-7RR offered Team Muzzy a new foundation for victory. The new short stroke motor and revised chassis they hoped would pick up where the '95 race bike left off. The new, more rigid chassis improved handling with better turn-in traction and feel going into corners. Improved weight distribution helped hold the chosen line in corners. Somewhere between the drawing board and the production line, though, some horsepower was lost.

The new motor needed some work to compete at this intense level. After a season of tireless development, the '95 long-stroke motor had more power, especially on top-end. The team started fresh with the new motor, burning the midnight oil trying to get more horsepower. The engine was dissected and rebuilt using the Muzzy Works engine kit, which is available for sale (see picture). According to Muzzy, this kit is always changing as parts are revised and improved. The team then worked with port shapes, piston shape, exhaust sys-

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***K-TECH* News Staff**

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Kawasaki Tech Services

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Don Church

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Gary Herzog

Editor-in-Chief
Gregg Thompson

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Fred DeHart

Central and South
Walter Rainwater

West
Robert Taylor

Contributors
Dove Behlings, Dove Corey, John Griffin, Jeff Hoeppner, Marge Lakin, Tevis Moffett

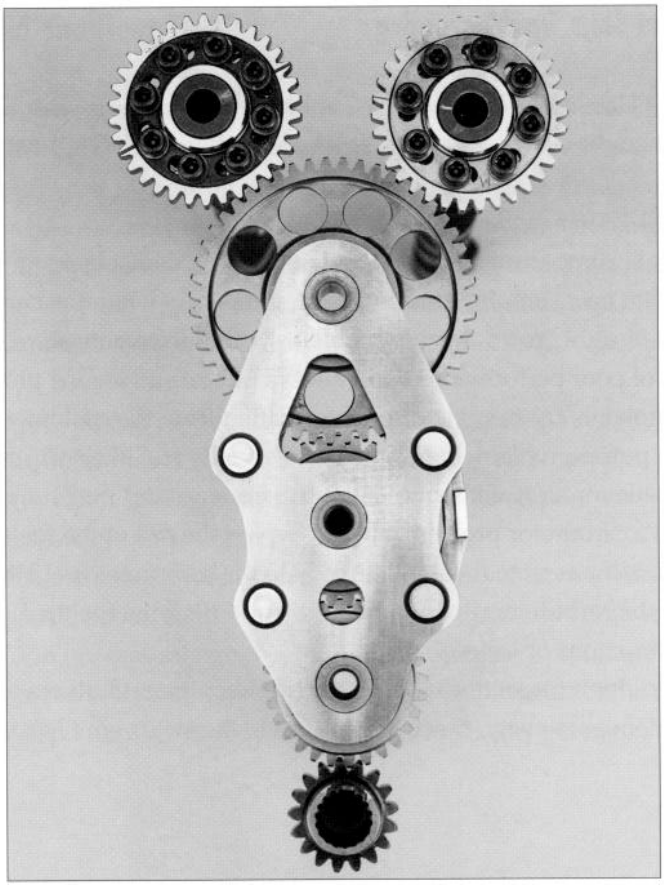
Graphics/Production

Graphic Art
Gregg Thompson

Photography
Dave Corey, Rich Cox, Kevin Wing

Copy Editor
Pat Shibata

Production
Desiree Holland



A *K-Tech News* exclusive picture - Muzzys Kawasaki camshaft gear drive.

tern, intake funnel and manifold lengths to generate more horsepower and torque. Muzzy uses a Serdi machine to do precision valve jobs. It has a one-piece cutter which cuts all the angles at one time and repeats the same programmed, near-perfect cut over and over.

The Daytona and Pomona races gave everyone a chance to see how their machines stacked up. Chandler needed more power and improved mid-comer traction to help his comer and exit speeds. The team went to work on the chassis by changing the rake and trail, shock linkage, rocker arms, altering the wheelbase, and changing the suspension valving. After the first third of the season, Chandler arrived at chassis settings he was comfortable with so the team could focus primarily on tires and suspension valving for each track.

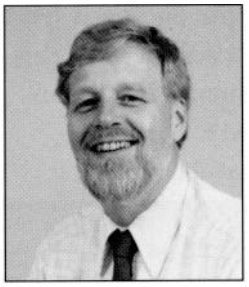
Muzzy said that engine performance really didn't come around until after the World Superbike race at Laguna Seca. They were finally able to come up with some combinations that gave them more top-end and improved rideability. An improved exhaust system and a new intake tuning length contributed to the success.

What about the gear drive for the cams? Muzzy told us it was never used on Chandler's '96 AMA bike; they only used them in Formula USA events. The gear drive (which will be used in the '97 AMA bike) only adds about one horsepower on top, but as Rob says, "sometimes they spend a month trying to come up with one horsepower, so a horsepower is a horsepower. "

Chandler and Team Muzzy had a near flawless weekend in Las Vegas capturing the pole position, leading the most laps and winning the race to capture the title. We wanted to know how they got the bike dialed in so well. Rob explained the performance on the track was the fruit of their labor put in during the season and especially the six weeks between the last two races. They spent three days at Daytona performance-testing new ideas and endurance-testing ideas developed during the season. The team was in the points hunt all year so they played it safe with their new ideas.

How does Chandler

Continued on page 12



NORTH & EAST

Jet Ski® Troubleshooting

Here comes another PWC riding and wrenching season! In view of that fact, I thought I'd put together a few of my favorite troubleshooting tips for you to refer to.

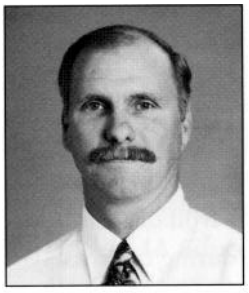
1) After working on a customer's boat, make sure you run the engine with the engine compartment cover on and latched. Exhaust leaks and obstructions in the intake tract can cause the engine to run poorly when the engine compartment is closed tight. You can catch problems you didn't know were there by doing this.

2) Customer complaints of poor performance don't always indicate an engine problem. Jet pump problems can result in the same complaint. Try to get enough information from the customer to distinguish between an engine problem and a pump problem. Pump problems usually feel like a slipping clutch to the customer. Check for a worn impeller or air leaking into the pump from around the pump housing.

3) If you think a unit has a carburetor problem, always bypass the rest of the fuel system and run it before tearing into the carbs. Connect a remote fuel tank directly to the carburetor fuel inlet. If the engine runs well with the remote tank, the carburetors are not the problem. Check the fuel tank, petcock, pick-up tubes and lines and filter for obstructions or leaks.

4) For electrical problems, don't forget to check the electrical box ground. Run a jumper lead from the box to the engine. If the problem goes away, check the ground in the stator wire harness for problems.◆

Fred DeHart
201 Circle Drive N. #107
Piscataway, NJ 08854
(908) 469-1221



WEST

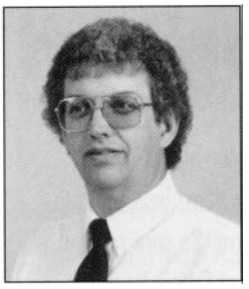
Temperature Gauge Fix

While I was conducting a seminar at a Good Times Owners Club rally last year, several Voyager® XII owners asked me questions about the operation of the temperature gauges on their Voyagers. The questions came from customers who were concerned because their temperature gauges never read above the low end of the normal range. Was there something wrong with their gauges or were the bikes really running that cold? Actually, it turns out neither was true in most cases.

When I got back to KMC, I did some checks and it turns out the problem stemmed from an inadequate ground for the gauge sending unit. The sending unit is mounted in the thermostat housing which is attached to the frame. The negative cable from the battery, however, is connected directly to the engine.

Apparently this long ground path from the sending unit to the housing to the frame to the engine can result in too much resistance even with all the connections clean and tight. To fix this problem, prepare a ground wire at least 10 inches long with an eyelet at each end. Connect one end of the wire to a thermostat housing mounting bolt (8mm head) and the other end directly to the battery negative post. If everything else is correct, the gauge should now read in the middle of the normal range at operating temperature.◆

Robert Taylor
9950 *Jeronimo Road*
Irvine, CA 92718
(714) 770-0400



SOUTH & CENTRAL

Did You Hear That?

There it goes again! For most of us, an abnormal noise in an engine can be pretty difficult to find. The sound seems to come from everywhere. Some people try to find the sound just by putting their ear next to the engine. Others use different objects like a length of rubber hose or screwdriver to try to hear the sound better. I've been assured that, if you use a screwdriver with a wooden handle, it really works. The screwdriver is probably the most common "tool." I've used them and I'll admit it, they work better than the "naked ear." But compared to a mechanic's stethoscope, these homemade tools don't work very well.

With a mechanic's stethoscope, you can pinpoint the noise in an engine within 4 to 6 inches of its source. That means you can not only hear the difference between the bottom and top ends, but you can tell what cylinder and even whether it's on the intake or exhaust side. If the noise is in the transmission, a stethoscope will sometimes even allow you to distinguish which shaft the noise is coming from.

There are many types of mechanic's stethoscopes on the market today. I have tried several of them including the electronic type with volume control. Some are more expensive than others and some are more effective than others. But expense and effectiveness don't necessarily go together, in my opinion. I prefer the old-fashioned kind that are similar to a medical stethoscope, but with a thin metal probe on the end instead of the flat disc that doctors use. These are relatively inexpensive and they work great. If you don't have one, get one. You'll be glad you did.◆

Walter Rainwater
6110 Boat Rock Blvd. S.W.
Atlanta, GA 30378
(404) 349-2000

Micro-K

Substitute Parts list

by Jeff Hoeppner
Parts Data Coordinator

I have been getting a few calls lately from dealers who need to know more about a certain publication that we send out. The publication I'm referring to is called the "Substitute Parts List." It provides information about replacement parts for canceled part numbers that don't have any direct substitutes.

One good example of this book's purpose and usefulness is the clutch hub nut and leaf spring washer on Concours and similar models. When you try to order either of these parts, the part numbers come up canceled with no alternate parts available. "How can such a vital part of a fairly current model be unavailable?!" is the usual response. The old parts cannot substitute to the new style parts because both of the new style parts have to be used together. In other words, the new spring washers will not work with the old hub nut and vice versa. When this occurs, there is a message on your K-Share confirmation that will solve the problem, but many people miss it. The message will read "SEE SUBSTITUTE PARTS LIST." This message appears any time a single part must be replaced with multiple parts. In this case, the leaf spring washer must be replaced with an updated pair of leaf spring washers and the new style nut.

The Substitute Parts List is mostly made up of older model headlights, meters and fork assemblies that are no longer available as a set, and lists all of the sub-parts that are required to make the assembly; but you will also find other important information. Take a minute to find your Substitute Parts List and familiarize yourself with it. You should keep it in your parts bulletin binder. If you can't find one, order it under part number 99969-0134, and keep an eye out for the message on K-Share.◆

Expanded Video Training Program

by Don Church
Manager, Service Training and Communications

In today's competitive retail environment, training is what distinguishes the winners! You probably know about Kawasaki's "Back to the Basics" series of technical training programs. If your dealership is a member of the Tech Training Video Club, you may have received the first two programs and perhaps the third has just arrived (see article below). Each video workbook has a quiz at the back. Please be aware that those technicians who send the quiz to Kawasaki and score better than 80% receive a Certificate of Completion.

Here is another great training opportunity for your dealership. The Service Training Department has teamed up with CareerTrack to offer a full library of audio- and video-based training programs covering a variety of Management, Customer Service, Communication, and Team Building subjects. All of these video and audio programs are very attractively priced for Kawasaki dealers with a discount of 35 percent. For the cost of sending one or two people to a seminar, you can invest in a training tool that is immediately available and can be used over and over again.◆

In January, Kawasaki sent every dealership a CareerTrack catalog of available training titles. Inserted into this issue of K-Tech News is the order form. Be sure to send the order form directly to Kathie Pillard at CareerTrack. If you have any questions about these or other programs, contact Kathie Pillard at (800) 325-5844.

Training Programs Available

Team Building:
How to Motivate and Manage People

Communication:
Dealing with Conflict and Confrontation
How to Deal with Difficult People

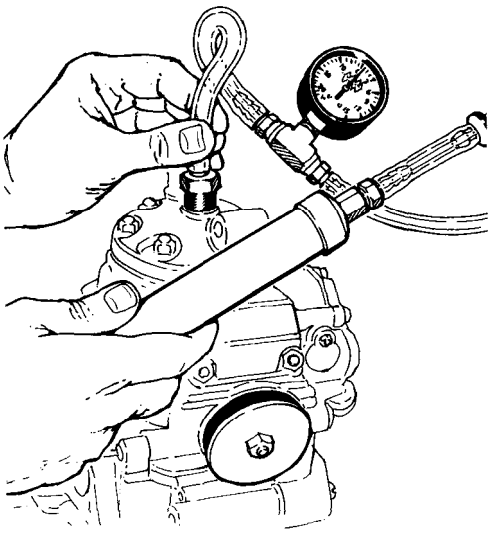
Management:
Succeeding as a First-Time Manager
How to Interview and Hire the Right People
Performance Appraisal Solutions

Customer Service:
Pleasing Your Hard to Please Customers
How to Give Exceptional Customer Service
Professional Telephone Skills

New Tech Training Video on Two-Stroke Engine Pressure Testing

by Ray St. John
Supervisor, Technical Writing

A new video in the "Back to the Basics" training series is now available. Two-stroke Engine Pressure Testing covers the tools and procedures for pressure checking most types of two-stroke engines. It takes you step-by-step through the process of performing a pressure check and gives suggestions on diagnosing running problems related to pressure loss. This tape is aimed at the new technician who has never done this job, and works well as a refresher for more experienced technicians.



If your dealership is a member of the Tech Training Video Club (over 500 dealerships are members so yours probably is, too), you have already received this video at the club price of $25.00 plus shipping, handling and applicable sales taxes. Regular price is $36.95 (plus the usual S & H & tax), but you can join the club and get the tape at the club price by calling Kawasaki Technical Services at (714) 770-0400, ext. 2465. Ask for Kiki.◆

It's Here!

Vehicle Service Inquiry

by Marge Lakin
Manager, Operations Administration

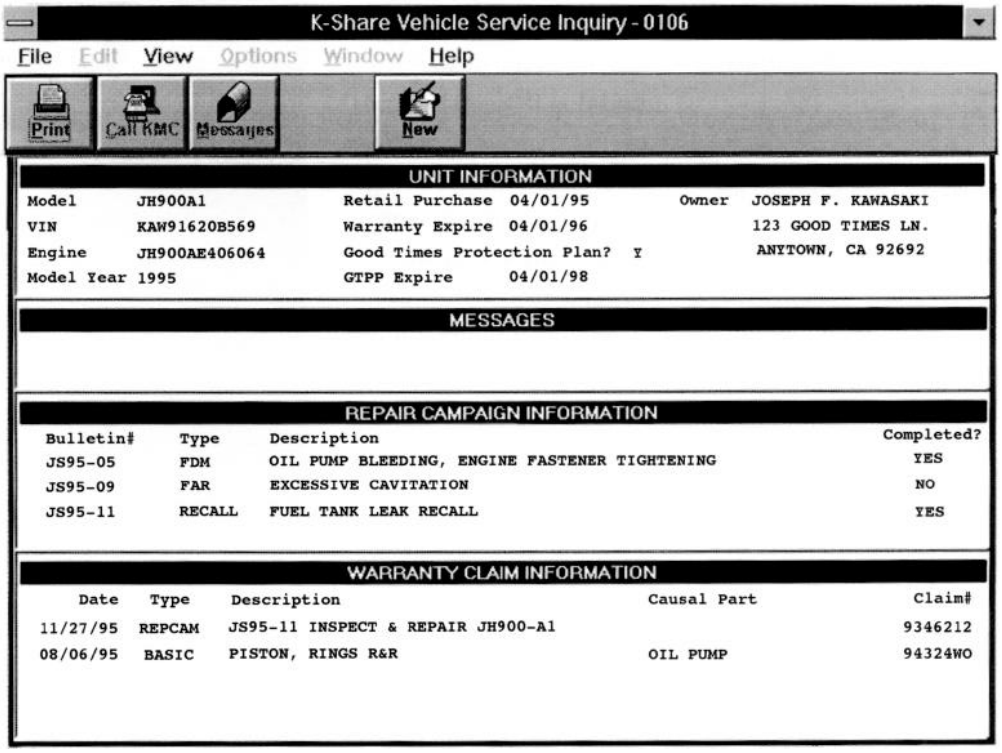
Just what you have been asking for: K-Share now offers Vehicle Service Inquiry (VSI). You have always wanted an inquiry system where you could find the service history on a particular unit. VSI offers just that.....!!!

All you have to do is go to your K-Share computer — open the K-Share Program Group, double click on VSI and the information will be at your fingertips.

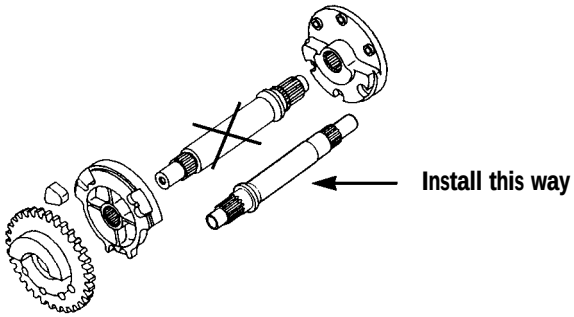
Simply key in the VIN/HIN numbers *or* use the short-cut method and key in the Model and Frame/Hull number (last six numbers of the VIN or middle five numbers of the HIN). Click on the "Call KMC" button to transmit the request to KMC. KMC will respond with the information we have on file, including customer address, warranty status, any FDM, FAR or RECALL activity, as well as completed warranty work. Any repair campaigns not completed will be highlighted in red. Be sure to check for any outstanding FDM's and RECALLS every time you use the VSI screen. Doing so can ensure that vehicles don't leave your shop with important campaign repairs not completed. Once you have the VSI information on your screen, click on the "Print" button to print a copy for your customer file.

Dealers are receiving the software update from Kawasaki automatically through the K-Share system or through the mail on a diskette.

If you have any questions regarding Vehicle Service Inquiry (VSI) once you have the software, please call K-Share at (800) 626-2158. ◆



After All These Years



We've recently learned of a small error that has existed in the Vulcan™ 1500 microfiche and service manuals since the first year of this model (1987). The balancer shaft (shown with the crankshaft) has been pictured backwards in all our publications. Recently you received new microfiche for all VN1500s, and the picture has been corrected on them. However, we can't correct your service manuals, so we suggest you get out all your VN1500 base manuals and make a note on the exploded view drawing at the beginning of the Crankshaft Transmission chapter.

It is possible to assemble the engine partially with the balancer shaft installed as depicted in your manuals (backwards), so make sure you make a note in all your manuals and toss out your old microfiche. ◆ — *Ed.*

Keeping Tabs

New ATV Binder Tab

by Put Shibata
Supervisor, Service Material

In an effort to keep up with the changing needs of dealerships, we have separated the ATV line from the motorcycle line for service-related materials. This means that any ATV-related bulletin you receive now has the ATV symbol and numbering system on it. A new ATV tab and index were distributed for both the Service/Warranty and Part/Accessories binders in January to make filing these new bulletins easier for you. In the future, add any new ATV bulletins behind the ATV tab. If you need additional tabs or indexes, please contact the Tech Pubs Department at extension 2472. ◆

4WD—Use It Only When You Need It

by Dave Behlings and
Gregg Thompson
Product Support

We have had several calls from dealers trying to fix 4WD Mules (2510s) that have a very loud intermittent "popping noise" coming from the bevel gear case (PTO) for the front drivetrain. In talking to the dealer, we find that the noise only occurs when the vehicle is in 4WD mode and being ridden on surfaces with good traction (usually pavement!).

What's wrong with this picture? It's easy (while concentrating on finding and fixing the noise) to overlook the rather obvious fact that there is NO NEED to be driving the mule in 4WD on pavement! The noise is NOT the result of a failure of any kind, but rather from using 4WD when it should not be used. Unfortunately, we have talked to dealers who have disassembled the whole transmission and/or other parts of the drivetrain looking for the cause of this noise. It's not the kind of noise a customer is likely to put up with.

Here is what causes this noise. The front drive system is intentionally geared slightly higher (wheels turn slightly faster) than the rear drive. The reason for this is to improve steering feel and reduce "understeer" (the tendency for the front wheels to push or plow in a turn). There is a spring-loaded cam-and-ramp damper in the bevel gear case which is mechanically *between* the front and rear drivetrains. On pavement, with the front and rear wheels constantly trying to roll at slightly different speeds, the cam damper winds up (taking up the difference) and eventually pops over center, causing a very loud noise. This noise will occur at regular intervals while driving on pavement or other surfaces with good traction.

In poor traction conditions where 4WD was intended to be used, this slight difference in gearing is easily taken up by tire slippage. The cam damper never has to bear any unusual load.

Make sure all your customers and dealership personnel know that this 4WD system was never intended to be "full-time 4WD." Use it only when it's needed. ◆

Body Parts and Decals... Still Confused?

by Jeff Hoeppner
Parts Data Coordinator

As you may have read here in *K-Tech News*, many cowlings and side panels are now being shipped without decals. Although ATVs, Utility Vehicles, and Jet Ski parts have always been offered this way, it will take a little getting used to for street parts. Figuring out if a specific part has a decal or not can be confusing. I've seen well-informed employees here at Kawasaki order too many decals for a specific job, so I thought another article was in order.

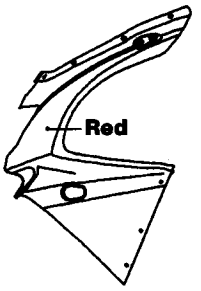
The confusion lies in the text provided to determine if parts come with decals. It reads in part:

"If the size of the decal is larger than 250mmx180mm (approximate size of your palm), but smaller than 360mmx250mm (approximate the size of your face), the part will be supplied without decal. If it is difficult to paste on because the design is complicated, a part will be supplied with decal."

Imagine trying to explain that to a customer at the parts counter! The good news is that there is an easier way to determine if any part will include decals.

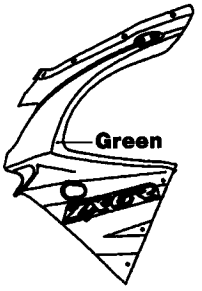
Example:

36001-1540-B1
(without decals)



Indicator digit

36031-5053-R1
(with decals)



If the first number of the suffix in the part number is "5", the part will come **with** decal(s); if it is any other number, the part will come **without** decal(s).

I haven't found a single part that doesn't use this method. It works on motocross, off-road, and street motorcycles; ATVs and watercraft. Even fuel tanks with decals clear-coated over will have the 5 in the part number, specifying that it will have a decal. Give it a try, and let me know if you find an exception. ◆

C.B.-Related Engine Trouble Voyager XII

by Tevis Moffett
Senior Product Support Specialist

"My engine almost dies every time I key my C.B. radio microphone!" You may have heard this complaint; others have and we usually get a call when it happens. The engine is actually dropping the number one and four cylinders (no spark) each time the mic is keyed. Also the tachometer may malfunction at the same time. Dealers usually can't decide whether to diagnose the ignition system or the radio.

The trouble has always turned out to be in the C.B. system, specifically the antenna or the coaxial cable running to the antenna. If the antenna has a poor ground connection (loose mount or corrosion) or if the cable is routed too close to a spark plug (high tension) wire, RF interference will get into the ignition system causing it to misfire on one coil (two cylinders).

If you get a Voyager in your shop with this complaint, first make sure the antenna has a good ground and then make sure the coax cable is routed as far from the coil wires as possible. You can also go to your local radio shop, buy some cable shielding and wrap the antenna cable with it. ◆

VN1500: Diagnosing Coolant leaks

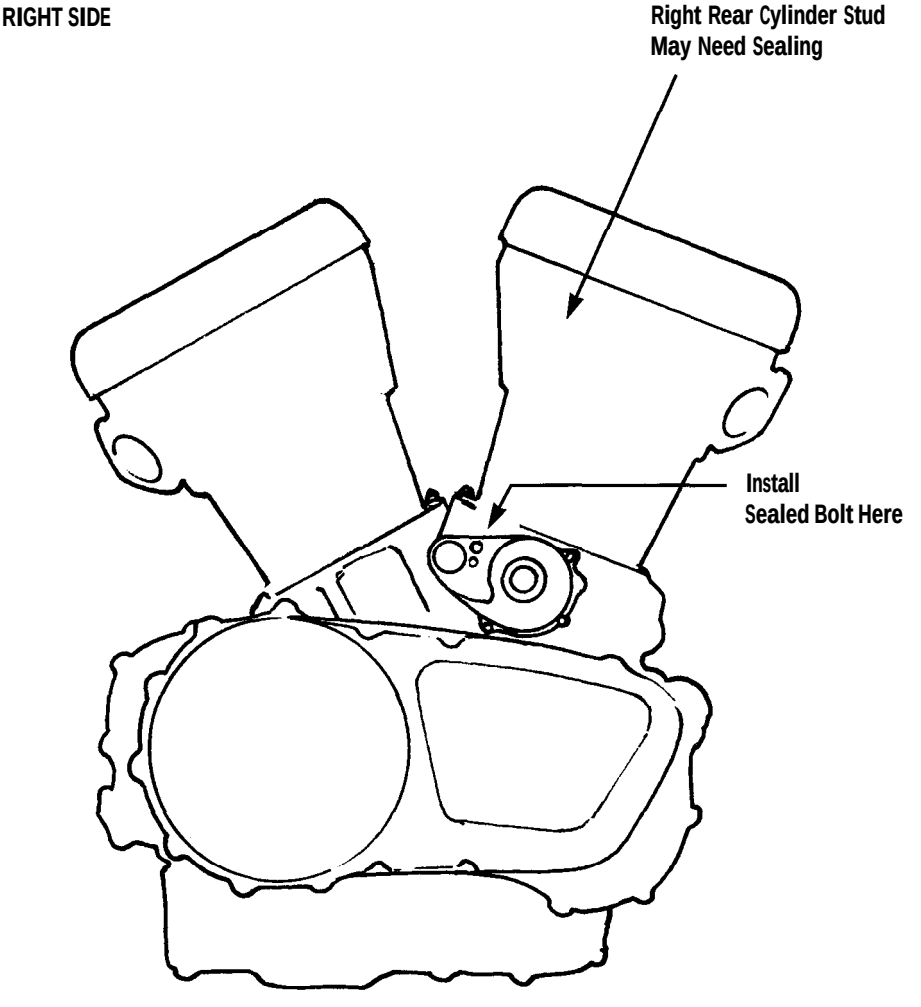
by Gregg Thompson
Product Support Supervisor

We have had a few calls on the Hotline lately regarding top-end coolant leaks on VN1500s that were difficult to diagnose. In each case, the area of leakage was identified as the right rear portion of the front cylinder or cylinder head. Although the leak can occur anywhere from the base gasket to the cam cover gasket, we believe the source of the problem was always in the same general area.

On the 1500s, coolant goes from the water pump into the right hand engine case between the base of the two cylinders and then travels up into the cylinders from there. This area in the top of the right hand crankcase between the two base gasket surfaces is full of water passages and bolt or stud holes. We believe that because of either casting flaws or mismachining the coolant passages may get connected to one or more of these bolt or stud holes. Once the coolant gets into a stud hole, it will eventually find its way out through a gasket or under a cap nut.

If you have a coolant leak from ABOVE the water pump (especially from the front cylinder area) on a VN1500, don't disassemble anything until you have pin pointed the exact location of the leak. Use the spray powder method of locating the leak. Clean the whole area of any coolant and spray the area with an aerosol foot powder. Then run the engine and WATCH CAREFULLY to see where the coolant is coming from.

If the leak is coming from the right rear corner of the front cylinder base gasket, head gasket or cam cover gasket, you might have to pull that cylinder stud and reinstall it with sealant on the threads. But first try replacing the upper left hand water pump cover bolt with a new sealant-coated bolt (P/N 92002-1622 for D models, and P/N 92002-1534 for A and C models). If this sealed bolt doesn't stop the leak, you'll have to pull the top end off and seal the right

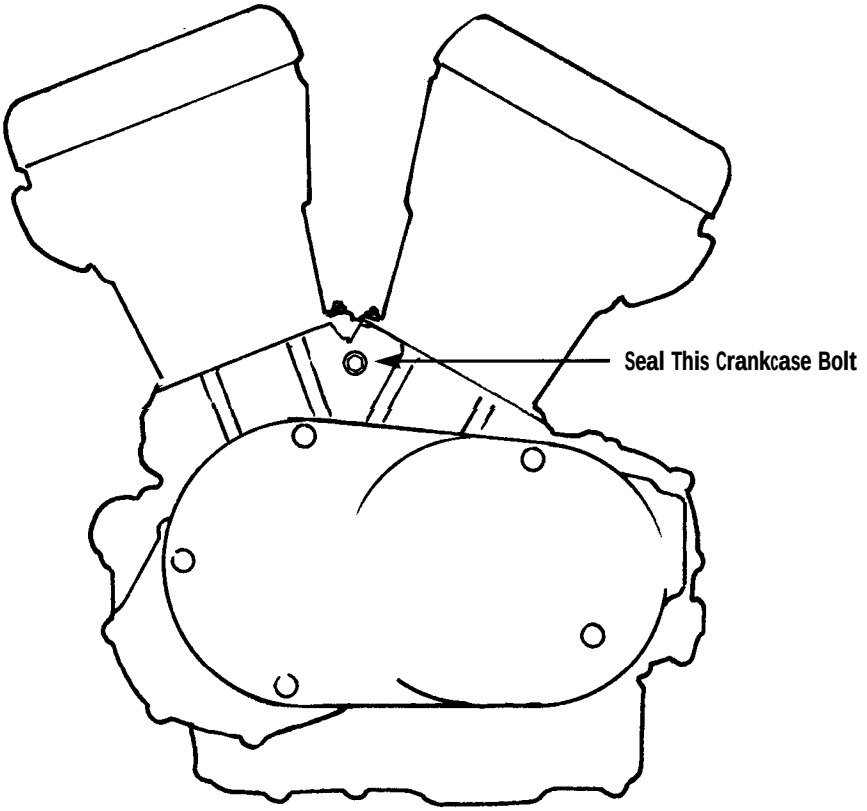


rear cylinder stud in the cases with a non-permanent thread locking agent (blue loctite).

If the leak is coming from the short stud in the rear center of the front cylinder base, you should not have to remove the engine to fix it. There is a 10mm crankcase bolt on the left hand side of the cases that goes into this area with the water passages. It always connects with this short stud hole but it's not supposed to connect with a water passage. If a casting or machining flaw connects this case bolt hole to the water passage, coolant will leak out from the short cylinder stud. You should be able to fix this leak by sealing the crankcase bolt threads.

To seal this crankcase bolt, remove it and drain all the coolant from the engine. (If there is coolant on the bolt when you remove it, you can be certain you're on the right track.) You should remove the water pump cover so you can do a good job of cleaning the crankcase threads. Blow contact cleaner and air into the coolant passage and the crankcase bolt hole. Then reinstall the bolt with a non-permanent thread locking agent, and reinstall the water pump cover using the sealed bolt mentioned above. ◆

LEFT SIDE



Case Sealer from Kawasaki Accessories

by Gregg Thompson
Product Support Supervisor

Most of you already know that for sealing crankcase halves, we recommend using only sealants that are specifically designed for this purpose. In other words, don't use RTV silicones, or gasket sealers. You also probably know that Kawasaki sells crankcase sealer under P/N 56019-I20 and that it is quite expensive.

We now offer crankcase sealant through our accessories department at a much better price. You can get it by ordering P/N 1211. Your cost is $9.65 per tube. ◆

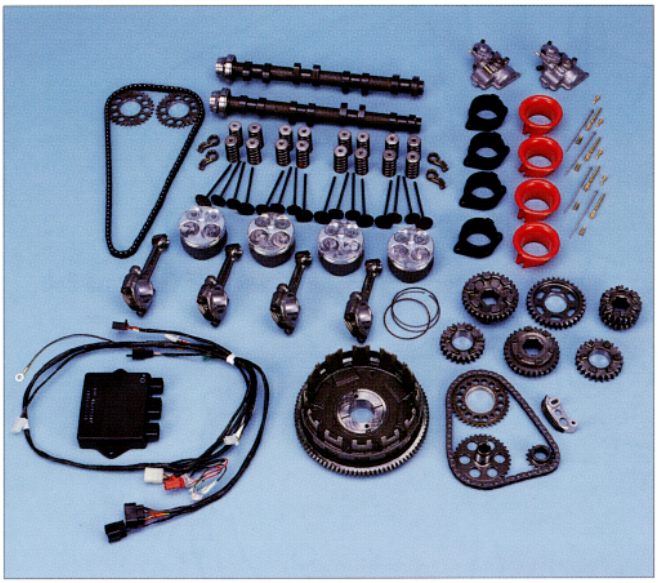
Note the massive single-sided magnesium swingarm now available from Muzzys and currently employed on Chandler's race bike.

Championship Bikes

Continued from page 3

relate to the bike? Muzzy said Chandler sets his motorcycle up similar to the rest of his very successful riders like Scott Russell. The rake, trail, and ride height settings are set to offer very balanced and neutral handling. He uses a 51% front- and 49% rear-weight bias, "just like he did before (when Chandler teamed with Muzzy Kawasaki to win the '90 AMA Superbike Championship) and the other riders have for years."

Muzzy Kawasaki has big plans for 1997, selling complete race bikes like a Chandler replica Superbike ZX-7RR, the new Raptor 850, and ZX-11 motors for Dwarf and Legend cars. The Superbike will put out close to 150 horsepower and weigh in close to the 355 pound weight limit. Cost has not been set, but Rob mentioned Chandler won the '96 championship on a $50,000 race bike against some that probably cost $250,000. The team is just wrapping up details on the Raptor 850 with a claimed 165 horsepower at 407 pounds. The Raptor will be less expensive than the Superbike, by using production oriented suspension instead of full race Ohlins forks and shock. The Raptor is a natural for the Formula USA series, where Chandler has already had great success on the bike.



Muzzys ever-changing works kit for the ZX-7R and ZX-7RR.

K-Tech News asked Rob if he had advice for Kawasaki dealers that have road race teams or sponsor local racers. "Don't get caught up in the trick stuff. Make sure the valves don't leak (as close to 100% as possible) and the rings (piston) don't leak." He sees bikes at the races with expensive titanium rods bolted under a cylinder head with leaking valves. Chandler's championship bike doesn't even use titanium rods or valves. Rob thinks a good valve job is probably the most beneficial modification to today's production street racers. If you have the need for speed at your local race track call Muzzys at (541) 385-0706. ◆