Hidden costs

Complying with new EU diesel engine emissions standards could significantly increase forklift operating costs if you choose the wrong model. Tim Waples of Doosan Industrial Vehicle UK sounds a profit warning for the unwary.

There has been plenty of talk about the effects of EU membership, most of which seems to have little impact on our daily lives. But there is one effect of membership that will certainly affect builders' merchants — new EU emissions standards covering diesel engines of non-road vehicles, including forklifts. Diesel forklifts in particular are the builders' merchants' true workhorses, hence anything that affects the cost of running them could have a huge impact on day to day business.

The first European legislation to regulate emissions of Nitrogen Oxides (NOx), Particulate Matter (PM), Carbon Monoxide and Hydrocarbons from non-road diesel engines (known as Stage I) was the start of a five-stage process which got underway in 1996.

This year sees the latest EU regulations come into force, Euro-Stage IIIB for all diesel engines over 37kW and Stage IV for all diesel engines over 55kW. Under EU Stage IIIB and IV regulations, manufacturers of non-road diesel engines are required to reduce NOx, HC and PM (soot) exhaust emissions in new engines by 90% compared to the Stage III standards they replace.

Engines are also required to use Ultra Low Sulphur Diesel. These stringent new targets presented engine manufacturers with the serious challenge of developing — from scratch — a truck which does not have a reduction in functionality and does not have a prohibitive cost over its lifecycle.

The traditional 2.5t and 3.0t diesel forklifts that are the work horse of most builders' merchants, their suppliers and customers are affected by the Euro Stage IIIB regulations and the 4.0t and larger models are likely to be caught within the Stage IV levels.

Implications for users

The first point to make is that these Stage IIIB and IV regulations apply to new trucks only. They are not retrospective so existing trucks will still be able to operate. However, merchants sourcing new trucks need to be aware of this impending change and what it entails.

The second point is to recognise that the new regulations present really tough targets and real challenges for engine manufacturers, particularly those relying on conventional approaches to the problem.

One response is to drop the power output of the engine so that it doesn't exceed 37kW or 56kW threshold; lower-powered engines complying with Stage IIIB regulations will remain compliant up to 2016. Problem solved? Perhaps in a low-use work environment, but for a builders' merchant's site, unfortunately not. The consequence of dropping power, of course, is that productivity is affected as jobs take longer to complete.

New problem… old solutions?

In order to comply with Stages IIIB and IV and reduce emissions and soot particles to the required levels, the majority of manufacturers have turned to conventional technology. Typically this involves diluting the amount of oxygen in the combustion chamber by mixing the intake air charge with cooled exhaust gas. This lowers the combustion peak temperature which achieves the desired result of reducing the formation and amount of NOx.

However, the downside is that the lower temperature also increases the amount of soot in the exhaust gases. The result is

■ Many builders' merchants already choose Doosan products for simple powerful performance, shaped by a focus on innovation and applied technology. Doosan addresses key user applications with a comprehensive range of lifting capacities, high standard specifications (such as oil-cooled disk brakes) and rugged build quality as standard. Many additional features, options and custom specials are available to help customers do their jobs more efficiently.

The manufacturer's forklifts have won multiple awards for design and innovation thanks to unparalleled investment in research and development. For example, it won the Innovation category at the FLTA Awards 2014 for its G2 engine, which completely removes the need for diesel particulate filters — a common cause of engine malfunction and business downtime. The G2 engine powers what the company claims are the EU's first Stage IV-compliant trucks.

that the engine needs a diesel particulate filter (DPF) to prevent the soot being emitted from the vehicle. But as common sense dictates, over time soot builds up in the filter, meaning the DPF needs to be either cleaned or replaced at alarmingly regular intervals.

Some DPF filters are disposable and intended for replacement once full, necessitating downtime while they are changed. Others use active regeneration in which the engine runs at high speed for a set period, thus burning large amounts of fuel, heating the filter to a temperature at which the accumulated soot burns off. This can involve the truck being parked up and left running until the regeneration process is complete, with the frequency of regeneration cycles depending on specific truck applications. Canceling or overriding regeneration cycles can damage the DPF, leading to potential additional replacement.

And this brings us to the hidden costs that many diesel forklift users have not yet appreciated — when they start buying DPF-based trucks later this year, they will pay a heavy price for the privilege of complying with the latest emissions standards.

The trucks themselves will be more expensive — DPFs come at a price. The Total Cost of Ownership (TCO) is also higher, due to both significant increase in maintenance and replacement of the DPF, and the additional downtime required for filter regeneration. And that is before considering the impact of fuel consumption, which varies between engine models but is always likely to increase when DPFs start to become clogged with soot, and the regeneration process is being carried out every few operating hours.

For these reasons it's hard to avoid the conclusion that DPF technology is an imperfect and inefficient 'sticking plaster' solution to the challenge of reducing diesel particulates. Needed instead, are radically new and innovative approaches to managing the physics and chemistry of diesel fuel combustion within a forklift engine, such that users can get the job done and remain compliant with standards — without ending up out of pocket.

Only forklift brands that can rise to this challenge can protect their customers from the hidden costs of cleaning up traditional diesel engines. Doosan Industrial Vehicle has invested millions of pounds to develop and deploy new, efficient and compliant engines, negating the requirement for DPF and thus significantly reducing operating costs. Now more than ever, customers will need to check the small print before signing on the dotted line.

With thanks to Doosan's Tim Waples.

For more information on Doosan Industrial Vehicle UK's portfolio and service provision circle readerlink 424