



## **2004 The First 90 Days**

LTS started running early this year. (*We usually do very little in January with seminars*) Our first remote seminar was with the AVI Video team in Sanibel Island Florida early in January. Rough trip to leave Indiana in January for warmer climates, but someone has to do it :) We will now make this the place to be each January for the next five years! Great place to do seminars and the weather is nice in January to boot. Watch for next year's dates which I believe to be the third weekend in January. Great training with a super location! Also in January we trained 7 remote area FSR's (Field Sales Reps) for our injector business and will train another crew in this month.

Local training rolled out in January with two eight-hour training sessions at the Indy facility. The January sessions were Electronic Service Information (ESI) in the morning and "Fuelish Tips" (our latest video) in the afternoon. February brought out our "Guru 3" for the Gurus that have attended "Guru 1 & 2 for a jam-packed three day session here on Gasoline Alley. From there, Michele and I were off to New York where we did evening seminars in Massachusetts, New York and New Jersey for the TST training group as well as a one day Saturday class in New York. The Saturday class was the first time we had presented our "mini-guru" class which consisted of a condensed version of several modules from the week-long Guru school. I actually liked New York City and plan on returning soon.

Back in Indianapolis, we traveled to Evansville, Indiana for a one evening seminar. We are scheduled for a return visit this month. Local training was the following week. John Thornton was here for 2 days of scope training. The following weekend Doug, Michele and I were off to the ASA Illinois convention where I taught a seminar and Doug and Michele took care of the trade show booth.

March brought the biggest technician event for overall training at the Kansas City ASA Vision convention. Doug, Michele, Greg and I set off in a rented Suburban for the 8-hour trip. LTS taught sixteen hours of training at this event, plus spending time at the trade show booth. WOW! Over 900 technicians attended this event! Back to Indianapolis for a one week "Guru" school with another full class of technicians. Local training followed the next week with Bruce Amacker spending two days with our groups. The morning session consisted of an introduction to the new 6.0L diesel and the afternoons were spent discussion Navistar multiplexing. Then Doug and I were off to New Jersey for the AASP N.J. Northwest convention with trade show booth and classes which was held the last weekend in March.

I feel fortunate to be able to attend and participate in these association events. If you don't belong to any of these associations, I recommend you think really hard about joining one or more of them! They make it happen for the service community each and every year.

Well, Auto Value classes are next, in Lansing, Michigan and then I'm off to Evansville one more time. Before I know it, summer will be here! Where does all the time go??



## Fuel Injection Service Update from the “Wizard”



### WHAT ARE THEY?

While going through some cores the other day, Stan came across an injector that we didn't have a place for in the core room. I decided to find out what its application was and put it in the appropriate place. At first glance I noticed that it had two part numbers on it: one was a Chrysler number and the other was a Bosch number. I checked my reference charts and didn't find either number. Not a problem, I called my local Chrysler part department. They told me they didn't show the part number, so they were no help in figuring out what this injectors fits.



I took one of the injectors over to the load bench and checked its' resistance. It read 4.6 ohms. I checked the others and all eight read the same. If they were high ohm injectors (12-16), the odds of all eight being shorted is slim and most low impedance injectors read 1-3 ohms. Now I have a mid-range resistance injector.



As I was putting the injectors in the flow rack I noticed that the discharge end was much larger than most Bosch injectors that we see. (See picture #2. Notice difference in pintle size) This usually means the injector has a high flow rating. The injector volume was so high I had to regulate the number of injectors tested at a time and adjust the time that I allowed the test to run. When all was said and done, I found that these injectors flowed 124Lb/hr. WOW!



Still curious as to what they fit, I did some searching. One more call to the dealer paid off. They are out of a 2000, medium duty, Dodge Truck that runs on CNG. We cleaned up set up and added them to our inventory. So if you come across one of these vehicles and need a set of injectors, just call 888-809-3835

## 2004 The First 90 Days (Cont. from page 1)

Some numbers :

There are 90 days the first quarter, and during that time, 200 plus hours of technician training was supplied to approx 700 working technicians in eight states.

Another way to look at it is: There are 480 minutes in a day, which means 28,000 minutes were available during the first quarter. LTS spent 43% of those minutes teaching someone / somewhere??? Not counting travel time!

The summertime will prove to be almost as busy as the first 90 days with sales clinics in Evansville, Louisville and Ft. Wayne along with an ASA trade show in Ohio and a fuel injection seminar in Northern Ohio and Detroit. We look forward to running into many of you during our travels this year.

## Analysis from the “Sleuth”, Michele Winn



This month’s case study is a 1991 Cadillac Deville with a 4.9L engine and around 130,000 miles on the odometer. This was brought to us several months ago for a diagnosis and the customer was told at that time that he would need to replace the fuel injectors. Now several months later, he was back requesting that we replace the injectors saying that the car runs so poorly that he has to “feather” the gas pedal to take off from a stoplight and his gas mileage had gone down considerably.

This made perfect sense because this vehicle was equipped with GM multec injectors which are known for shorting out which then causes a rich condition. Normally in a vehicle of this age with original injectors, I would expect to see at least half of them shorted out, but this vehicle had only 3 that were a problem. Still more than enough to cause a driveability issue and warrant a new set of injectors. I installed a fresh set of Bosch lifetime replacement injectors that Doug and the crew had ready for me. The vehicle was running in no time and I was off on a test drive. Seemed to be running great. Started right up, no hesitation on take-off and cruised down the highway just like a Cadillac should. I returned it to the customer later that afternoon and went on with the rest of my day.

So far, it doesn’t seem like much of a case study. An old Cadillac that needed injectors.....not really a new technical tip that will do you much good, right? But wait. I finished the injector job on Thursday. Tuesday morning the customer was back on the phone. The conversation started out thanking me for doing such a good job and for giving him such a great price. (I should have known the hammer was about to drop. How often do customers call just to tell you what a great job you did) BUT, now the car boggs down when he tries to pass. Two days later he dropped the car off for me to look at again.

My first test drive went just like the one the week before, started fine, idled fine, ran great, I didn’t feel any problems. When I got back to the shop and called the customer and asked him to explain the problem to me again. He said that it ran fine unless he tried to pass and it didn’t matter how fast he was going, 25 mph or interstate speed. It would bogg down and actually lose speed.

OK, I went on another test drive and I decided to be a bit more aggressive with my driving. I got out on the highway and was cruising around 60mph and went to WOT. Sure enough, the car actually hesitated for several seconds, then sped up, then hesitated again and sped up. It continued this pattern until I let off the gas and then it drove fine once again. I tried a few WOT passes at slower speeds and found the same problem. It didn’t feel like a misfire, but it felt like the car was running out of fuel.

I was a little frustrated when I got back to the shop because I knew I wouldn’t be able to simulate the problem in the bay. I thought it would be something that I would have to be able to test while driving down the road. I

talked it over with Jim for a few minutes and we both agreed that even though it might not be the easiest test, it would probably be a good idea to get the CODA fuel system analyzer and check pressure and volume.



As you’ll notice from the picture on the left, the pressure was good, reading 35psi at idle. The spec calls for 32-38psi at idle.

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## Analysis from the “Sleuth”, (Cont. from pg. 3)

If I had only connected a pressure gage, this reading would have led me down the wrong path. Now take a look at this picture which shows the volume meter. This pump was only producing around .18gph and it had to run for several minutes just to generate that much volume. The other thing I noticed that isn't very clear in this picture was lots of air bubbles in the tube. On a good pump, I would have expect to see a minimum of .5gph, and with this pump putting out less than half the expected volume, it was time to call the customer and give him the good news. Like I told him on the phone, it's a good thing we saved him so much money on injectors, because he was going to need it to replace the pump!



**Other tests:** Below is a scope capture of the current ramp of the Cadillac pump looked like. Amperage is normal at 4 amps. The humps didn't seem very uniform, but I wouldn't have condemned the pump just based on that fact alone. How about rpm? It was very hard to find a repetitive signature to tell exactly how many commutator bars this pump had, but we'll go with 8 which is very common. The red arrows indicate the total time for one armature revolution (8 humps). Our scope is set at 1ms/div, so there are almost 9ms in one revolution. To calculate pump speed, simply divide the # of ms in one revolution into 60,000.

$60,000 / 9\text{ms} = 6,666\text{rpm}$  which is slightly higher than what we would expect to see at idle. 4,500rpm would be considered more normal. Once again, just based on the current ramp alone, that wouldn't have been enough for me to condemn this pump. One more reason having the right tools and using them at the right time is so valuable.

