When the Chickens Come Home to Roost, HECAT's Coolant Pulsator Saves the Day

By Stu Oltman, Senior Technical Editor

With the cooling of temperatures in most parts of the country, many of us may be considering putting our trusty steeds up for the winter. Naturally, we think of things we should do to prepare our Wings for a long winter's nap. Attach a battery maintainer. Change the oil and filter, and flush the brake and clutch fluid if it's due according to mileage or time. But how many of us consider changing the coolant?

Now, I realize we've published a coolant article or three lately. But recently, a trike was brought to me with some unusual problems that speak to the necessity of both changing the coolant at regular intervals, and of keeping track of what maintenance has been performed on your bike, and when. It also gave me the opportunity to test a new cooling system tool, which in this particular case saved the day—both for me and for the trike's owner.

Fox Guarding the Henhouse?

The trike in question is a conversion of a 2002 yellow GL1800. As related to me by the owner, it had always seemed to run hot, even when new. Now, I'm not talking about the "parade mode" problem in which the temperature gauge pegs when riding constantly at speeds of around 15 miles per hour. No, this bike seemed to run a bit hot at all speeds. As time went on, the symptom became worse, and the owner presented his bike for what most of us know as "The ECM Recall."

Actually, that wasn't a recall at all. It was officially termed a "Product Improvement Campaign" and was completely voluntary on the part of the bikes' owners. They were entitled to it, but they weren't forced to accept it. The Campaign included replacing the Engine Control Module, installing a resistor harness in the coolant temperature gauge circuit (specific bike models only), inspecting the left radiator outlet for clogging due to electrolysis, inspecting the coolant holding capacity of each cylinder head (except for some late '03 models), massaging a wiring harness so it wouldn't chafe on the top of the left radiator, pressure testing the cooling system and radiator cap, and finally refilling the cooling system—properly.

I have a hunch that many owners who presented their bikes for this inspection mistakenly asked that "The ECM Recall" be performed. I also have a sneaking hunch that that's exactly what they got, and little else. Accomplishing everything in the Technical Service Bulletin (TSB) as listed above would take a pretty fair amount of time. In fact, when American Honda was nice enough to have the GL1800 Model Specialist walk me through the entire procedure out in the Torrance headquarters, we spent a good part of the day doing it.

So why would a dealership technician not follow the Service Bulletin to the letter? There are several reasons I could think of. But few of them would speak well of either a service manager or a technician, so I'll refrain from public speculation. What's *not speculation* is the fact that many GL1800s that underwent this campaign were never given the punch mark on the engine serial number indicating that the service had been performed. If one portion of the TSB was ignored, who could speculate what portions *weren't*? Scanning the service receipt provided by the dealership that performed The Campaign on the bike we're discussing here, I noticed they'd listed one quart of coolant at no charge to the customer—that's when I knew The Campaign was only half-done at best.

You see, the TSB instructed them to completely drain the coolant and dispose of it. Had that happened, the service receipt would have listed at least four quarts, not one. What dealership would needlessly eat the cost of three quarts of coolant? None that I know of. The parts ordering information in the back of the TSB listed the part number for one quart of coolant, simply because that's the way it's packaged. Whoever wrote up the service receipt obviously hadn't read the TSB and wasn't

clever enough to realize they could have scammed American Honda for the entire four quarts. The labor involved also seemed a bit light, considering the nature of the work that I knew would be involved for the full deal.

I realize that there are many diligent and honest service managers and technicians who both performed the entire service and listed for reimbursement only those parts and supplies they'd actually used. Considering those who did otherwise, it's like watching a TV episode of "World's Dumbest Criminals" with one major difference; these folks never get caught!

Two problems arise when a TSB like this one isn't taken seriously or its instructions aren't completed. Problems like those intended to be disclosed by the inspection aren't. So when problems later crop up, it's hard to determine which came first—the chicken or the egg. Also, a false sense of security is imparted to the hapless owner who trusts his dealer to have done the job thoroughly. What false security, you ask? It was known by many owners of the bikes affected by this Campaign, that a complete coolant replacement was instructed in the TSB.

So, after consulting the maintenance schedule in their owner's manuals, many of those who took advantage of the Product Improvement Campaign assumed they had no need to change coolant again for two years or 24,000 miles from the date of completion of this service. For many of those owners, that assumption was incorrect. And for some, the chickens are now coming home to roost.

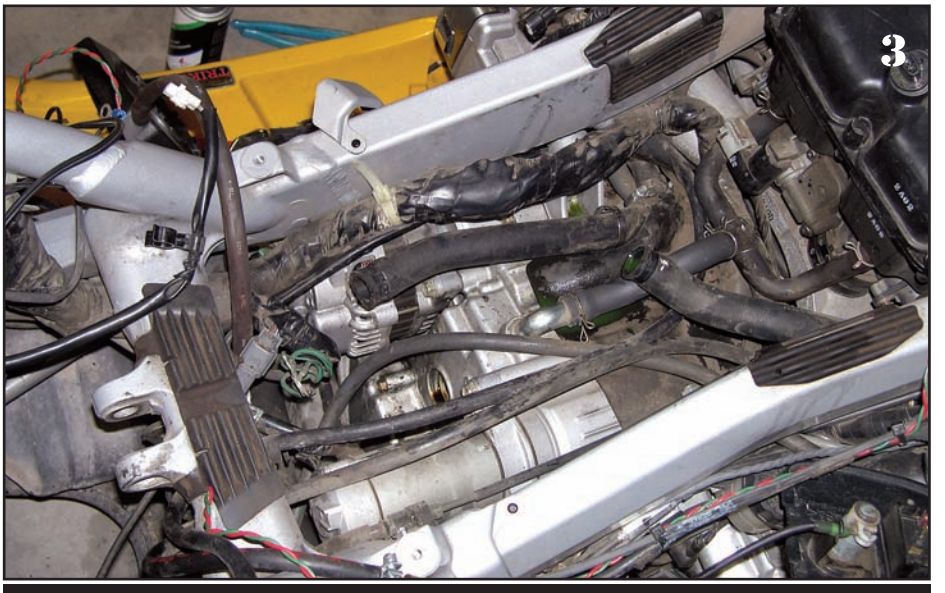
Examination and Evaluation

Previous to observing this trike, I was asked to examine a 2003 GL1800 that had not been triked. Though it had undergone The Campaign, it had no punch mark on the engine number to indicate that, and my hunch is that it contained the very same coolant with which it left the factory. It presented no particular temperature issues on the road other than mildly elevated gauge indications under certain circumstances and the fact that if the radiator fans came on, they would never cycle off unless the bike were ridden above 15 miles per hour.

In other words, the fans were incapable of reducing coolant temperature to the point that the ECM would cycle them off. Manually holding the engine RPM at 2,000 in neutral would produce a full-scale temperature gauge reading within 5 minutes. Examination of the radiators at various points with a non-contact thermometer revealed restricted coolant flow, so the cooling system was drained, and the drain liquid exhibited what appeared to be small metallic particles mixed with non-

Contaminated pump housing.

Coolant Pulsator.



All hoses disconnected, ready to attach pulsator.

Flushing the left head.

Hose barb connects device What happened next was astounding…

Pressure applied at cylinder head rear blasts through the front hoses.

metallic matter of unknown origin.

Next, we disconnected the hoses and thoroughly flushed the system with a garden hose—the most effective method available to me at the time. The thermostat was checked and found to be operating properly, and no restriction was evident in either the radiator outlets (inspection per the TSB) or in the thermostat and coolant pump housing. We did observe some greenish-gray material exiting one of the hoses during the flush, though we weren't able to determine its origin.

After reassembly, the cooling fans were able to draw down the coolant temperature to the point that the ECM turned them off, but only for maybe a half-dozen cycles. After that, they stayed on continuously, though the temperature no longer raised much above the halfway point on the gauge if the RPM were manually held above idle speed. The cooling system performance was improved markedly. Though I'd wished for a bit better outcome, the owner proceeded on a very long trip with trailer in tow and reported no problems enroute.

The situation with the 2002 GL1800 trike was quite different. This machine produced severe engine knock (detonation) when accelerating, even in second gear. And even the mildest of hills loaded the cooling system enough to peg the temperature gauge. While observing the bike at idle and in neutral, the fans came on within a few minutes of cold engine start and never turned off. In fact, after about 15 minutes idling, I could hear the engine rattling and actually heard detonation. At idle!

When I was told that the machine was ridden in this condition from Phoenix to Billings for this year's Wing Ding, stopping at short intervals to cool things down, I immediately checked the engine compression and pressure-tested the cooling system, looking for fried piston rings or a blown head gasket. From the results of those checks, I have to think the Army would be happy if the engines in their tanks were built as tough as the one in the GL1800—it had apparently suffered no damage from this abuse. As an aside, the coolant was changed just prior to Wing Ding with the same performance complaint. One wonders why the shop performing that service never addressed this severe overheating condition. And as far as changing coolant goes, it's my opinion that a cooling system service should always include flushing and not be a simple drain and fill. That's about as effective as rearranging the deck chairs on the Titanic as it's sinking.

Well, something had to be done, but what? We considered the possibility of a stuck thermostat, but removal and testing proved it to

be okay. Still, having done the requisite surgery just to access the thermostat, a new one was installed on principle. But before reassembling the housing containing the thermostat and coolant pump, it made sense to remove the severe clogging evident in the cylinder head bypass hose inlet (see Photo 1). This material was hard and crusty and could only be removed by reaming with a rotary brush. We estimated it was causing at least a 25-percent restriction in that line, and it certainly pointed to the likelihood of similar contamination elsewhere in the cooling system—stuff that a garden hose could never remove.

After disconnecting all of the cooling system hoses, a garden hose was inserted into one of the radiators and turned on full. The radiator quickly filled and began back spraying, as water trickled from the outlet at the other end. Yes, that radiator definitely needed service or replacement. But what of the other components—the other radiator and the cylinder heads. Would we need to remove the heads and radiators to have them boiled out by a specialist? Would replacement be a better option?

Cleaning Out the Chicken Coop

As we considered the alternatives, I happened to spy a new product release in my copy of *Professional Tool And Equipment News*. Manufactured by HECAT, Inc. of Suwanee, Georgia, it was referred to as The Coolant Pulsator (see Photo 2). The claim for this product was that it had the ability to remove severe cooling system contamination through a pulsating jackhammer effect created using water, shop air, and a pulse valve. I had dealt with this company in the past and was happy with their products, so a call was made to see if we could get a sample of "The Pulsator" for evaluation. It arrived in a few days.

As seen in the photo, the product consists of a handle/trigger assembly with attached air pressure regulator, a large rubber cone for sealing off hoses and metal passageways, a hose with small cone for small openings, and two hose barbs for direct connection to radiator or heater hoses. What's not seen in the photo is the contents of that small white box. It contains a backflow preventing device for attachment to the hose connection on the building. This is necessary, because the air pressure fed into the handle when the trigger isn't squeezed could actually empty the contents of the garden hose right back into the building's water mains. Hopeful but skeptical, we detached all hoses connecting the various cooling system components and prepared for the cleaning attempt (see Photo 3).

The game plan was to flush all components for ten minutes each in the reverse direction of normal coolant flow, then repeat the procedure in the normal flow direction. Using a hose barb and hose clamp, we first connected the tool to a large hose at the front of the trike that was connected to the left cylinder head (see Photos 4 and 5). What happened next was astounding. We squeezed the trigger and applied its lock. The handle and hose began jumping around as water pulsed from every outlet of the left head (see Photo 6). It can also be seen spraying from the bike's service drain hole up front. I went to the rear of the head and found I couldn't hold my hand anywhere near the coolant outlets, because the high-pressure pulse blasted it away.

It was indeed like a "water jackhammer." HECAT came up with this idea after seeing professional radiator shops attempting to create pulses by a squeeze-and-release action applied to a water hose, or to the hose of similar products that don't incorporate any pulsing device. This is much better. Not only are the pulses sharp and rapid, the air pressure creates a much stronger effect than could ever be achieved with a hose alone. That's all very well, but would it solve the issues we faced? Read on.

After flushing both radiators, we noticed a significant flow improvement and proceeded to the cylinder heads. After wedging the small cone in the bypass outlet at the rear of the left head, I squeezed the trigger and…Whoa, Nellie! I could barely hang onto the small hose as it blasted its 75psi pulse through the head. For perhaps 20 seconds, only clear water shot out of the large hose up front. Then, a greenish-gray substance began oozing out onto the garage apron and foaming as it floated away. I have no idea what that stuff was, but I'm sure it didn't belong in the cooling system. It was interesting (to me) that it took a bit of time before whatever this crud was broke loose from its moorings and exited the cylinder head. No doubt about it; The Pulsator was accomplishing something I hadn't a prayer of doing otherwise. We followed the rest of our game plan.

Confirming the Repair

After bringing the soaking wet trike back into the shop, we reconnected all of the hoses and pressure checked the system. One O ring on the right head's bypass hose connection was leaking and was replaced. We then hooked up the UView 550000 (highlighted in "Garage Day," p. 30, the October issue of *Wing World*), and evacuated the system to a vacuum of 25 inches. The vacuum held steady, confirming the system as leak-free. All that remained was to stick the UView's refill hose into a gallon jug of Genuine Honda Type 2 Long Life Coolant, and allow the system to refill itself while remaining free of air pockets.

Not wanting to have to remove the fuel tank a second time should the flush job prove ineffective, I connected the trike's fuel lines to my fuel injection cleaning machine and started the engine. Ten minutes, then twenty went by. The temperature gauge read halfway between the mid point and the line just beneath. Then finally, twenty-five minutes after starting the engine, the fans came on—but not for long. It required only a couple of minutes to cool the system, and the fans shut off. This cycle repeated at about five minute intervals until this test was terminated 20 minutes later. The throttle was then held manually at 2500 rpm. After five minutes of this, the temperature gauge had moved slightly, but it still read below the halfway mark. The system appeared to work as good as new—maybe better. And a thorough test ride in the mountains north of Phoenix failed to produce any engine knock or coolant temperatures exceeding the halfway mark on the gauge.

Conclusions

Whether due to ignored maintenance schedules or incorrect assumptions regarding what procedures a service facility may or may not have performed, some aging GL1800s are now beginning to exhibit problems in the cooling system that can not be eliminated by simple flush-and-refill tactics. A more effective procedure is necessary to restore cooling efficiency on these bikes.

To say that I'm impressed with The Coolant Pulsator is a gross understatement. This tool saved the trike's owner the cost of complete component removal and repair or replacement. It also saved your Senior Technical Editor a bunch of time and effort, not to mention skinned knuckles. Is this tool suitable for home use? Sure, but the cost may be prohibitive unless the home mechanic puts it to good use doing routine flushing on all of the household vehicles. This is a professional tool, heavily built using high quality materials, and its price is commensurate with its quality. Is this tool suitable for everyday use in a professional shop? I don't believe that many motorcycle service facilities have even one piece of professional cooling system service equipment other than perhaps a common pressure tester. But they should, and The Coolant Pulsator is one they shouldn't be without. It made me a hero in what appeared to be a hopeless situation after several dealers had tried and failed to make any positive impact on this problem.

For more information on The Coolant Pulsator, contact the manufacturer directly at Hecat, Inc., 4240 Jenkins Ct., Suwanee, GA 30024; (800) 380-9501; www.hecatinc.com.