Fuel line failures and the Fuel pressure damper

Posted by joeblow - 25 May 2014 17:56

I am adding a fuel sample port and drain system to my car and obviously updating the fuel lines for safety. The two most notorious fuel line failures are the hard line to fuel pressure damper and the fuel pressure damper to the fuel rail (bridge line), these even have a factory recall on them. The problem with the factory bridge line is that it is very difficult to update to a safer design due to the limited options available in the way it is run.

I am dead set against running the factory bridge line . I would like to eliminate the fuel pressure damper and run a ball valve in its place with a quick connect drain port and a direct to fuel rail port. With this set-up I can run proper lines and fittings with no compromises to safety.

My question is that the FPD is not mentioned in the rules and as it is in the interest of safety and has ZERO performance benefit I would think that there would be little push back allowing this.

By the way the FPD is not needed for track cars as its function is to keep internal fuel rail pressure pulses even at idle and low RPM, at medium to high RPM is is completely unneeded.

Thoughts?

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Re: Fuel line failures and the Fuel pressure damper

Posted by Sterling Doc - 08 Jun 2014 19:17

I am not a mechanic, and don't know what a car will run with and without in terms of the fuel lines. I have seen cars run poorly when the damper fails.

If there was a factory recall, it seems there should also have been a factory fix to this.

The only fuel leak failures that I have seen (and I have seen several) are cracks in the rail itself, typically by the mounting brackets that are due to vibration/harmonics from mis-timing the balance shaft.

My experience with open up factory design to backyard engineering is that more failures result do to the

variation in the quality of fixes - maybe not by the OP, but others that follow.

Tim Comeau spoke of racers crushing the damper to a degree to alter fuel pressure in search of a performance advantage, and used to inspect cars for this.

If it can be established that there is a problem here, there would need to be a carefully though out "spec" fix for this.

So...

1) Has anyone else seen this issue?

2) What do our resident mechanics think about the potential problem, and solution?

3). Are there performance gains to be had from altering the fuel pressure?

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Re: Fuel line failures and the Fuel pressure damper

Posted by joeblow - 08 Jun 2014 21:55

Doc,

While my post was centering on the reliability and safety gained by simplifying the number of lines and connections. Further reducing cost and adding lower cost replacement options (Metric 16mm fittings are VERY expensive!) by being able to remove the FPD. However you have brought up an additional issue.

While altering the Fuel pressure itself will not directly increase power it does have the potential to facilitate further tuning beyond what is currently within the rules.

Of course there are many many ways to increase or decrease fueling and most would be VERY difficult to detect. For example, simply flowing batches of injectors to find higher or lower flow units or just having them opened up to do the same. Adding any restriction in the fuel return will add pressure. Stock pumps are easy to rework to higher or lower flow. There are many many more.

The good news though is the net result is at best optimization of the tune and not necessarily excessive

HP. Adding more fuel to an ideal mixture will reduce power as will removing fuel. So what can be gained is similar as to what tuning the AFM will. Though cheating, these methods are not necessarily going to gain any more or less than can be gained with legal options.

I prefer to focus on the fact that there are catastrophic consequences to fuel line, fuel rail, and other failures within the fuel system. Though Porsche built amazing cars in the 80's, there is much more available now. While Porsche designed our 944 fuel system to be inexpensive and easy to manufacture, the benefit of running AN braided aerospace hose with proper AN fittings cant be marginalized, especially in our extreme environment.

My car is fitted with a full AN system (lines and fittings) except where metric adapters were required. I have also spent as much on just the FPD to plumb it as the rest of the entire system! While there are many fuel line kits available I chose to not rely on any clamps including the FPR so I instead am using a compression fitting over the nipple. Again not cheap but it is the 'right' way to do it within the rules.

I look forward to this being considered as a safety and cost cutting option for next years rules.

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Re: Fuel line failures and the Fuel pressure damper

Posted by Sterling Doc - 09 Jun 2014 03:18

Joe, it can be looked into next year, and it's good to have some time to gather input on this.

The It's going to be hard to make the cost argument fly - it is cheapest to leave the fuel rail as is, or get a clean used one. While AN lines are good, putting them together well is not always easy and opens the door to fuel leaks in amateur hands. Whether that risk is more than the stock hard lines remains to be seen.

Do you have any idea what the factory fix was for the recall?

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Re: Fuel line failures and the Fuel pressure damper

Posted by joeblow - 09 Jun 2014 06:07

Doc,

The fuel lines are commonly replaced, as you know, by cutting the crimp on clamps and removing them. Then the fuel lines are replaced, usually with cheap fuel injection hose from the local auto parts store. These are then topped off with cheap worm clamps. This is not a safe process, and though better than leaving 30 year old fuel lines on the car, leaves much to be desired. Fuel injection hose sold by the discount auto parts chains varies wildly. I have used plenty of it myself and can assure you that most of it is barely up to the task.

The option to replace the lines with a factory set-up means $400+ dollars the last time I looked into it as the dealer wants the entire hard line assembly (pump to engine)replaced as a unit. Buying a used setup does not solve the 30 year old hoses and crimped fittings.

What is rarely ever replaced is the short bridge line from the FPD to the rail. The recall was for this line which failed at the crimps. The replacement line had a slightly changed crimp connector. I find it a little funny that guys will change the fuel lines from the chassis to the rail but NEVER change the short FPD line! It is the same fuel hose and crimps that fail on the other hoses.

What I propose does not change or modify the fuel rail at all. Removing the FPD (simply unscrewing it from the rail) and the 'bridge' hose from it does reduce the number of fittings and reduce the weight acting on the rail which has the benefit of reducing the propensity to crack and lower the potential points of leakage as well. Lastly as you mentioned the FPDs do fail which can cause a poor running car which is yet another reliability item to consider.

Regardless of HOW you replace the lines (my way or the cheap auto store way) removing the FPD reduces the connection points, reduces weight on the fuel rail, and reduces the potential components that can fail, it also reduces the cost of replacing the fuel lines since there is less to replace (how ever you decide to do the job).

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Re: Fuel line failures and the Fuel pressure damper

Posted by Sterling Doc - 09 Jun 2014 09:23

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Agreed on the fuel lines in general, and your ideas are intersting. This needs some research with people more knowledgable in the implications of it than I am. Moving away from stock is always a big deal, and requires the "burdon of proof" so to speak, but can be done. I'll put some requests out there for input.

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