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Del-Ron, oikeasti synteettinen PAO, etuja-4

Yleisesti noin puolet vähemmin haihtumista(4-6%,Noac 250°C/1h) verrattuina ”kaupan öljyihin”(8-14%) Haitta korkeasta haihtumisesta on että haihtunut öljysumu kulkeutuu huohotuksen kautta imusarjaan jossa tahmaa/likaa venttiilit ja aiheuttaa sylinterissä ”öljy-detonaatiota” -nakutusta.

Controlling low speed pre-ignition

While low speed pre-ignition (LSPI) is not a new phenomenon, the use of downsized and turbocharged gasoline direct injection engine technology means it has become more of a concern.

Here, Lubes Development Technologist discusses how careful collection and analysis of LSPI data will enable statistically rigorous evaluation that could be used to help in its control.

Market demand and evolving global legislation are driving OEMs to find new ways to improve fuel economy and reduce CO_2 emissions across their vehicle fleet. Downsizing of gasoline engines is a common yet effective method that can be used to help achieve these goals. The reduced engine displacement results in reduced pumping, frictional losses and lower gases-to-wall heat transfer, which means the engine is more efficient.

Engine downsizing can improve fuel economy, but it comes with a sacrifice of performance. Increased boost pressure using turbochargers or superchargers is needed to compensate for the lost power and torque output.

Downsized engines suffer from pre-ignition

LSPI is a disruptive abnormal combustion event, which has been observed in the new generation of smaller, turbocharged, gasoline direct injected engines.

Characterised by spontaneous ignition of the fuel before the spark is generated, LSPI can create a downward force and exert peak pressures that often exceed 100 bar. At high loads, where the engine is knock-limited, this advanced phasing results in a very strong knock, which is often associated with significant audible events. Although relatively infrequent, in the most severe cases, LSPI can result in cylinder head failures, broken piston rings, damaged pistons, bent connecting rods, and cracked piston lands and skirts.

Industry focus on LSPI

is examining the fundamental issues behind LSPI and has previously expressed the need for a meaningful engine test to measure the effects of lubricant composition on its occurrence.

believes that introducing a new test rather than new chemical limits will allow formulators to use their full expertise to find the best solutions to overcome the LSPI challenge. For example, the deleterious effects of one component may be mitigated by other additive chemistries and combinations, which can be optimised to deliver the required engine protection. Tightening chemical limits has the potential to stifle creativity and technical innovation.

In the past year, there has been a considerable amount of activity in the industry to develop an LSPI engine test.

This includes precision matrices on a new ASTM LSPI test, which will be included in the ILSAC GF-6 specification. However, delays in other test developments mean that the ILSAC GF-6 first allowable use date, which had been set for April 2018, now appears not to be achievable although industry is working to minimise the delay as much as possible.

Over the same period, has continued its own research into the influence of lubricants and fuels on the occurrence of LSPI. In addition, it has been looking for ways to help eliminate, or at least control, these unpredictable and highly undesirable events.

view, this activity is becoming increasingly important as LSPI limits the extent to which OEMs can use engine downsizing in their efforts to reduce CO_2 emissions from their gasoline engines.

*Two examples of piston damage due to LSPI observed during testing at Southwest Research Institute**
*Photo courtesy Southwest Research Institute**