

CHASSIS DYNAMOMETER TEST

a). Volvo 340 FM12 12 Litre Tractor unit 1st May 2003
 b). Scania 124-470 12 Litre Tractor unit 29th May 2003

Introduction

Previous trials on 6 litre diesel engines have demonstrated considerable improvement in torque in the lower r.p.m. ranges when Hiclone is introduced. Following this success, it was decided to investigate the effect of Hiclone on 12 litre engines that operate at these lower speeds, to find out if Hiclone could have a beneficial effect.

Method

A Volvo FM 12 litre tractor unit was tested on a chassis dynamometer and the torque and power tested and recorded. Attempts were made to fit Hiclone into the air induction system of the engine, but due to the complex set up, no positive effect was recorded, despite several attempts using different configurations. As it was impossible to fit Hiclone inside the air induction system, it was decided to fit it inside the engine manifold (casing). Six Hiclones were temporarily wedged in the casing, near the inlet ports and the engine trialled on the dynamometer. This arrangement was imperfect, but it was noticed that a difference to the torque and the power had occurred, as indicated in Figures 1 and 3 and table 1.

A Scania 12 tractor unit was chosen to be tested on the same dynamometer for power and torque. The vehicle had previously undergone a short road test which indicated a fuel saving in the region of 5% whilst laden, with the driver commenting that "it seems smoother and pulls much better". "I saved half a gear on the climb to the M25 at Dartford". The vehicle was tested with the Hiclone in position and then repeated with it taken out. The results of the tests are as indicated in table 2 and graphs 3 and 4.

Discussion

The Hiclone effect is apparent in both tests where torque and power has been improved, especially at the front end of the operating range. In both cases the power and torque curves have been affected in the same way, but to a different degree.

Hiclone has smoothed out the torque and power curves making them more even. The Volvo test result is useful in that it is indicative of what may possibly be achieved if Hiclone is fitted in the manifold properly. It is quite likely an improvement in torque and power can be made by careful design and further testing.

The Scania result is interesting in that it is borne out by the short road test which indicated a substantial fuel saving of around 5% whilst the vehicle was fully laden. More accurate fuel measurement tests should now be carried out to corroborate this result and ascertain actual fuel saving figures. The fact that the Scania torque has been improved (albeit in a small amount) throughout the range, is very encouraging and further tests should be carried out to try and improve this result.

Chassis Dynamometer Test - Volvo

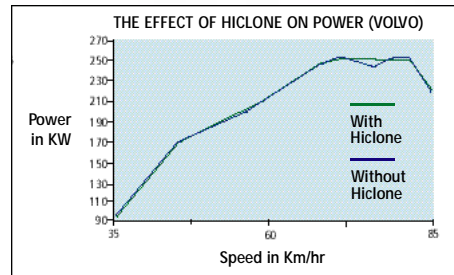


Fig 1

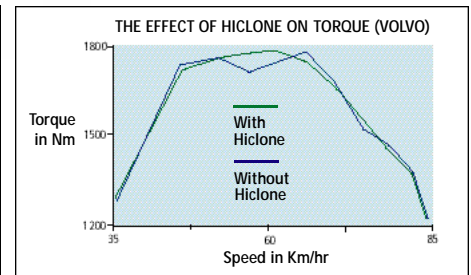


Fig 2

Speed in Km/Hr	Power without Hiclone	Power with Hiclone	Percentage difference in Power	Torque without Hiclone	Torque with Hiclone	Percentage Difference in Torque
35	95.4	97.8	2.52	1318	1345	2.05
40.5	128.7	130.6	1.48	1523	1542	1.25
45	163.7	161.7	-1.22	1721	1702	-1.10
50	184.6	184.5	-0.05	1759	1756	-0.17
55	198.7	204.2	2.77	1723	1777	3.13
60.5	221.7	223.8	0.95	1756	1782	1.48
65	242.5	239.7	-1.15	1793	1762	-1.73
70	249.4	246.7	-1.08	1714	1695	-1.11
75	241.2	246.7	2.28	1564	1593	1.85
80	249.9	247.9	-0.80	1521	1498	-1.51
85	249.6	246.9	-1.08	1438	1424	-0.97
89.5	225.6	230.7	2.26	1256	1270	1.11

Table 1

Chassis Dynamometer Test - Scania

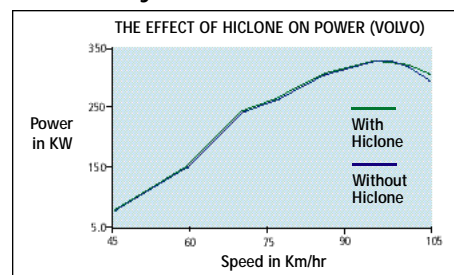


Fig 3

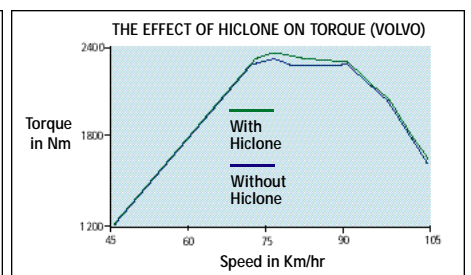


Fig 4

Speed in Km/Hr	Power without Hiclone	Power with Hiclone	Percentage difference in Power	Torque without Hiclone	Torque with Hiclone	Percentage Difference in Torque
45	83	85.4	2.9	1213	1248	2.9
50	116	118	1.7	1503	1531	1.9
55	147.1	149.1	1.4	1728	1757	1.7
60.5	191.9	194.5	1.4	2033	2068	1.7
65	232.4	235.8	1.5	2275	2316	1.8
70	256.1	258.2	0.8	2337	2365	1.2
75	268.6	274.2	2.1	2298	2356	2.5
80.5	288	292	1.4	2299	2341	1.8
85	306.5	308.9	0.8	2313	2341	1.2
90	317.8	318.1	0.1	2277	2292	0.7
95	327.1	328	0.3	2234	2252	0.8
100	329.8	328.3	-0.5	2149	2149	0.0
105	331.6	334.2	0.8	2066	2089	1.1
110	330.4	333.4	0.9	1975	2001	1.3
115	328.9	330	0.3	1896	1912	0.8
120	319.2	326.4	2.3	1778	1823	2.5
125	310.2	318.8	2.8	1677	1723	2.7

Table 2