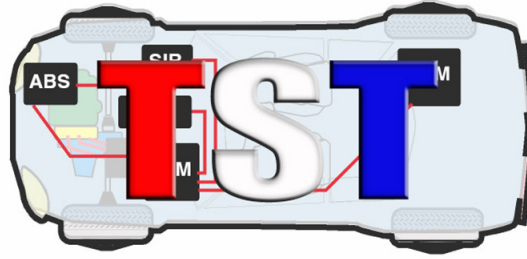


October 2010



Technicians Service Training

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Upcoming Seminars:

SCAN THIS!!!

John Anello

Nov 8th to 11th, 2010

Fuel System Solutions for Driveability Problems

John Thompson

Dec 6th to 9th, 2010

Editor

Jerry "G" Truglia

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Technician in a Bottle Part II: 2004 Mazda RX8

We were asked by a customer, who was referred to us by patrons in his restaurant, whether we diagnosed and repair Mazda RX8s. Description of the customer complaint was that the car essentially ran like total crap all the time. The vehicle had 93,000 miles. At the moment, we were not thinking about the Wankel engine it had. So, the car was in our bay and up to us to diagnose.

The first thing we did was look at the maintenance schedule and saw that the vehicle was approaching a tune-up. We pulled out a spark plug and saw that this was a good place to start.

We also called up some friends and asked them whether they ever worked on a RX-8. They all said no. Have you ever worked on one?

So we went about asking G Truglia what he would do, but he said he only worked on RX-7's back in the day and no one ever sent him a RX-8. So, we asked what he would do with those cars. He told us to squirt some motor oil in it.



(Con't on page 3)

Technicians Service Training

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John Anello Auto Tech On Wheels www.autotechonwheels.com

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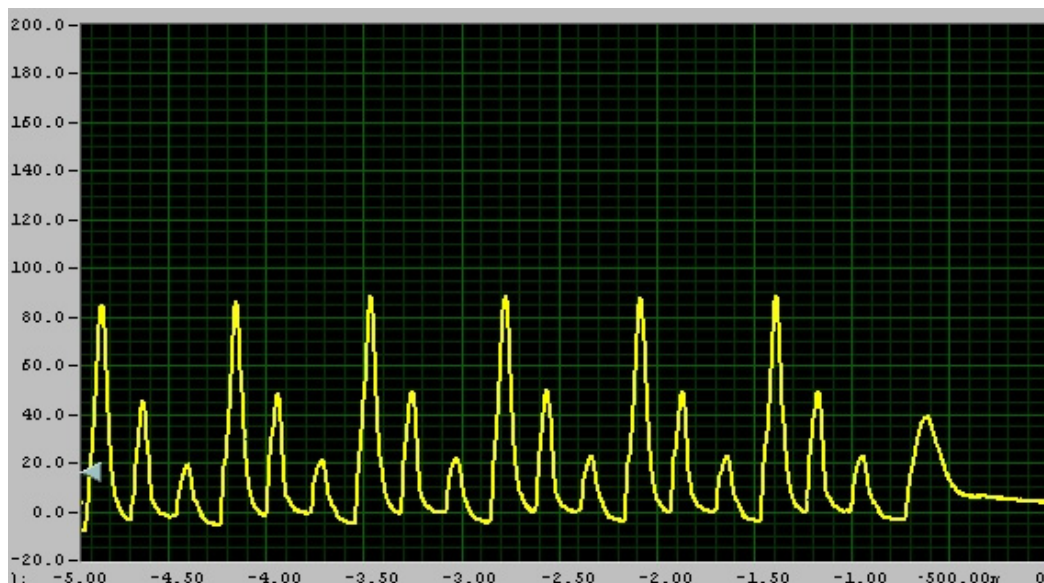
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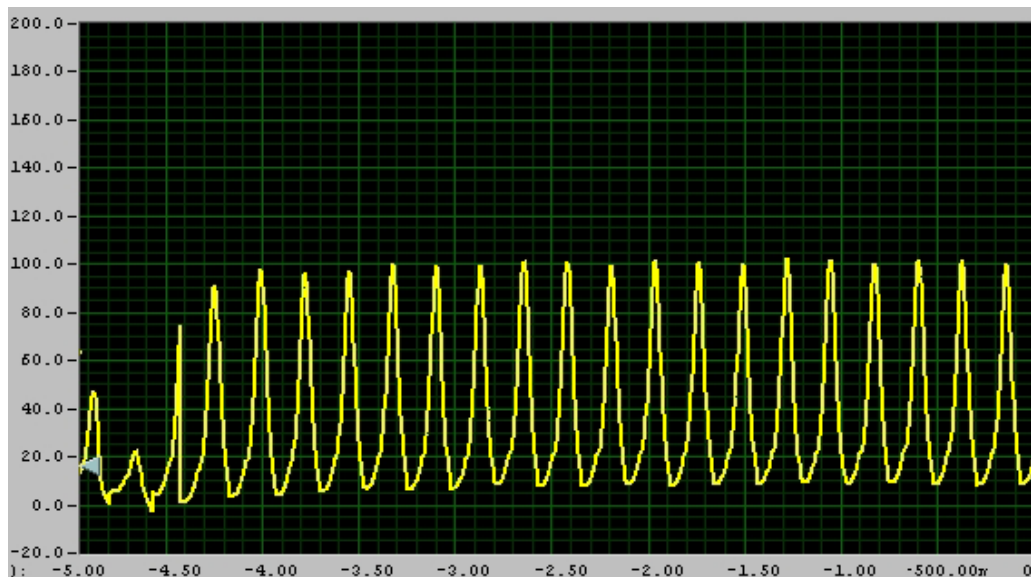
Technician in a Bottle: Part II (con't from p. 1)

With the spark plug out, and new spark plugs on their way from the parts store, we decided to use some of the ATS tools we had to check engine compression. We installed a pressure transducer into the spark plug hole and here's what we found:

Rear Chamber Cranking Compression



Front Chamber Cranking Compression



We looked up the specifications and found that the engine should have been generating at least 96 psi up to 120 psi. The rear chamber was low by at least 10 psi, and we had no idea what those other, lower squiggly lines were that made the rear chamber compression so different from the front's.

(Con't on p. 7)



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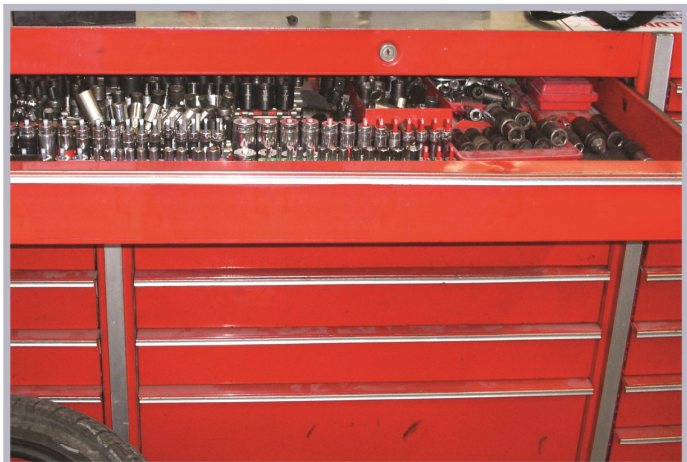
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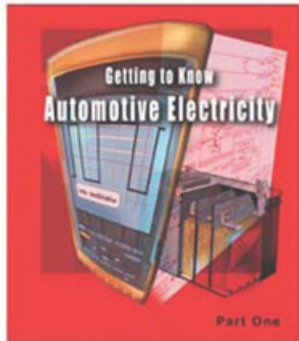
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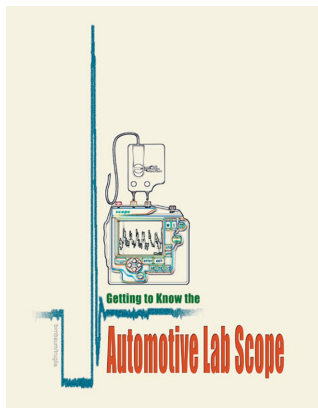
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Technician in a Bottle: Part II (con't from page 3)

We are not very sophisticated, but we remembered what Labscope 101 dictates: if the squiggly lines don't look like the other squiggly lines, there's something wrong with that waveform! We called up the King of Waveforms and Pressure Transducers, Bernie Thompson of ATS himself, and asked him if he's ever worked on an RX-8. After all, a mobile-tech and former shop owner like himself with all that crazy ATS equipment must know RX-8's like the back of his hand.



"Dude, I never worked on one of those!," said Bernie. "But, send me the waveforms."

So, we sent him what we found and were hoping that the new spark plugs would do the trick. We installed the new plugs, and the car was running as awfully as before, and its compression waveforms were exactly the same.

We called up the customer and told him that to the best of our knowledge, there was an engine-mechanical issue as the compression tests were below Mazda's specifications. Thus customer decided to pick up the car the next day.

That night we had a class with G Truglia (TST President and one of the author's father) and being that it was an engine and emissions class we raised our driveability concern to him. It's sort of funny how much more helpful in class he was than when we asked him during the day.

"Decarb the engine."

(Con't on p. 9)

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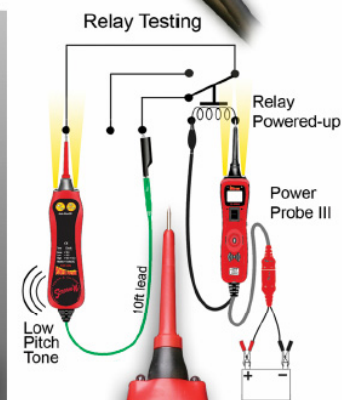


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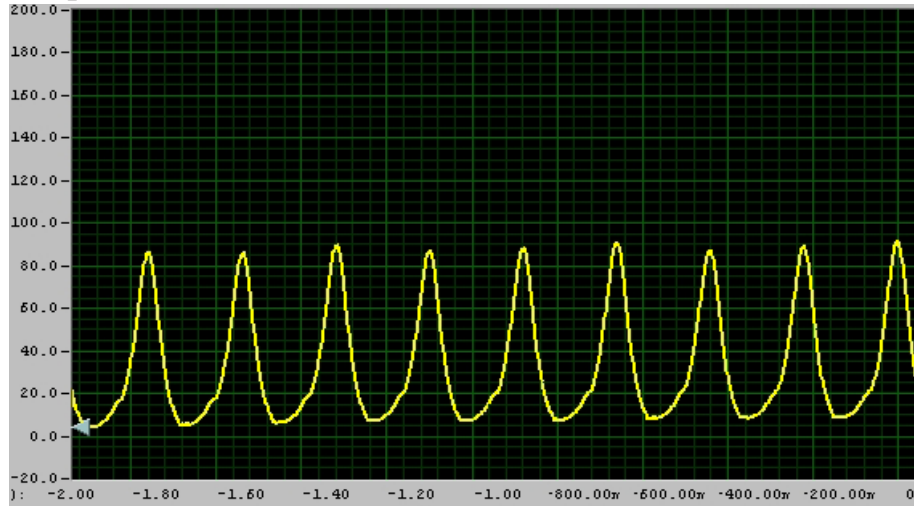
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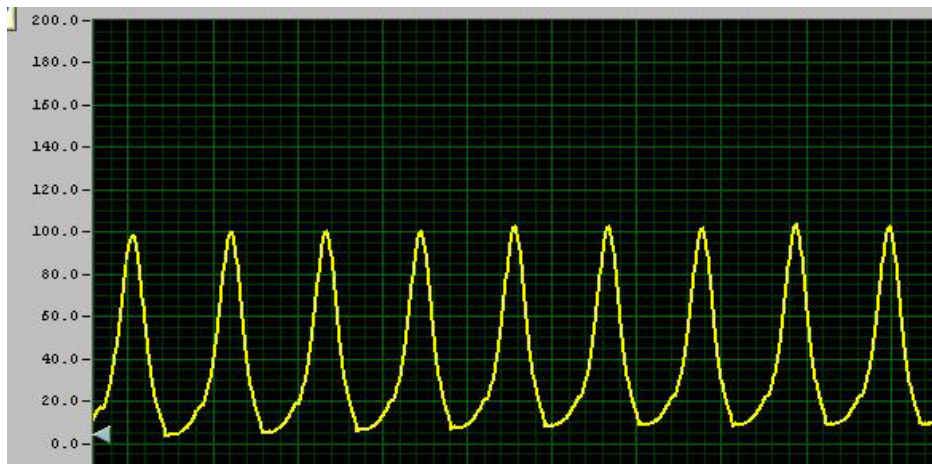
Technician in a Bottle: Part II (con't from page 7)

So, the next morning the first thing we did was decarbed the engine with Run Rite. The car now ran great and we got the following compression waveforms:

Rear Chamber Compression After One Decarb



Front Chamber Compression After One Decarb



Look! The squiggles look like the other squiggly lines! The waveforms, now that they matched up, proved that the engine decarb cleared up the compression issue that was making the driveability issue. Rear chamber compression was still a little low, but the car has 93,000 miles so it's not going to be like brand new.

The customer was elated and agreed to a few more decarbs and we were happy to successfully diagnose and repair this car. I have to hand it to Run Rite, in this situation they really were a technician in a bottle.

Update: Ever since the writing of this article, the following happened. After having G Truglia contact an engineer at Mazda we found that this particular car had a recall for a defective engine. So, our customer got a new engine from Mazda free of charge.

Article by Kevin Quinlan and Craig Truglia

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BMW Cooling Systems Diagnostics

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2. Do you find the seminars useful?

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We need your support:

Thank you, G Truglia

Most of what you read here is also true with other brands, so all of us should be able to make use of what we read here.

I was called to a shop to diagnose an '88 BMW 735i with 300,000 miles on it. The shop had replaced a faulty aux fan just the month before (it was blowing the fuse) and the customer thought that should have fixed it.

The shop owner didn't want to be caught in a "you don't know BMW" or the old "since you" situation. The thermostat was replaced by this shop last year and the customer stated that the radiator and water pump were "recently" replaced elsewhere.

BMW and other manufacturers like a "mechanical brinksmanship" design philosophy where they take temperatures to the edge of disaster before employing the next stage of protection. In BMWs, the thermostat is two stage design that when the engine is cold "hot" engine coolant is reused. When the engine gets close to operating temperature, the thermostat starts to open and mix in "cold" coolant from the radiator.

If the temperature gets over the thermostat set-point it closes the "hot" side and draws only "cold" coolant. All this time only vehicle motion and a free-wheeling fan are pulling air through the radiator. If the radiator temperature gets over the fan clutch set point (usually just over the thermostat set-point) then it becomes more viscous and starts to pull more air through the radiator.

If that's not enough, at some higher temp, the aux fan will come on to increase airflow through the radiator. On this car, coolant that is pumped is purely a mechanical feature of water pump design and engine speed, but newer BMWs have computer controlled variable speed electric water pumps.

Quite frankly, we get into trouble when we miss a step in our diagnosis or are fooled by other factors.

(Con't on p. 16)

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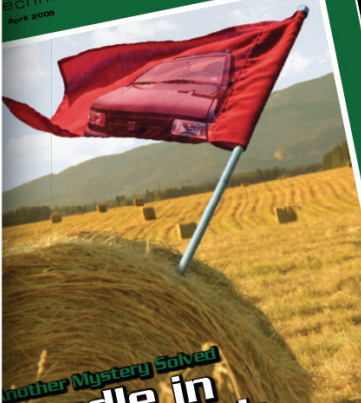


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April 2009



Another Mystery Solved
Needle in a Haystack

Business INSIDER

Inside the Insider

Five Ways to Limit Liability
By stepping out into the business world, every shop has exposure. While you cannot stop people from suing you can insulate your business, personal assets and wallet from most liability if you take some steps to protect yourself.
(Turn to page 1)

Human Potential
The mind is a strange and powerful tool. Psychologists tell us some very interesting things about its function. First, 90% of its activity is subconscious.
(Turn to page 1)

In Times Like These
Small business is the backbone of our economy. Businesses like ours
(Turn to page 3)

Sole Proprietorship
If you are getting started in a new business or a twenty year business ventures this question comes up on a regular basis. My answer to this dilemma has always been the same, it depends.
(Turn to page 6)

MT Business Insider Pricing Matrix
Businesses are based on percentages, but consumers look at prices. How do you recent profit margin on parts with your customers' need to pay this price?
(Turn to page 8)

E Certification: The Competitive Advantage
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It's generally agreed that a human's learning ability is physical. Remember that a scrap of brain tissue no larger than a grain of rice contains more information than a computer the size of a Honda. Now consider that an average person's brain weighs about three pounds. How many ounces of yours do you actually use?

BMW Cooling Systems Diagnostics (con't from page 12)

On this 1988 BMW 735i the cooling system symptoms were a gradual increase in temperature when idling or in heavy traffic only when the outside temperature was hot. The auxiliary fan never came on, even with the temperature in the red.



I installed thermocouple leads to the radiator inlet and outlet, disconnected the auxiliary fan switch plug and installed a scanner to monitor engine and heater temperatures. An IR pyrometer was used to check everywhere else.

The car has an 80C thermostat and a 91 low speed/99C high speed auxiliary fan switch. The viscous coupling (fan clutch) should engage at 82-84C (I've not seen a published spec on this.) Outside air temperature was only 85F, but this is a black car and I was on an asphalt lot in the sun.

As the engine came up to operating temperature I noticed that the inlet and outlet temps were only 7 – 10F degrees apart. This can be caused by weak airflow or a faulty radiator.

When I jumpered the aux fan – high speed, it was still 7 – 10F, so the radiator was a little weak. As the engine got over operating temp, the fan failed to speed up. I removed it and found a telltale oil stain. So, I bent the bi-metal spring to make it stay locked and retested, but there was no change. This means that the coupling was bad and the main cause of overheating. I then ran the car with an ohmmeter on the auxiliary fan temperature switch until the radiator outlet temperature was over 91C. It never turned on, so the switch was also faulty.

The bottom line here is “test, don't guess”. In the end, this car had four separate problems: the auxiliary fan and switch, viscous coupling, and a weak radiator.

Article by Pierre Respaut, Vice President of TST

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