

das Rundschreiben



Announcing

July 2011

* 2011 NAKUSP RALLY *



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The 10/25 Event !

This year's annual rally marks a special point in Bee Cee Beemers history. We are holding our 25th club rally and also celebrating 10 wonderful years in Nakusp! To mark that occasion we are planning some special guests and hoping for a good turnout to enjoy this special occasion. Long time members will recall humble beginnings in several locations around British Columbia but the 2nd millennium has belonged to Nakusp. It seems we've found our place there and when one considers what Nakusp has to offer it's no surprise we keep coming back! Glorious vistas, great services, a town site within walking distance, a shady village campground, an awesome caterer whose food never fails to please, relaxing hot springs a short ride away and no matter which way you approach Nakusp you are in for some great riding! So please pre-register so we have some idea how many are coming and tell your riding buddies about the Hotsprings Rally in Nakusp! This year we start on Thursday August 18th and wrap up on Sunday August 21st. There will be a special commemorative gift for the first 250 guests this year so don't be late!



Bee Cee Beemers Tech Corner

Fuel Injection and Beyond

by
Robert Wilson

Here's a basic primer on fuel injection systems. But first, a little history is in order. Back in prehistoric times, there was the carburetor. But what started out as a simple device, gradually became more complex. Ever increasing demands to reduce emissions, and the need for more accurate fuel metering, added more and more complexity, turning what was once a simple carburetor into a plumber's nightmare. It was clear that something better was needed. That "something" was fuel injection.

Already from the 1940s until the late 1960s some limited production high performance cars offered mechanical fuel injection from manufacturers such as Hilborn, Rochester, Bosch and Kugelfischer, as a way to obtain better performance. But these systems were expensive and needed periodic adjustment, and so never really made it into volume produced vehicles. What was needed was a more accurate yet simpler system that never needed adjustment, and which could compete in cost with the increasingly complex carburetors of the day. The answer, it turned out, was electronics.

The first electronically controlled FI system was the "Electrojector" made by Bendix and offered as an option on several US cars starting in 1957. Unfortunately the electronics of the day were not up to the challenge, and Bendix abandoned the system. In the mid 1960s, Bosch bought Ben-

dix's patents and embarked on further development. The result was the introduction of the Bosch D-Jetronic FI system first used on the 1967 VW 1500 sedan. Over the years, Bosch followed with the K-Jetronic and several variants of the L-Jetronic FI systems, each an improvement over the last.

Of interest to BMW riders, starting in 1983 the improved LE-Jetronic FI system was installed in all K100 and K75 motorcycles, which became the first series-produced motorcycles with fuel injection. The result was a motorcycle that required no tune-ups, had lower emissions, and was absolutely reliable.

Up to this point, FI systems were considered to be simply carburetor replacements. Spark generation, spark advance, timing, and preignition sensing and prevention (if installed) were all handled separately. The next step was to integrate all the above into a single engine management system. The Bosch Motronic system accomplished this, integrating all engine control into a single control unit. Over the years, Bosch has evolved several generations of Motronic digital engine management systems, with the latest being the Motronic BMSKP system used in the new generation BMW K-bikes.

But enough history! Now I'll try and explain the basics of a modern engine management system. The core of any engine management system is

its Fuel Injection system. To begin with, there are two basic families of FI systems: High pressure systems that inject fuel directly into the combustion chamber, and low pressure port injection systems that inject fuel into the inlet ports. High pressure "direct injection" systems were the first to be developed, and were purely mechanical until recently. The need for high pressure and ultra-precision machined parts meant that they were expensive and therefore not very common. Recently, there is revived interest in ultra high pressure (20,000 psi and higher) direct injection systems, but now with electronic control. Expense is still a factor, so these systems are mainly relegated to expensive, high performance cars. Diesel motors use direct injection exclusively, which is one reason why a diesel motor costs more than its gasoline counterpart.

By far the most common FI systems today, are low pressure port injection systems, so from here on, I'll focus on these systems.

The low pressure port injection system FI system consists of several injectors (one for each cylinder), an electric fuel pump and pressure regulation system to supply fuel at a defined pressure to the injectors, and a number of sensors that measure engine temperature, ambient air temperature, crankshaft position, engine RPM, and how much air is being

(Continued on page 4)



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THE PRESIDENT'S CORNER

For my first letter to the members let me say first how much I enjoy being a member!

Looking over the old Das Rund... issues(1982 - 2011 which are now available on our updated website); they bring back great memories and also a lot of good information on life and how bikes fit right in.



I ride wear round as do a number of the members although I must confess to taking the car to work when it snows or if the rain is just too ugly.

But now that the sidecar rig (Yamaha-Bmw-Dnepr hybrid = YamaBnepr) is running again, I haven't really got an

excuse for skipping snow driving.

Where are those studded Trials Universal tires? Sidecars are fun! So are fast bikes, slow bikes, scooters, step-throughs, etc...we all enjoy riding on our various mounts and so I want to repeat here - with all due humility - the club motto "Ride To Eat - Eat To Ride".

Hope to see you in Nakusp for the 25th Anniversary!

- John Robertson

THE EDITOR'S DESK



Could summer finally be here? Really? The last couple of weeks we have finally seen some warm days which of course bring our favourite pursuit to front of mind. It's time to get the bikes serviced and ready to go. With several ride opportunities already come and gone it's now July and time to get rolling. While the rounders just keep going many of us are more of the fair weather type and this spring has been challenging in the precipitation and temperature categories! Nevertheless, this year's Easter ride went off pretty well with a couple of really nice days on the Olympic Peninsula and northern Oregon punctuated by a

really wet ride home!

The Bee Cee Beemers are growing. Membership renewals have been strong this spring and we have also been attracting new members as more and more people discover the BMW brand. Clubs like ours offer a great opportunity to network with like minded riders, learn about bike maintenance and repairs and also to participate in local and long distance riding with fellow club members.

At our last meeting, Otto Rieve presented a great slide show on his latest adventure which was a fund raising event for the Rotary club. Their goal is to hopefully eradicate Polio globally and this year a long distance fund raising sponsored ride was held with the end point being a Rotary convention in New Orleans. One of the major sponsors of this notable effort is none other than Bill Gates. Several Bee Cee Beemers members sponsored Otto's ride and by all accounts the Rotarians are well on their way to meeting this admirable goal. We wish them all great success in this endeavour.

As we celebrate our 25th rally it is a great time to reflect on our club and it's purpose. All those years ago Phil Funnel and a couple of motorcycle enthusiasts created the Bee Cee Beemers which were really a loose knit collection of BMW enthusiasts with the idea of promoting the enjoyment of owning and riding these great machines.

I sometimes wonder what Phil and Co. think of the Beemers today and what we have grown into. As this milestone passes it is a good time for us all to think about our club, how far it has come and what we want it to be in the future. The best way to do this is to get involved and to volunteer. By bringing one's views and skills to the fore the club can grow and improve. The club is us and we are the club. If you have ideas and suggestions by all means, come to the monthly meetings and throw your hat in. We'd love to hear from you. And if you have a tale to tell, please send it in to me! We all love a good story !

-Michael McPeak



Bee Cee Beemers Tech Corner

(Continued from page 2)

sucked into the intake (the so-called "air mass"). The system takes all this into account, computes how much fuel each injector needs to inject for the present conditions, and commands each injector to open for a predetermined time (usually between 2 to 8 milliseconds, depending on load and other factors), each time the inlet valve begins to open.

Programmed into the FI controller, is a so-called "memory map". This is an electronic look-up table, that provides the optimum duration to open each injector, based on all the above variables. The most important variable is air mass that is drawn into the cylinder during each intake stroke, and that primarily depends on how far open the throttle is. There are several common ways to determine air mass. Nowadays, the preferred method is to simply sense the angle of the throttle butterfly, and look up (in the look-up table) the value of air mass flowing into the engine, corresponding to the exact throttle butterfly angle. Since the look-up table was created for air pressure at sea level, at 20°C, a tiny barometric pressure sensor in the controller as well as an air tempera-

ture sensor, are used to correct the look-up value for differences in altitude and air temperature, respectively.

Another common way to sense air mass being sucked into the engine is to use a "hot wire sensor". Here, a thin platinum wire is stretched across the air inlet. The wire is heated electrically to a red heat. As intake air is sucked in, the wire is cooled somewhat. The amount of cooling is directly proportional to the mass of air flowing past. Yet another method familiar to those with K75/K100 bikes and their LE-Jetronic FI system is the use of a spring-loaded flap in the air intake system. The more the throttle is opened, the more air is sucked past the flap, and the more the flap deflects. The deflection angle is detected and fed to the FI processor.

Once the FI system's processor has calculated the correct amount of fuel to inject based on data found in its look-up table, feedback from the oxygen sensor in the exhaust is then used to fine tune the quantity of injected fuel to create a perfect fuel

air mixture.

Now, we can have a look at the fuel pump and fuel feed to the injectors. Until about 10 years ago, FI systems used a "return" fuel system. The fuel pump (usually located inside the tank) pumped fuel to the engine. Each injector tapped off the fuel it needed, and the excess was returned through a pressure regulator, and back to the tank through a return line. The regulator created a precise amount of backpressure in the fuel line to supply working pressure to each injector (usually in the range of 32 to 50 psi depending on the system).

Nowadays, so-called "non-return" fuel systems are the norm. With this system, as found on the newest K and R bikes, a special variable speed turbine pump feeds fuel to each injector, but there is no return line back to the tank. An electronic pressure sensor is installed in the fuel line, and the fuel pressure is monitored by the FI system, which then actively controls pump speed in order to create the correct fuel pressure needed by the injectors.

Now, things get more complex. Fuel



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Bee Cee Beemers Tech Corner

injection systems have added new capabilities and become complete management systems. An Engine Management system doesn't just inject fuel; it fires the spark plugs at the precise instant needed, monitors for preignition and retards the timing if it is detected. Gone are the crude mechanical and vacuum advance systems previously used. The spark is electronically advanced or retarded as required by engine RPM and load. Over revving protection is generally provided, cutting off the spark at the rev limit.

One relatively new Engine Management function is "ride by wire". Here, when you twist the throttle, you are not actually opening the throttle butterfly. Your desire for more power is sent to the Engine Management sys-

tem, and it drives a stepper motor that opens the actual throttle butterfly. But it does so at a controlled rate to avoid hesitation caused by too rapidly opening the throttle. In some BMW bikes (notably the S1000RR and the new K1600 series) one can select a so-called "rain mode" which causes the system to open the throttle butterflies at a more gentle rate to avoid wheel spin on wet roads. The S1000RR, BMW's one-liter superbike, takes this even further. It will not acknowledge a sudden opening of the throttle at all if you are leaning hard into a corner, thus saving an unskilled rider from sudden traction loss and a low side crash.

So things have come a rather long way since the lowly carburetor. Most new vehicles now actually have more

computing power than the Space Shuttle! The good news is that modern Engine Management systems result in more power, lower emissions, better driveability, more safety, better mileage, and more reliability. The bad news is that the day of the back yard mechanic is drawing to a close. As interesting as it is to learn about these systems, there is very little that the average backyard mechanic can do to service them. Fortunately, other than fuel filter replacement, there is simply nothing to service. Modern Fuel Injection and Engine Management systems are generally so reliable, the owner can simply forget them.

- Robert Wilson

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2011 Frasers Ride





The North Cascades Highway had record snowfall this year and although clearing began in April the road was only opened the first week of June! So the Beemers had a bit of a chilly ride methinks...

Heated gear was definitely the order of the day!

Above left: Shot taken at Samish Island. Looks to be a bit warmer there ...

Below left: Stalwart Canadian lads take a moment up in the mountains

: MLA Ride: Mixing it up with the Politicians in Victoria



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this
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cont'd...



OK Boys... It's time to Rally !



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Monthly Meetings

The club meets on the second Tuesday of each month at the ABC Restaurant at School House and Lougheed in Coquitlam. Members begin gathering after 6:30 pm and the meeting starts around 7:00 and goes on until we get fed up with each other or they kick us out.