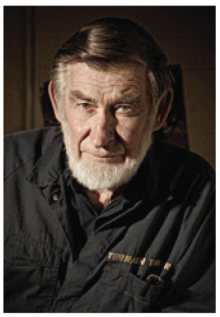
# Servicing Modern Diesels Part:1 by Allan Gray

## "the biggest problem is contaminated fuel"



Sales of diesel vehicles are at an all time high and this is predicted to continue. Workshops are also seeing an increase of air/fuel related issues of concern from customers. With over 50 years' experience on the tools, well known diesel repairer Allan Gray shares his concerns with us.

In previous issues of AWM we have touched on the subject of carbon build-up in modern diesels, but according to Allan dirty fuel is just as bad, if not worse. We will revisit carbon build-up issues in our next instalment of this series.

Common Rail Diesels are an excellent modern development, using very high injector rail pressures (25,000 – 30,000 PSI). They develop high torque at lower revs, have much improved fuel economy and, best of all, they have dramatically reduced particle emissions.

"We speak to workshops and vehicle owners every day and they are reporting some cases of serious damage to diesel pumps, injectors and engines, largely caused by contaminated fuel, therefore most of these dramas could have been avoided," Allan said.

Older diesel vehicles were not so much of a problem. Newer diesels have much finer tolerances and in my opinion require superior filtration. I recommend additional filtration to my customers.

"The requirement for 'ultra clean' fuel was not as important on these older units as most had more generous tolerances and in most cases were fitted with adequate filtration.

The fuel system pressure in older (non common rail) engines was around 3000 PSI, whereas now pressures are nearly 10 times as much.

OE filters fitted to most common rail engines are not adequate in my opinion and I suggest owners to fit a second filter.

The bottom line is that all diesels need clean air, fuel and oil. Injectors in earlier diesels pulse millions of times in 100,000km. Faulty injectors can cause serious engine damage if they are just squirting fuel into the cylinder rather than atomising it thoroughly. This can go unnoticed until costly damaged has occurred.

**Hilux injector actuating rod showing damage from contaminated fuel**

Common Rail Diesels inject up to 6 times each firing stroke and any indication of a problem should be attended to immediately. It is a factory requirement to change injector pipes at the same time as injectors. The fuel not consumed by the engine (up to 80%) is used to cool the injectors and is returned to the tank (in some vehicles through a radiator).

It is not unusual for the fuel in the tank to reach 80°C, so to minimise condensation, the fuel tank should be kept topped up regularly to reduce the introduction of algae which can grow in the warm environment. Algaecides are not normally used in fuel additives as they are mostly carcinogenic.

**Blocked Hi Lux Fuel Filter.**

### THE BOTTOM LINE

To summarize,

- The average factory fitted fuel filter rates at around 5 microns (a human hair is approximately 100 microns).
- Fuel filter change periods should not depend on kilometres travelled, but solely on cleanliness of fuel supply.
- Serious (read: costly) fuel system and/or engine damage can result from using contaminated fuel (Damage, which is specifically not covered by vehicle warranty or insurance).
- It may not be contaminated fuel delivered, but 'stirred up' dirty fuel. In some European countries, it is prohibited to sell diesel from a pump for an hour after receiving a tanker delivery.
- If a filter partially blocks, there is no loss of power due to the excess fuel available. However, the injectors can mechanically fail due to overheating. Repair costs vary from $2000 to $20, 000 (or greater for engine overhauls).

- Filters are designed to remove water and contaminants from the fuel and ideally an extra (primary) filter should be installed between the factory filter and the fuel tank.
- 30 micron filters (with a dash mounted water indicator) are available from your nearest Terrain Tamer stockist.

**The design team at Terrain Tamer is headed by 79 year old Head Engineer Allan Gray, who worked on the very 1st LandCruiser to arrive in Australia. Allan has over 63 years experience working in the automotive industry, even older than the LandCruiser itself!**

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