

GASOLINE ENGINE WHDC VALIDATION STUDY

On the request WHDC working group during 55 GRPE session the validation study of WHDC cycles with gasoline engine was carried out.

Engine tested:

Engine type – V 8, four stroke, positive ignition, 4.67 l capacity;

Fuel – petrol;

Fuel feed- carburetor type with electronic control of air/fuel ratio;

Emissions control – 3-way catalytic converter.

CONCLUSION

Validation study with WHTC and WHSC cycles was carried out. ETC and ESC tests were also carried out for comparison.

The engine tested could not meet the validation criteria of the GTR completely both in WHTC and ETC cycles. Nevertheless the compliance with the statistics criteria with the WHTC is obviously better than for ETC. Suggested reason for engine not conforming the statistics criteria is that the engine initially was meant to comply mainly with the stationary (ESC) modes.

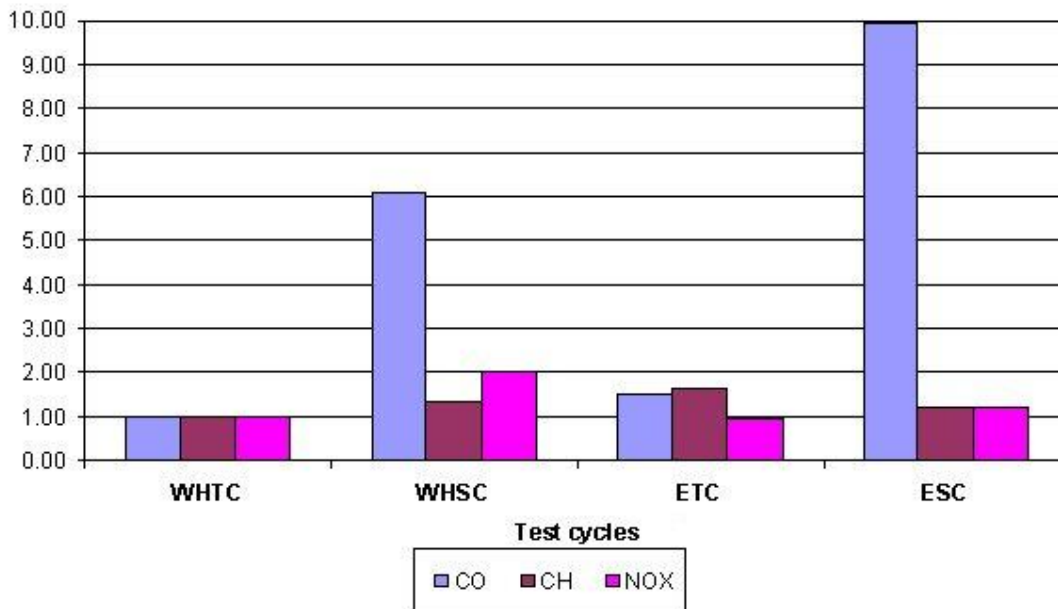
As for load/speed distribution the pattern mainly the same as one for the diesel engines determined early.

WHTC cover wider range of the engine map than ETC. As a whole both WHTC and WHSC cycles are more appropriate than ETC and ESC ones.

Emissions, g/kWh

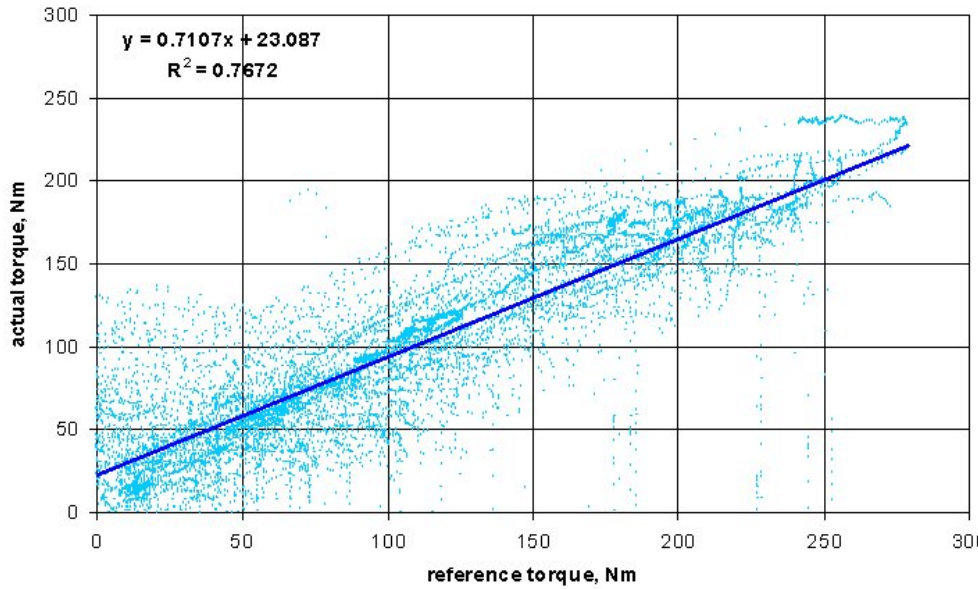
	CO	CH	NO _x
WHTC	0,78	0,15	2,19
WHSC	4,73	0,20	4,42
ETC	1,17	0,24	2,12
ESC	7,77	0,18	2,62

Relative Emissions

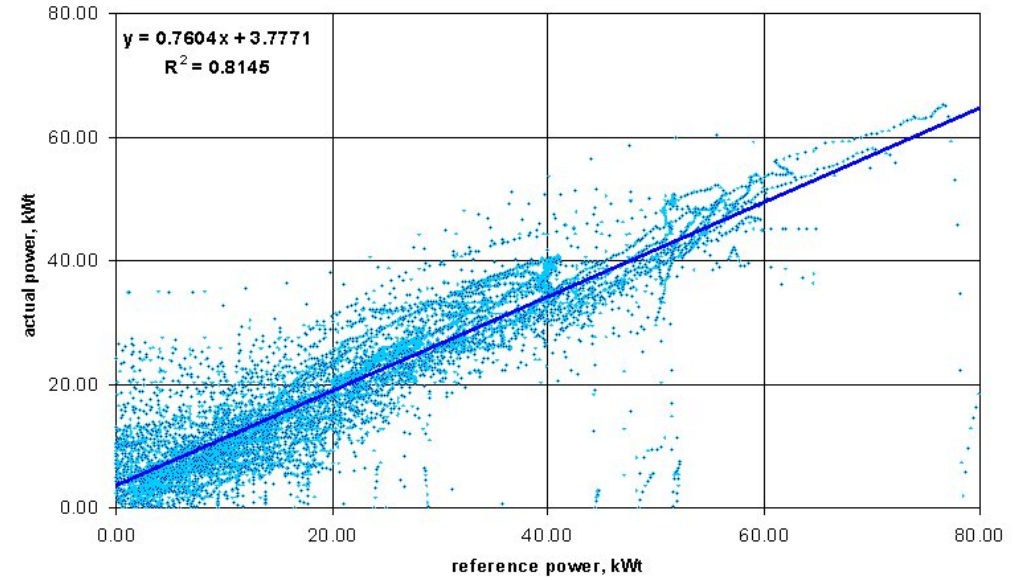


Driveability WHTC

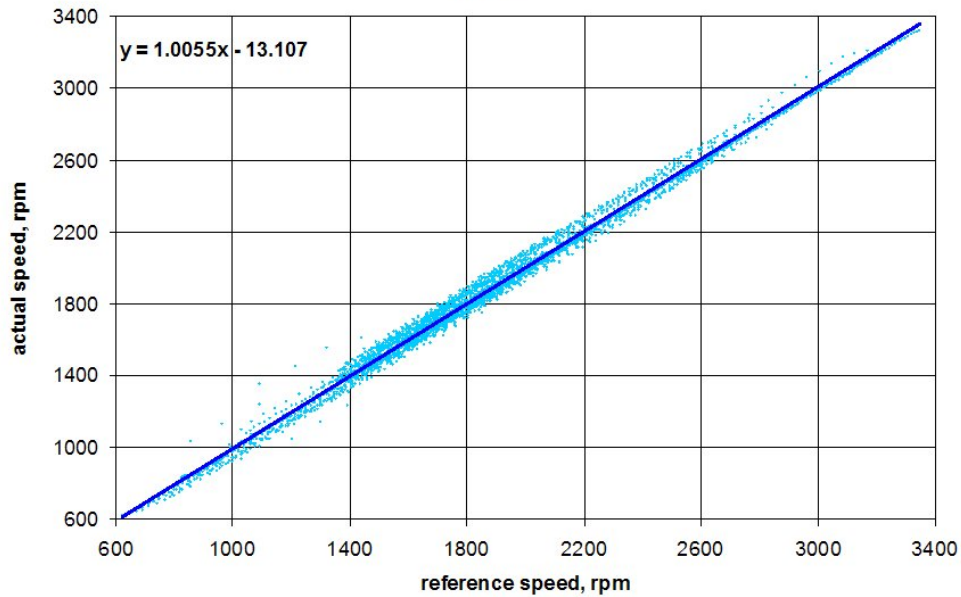
Torque



Power



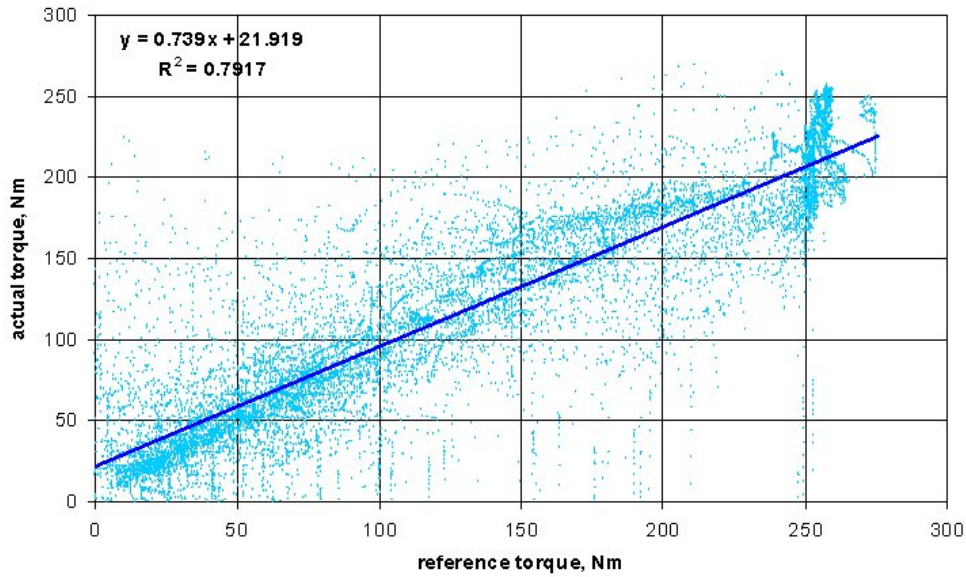
Speed



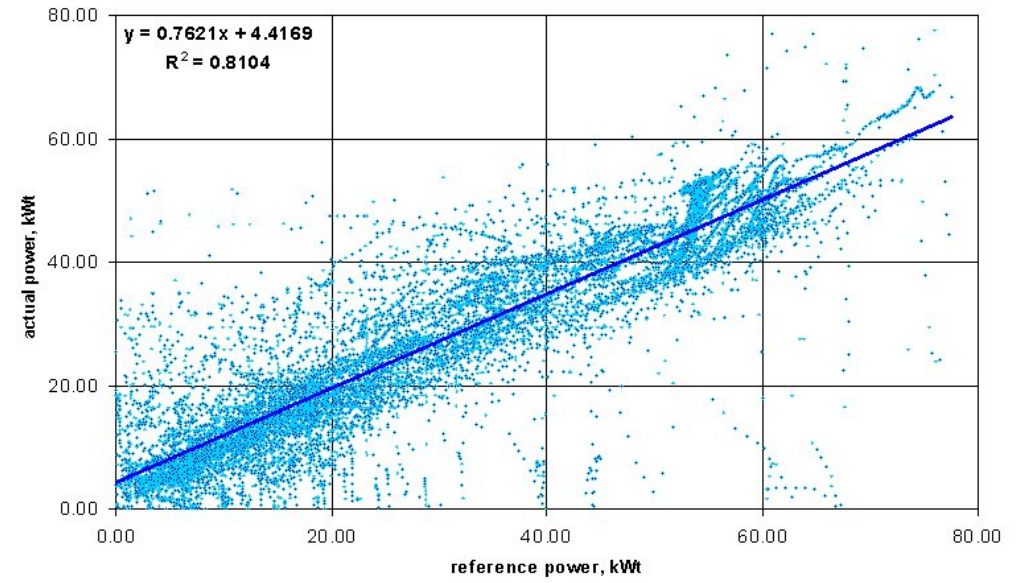
	Speed		Torque		Power	
	limit	actual	limit	actual	limit	actual
Standard error of estimate (SEE) of Y on X	max 100 min ⁻¹	25,38	35,36	27,6	6,4	5,8
Slope of the regression line, m	0,95-1,03	1,006	0,83-1,03	0,71	0,89-1,03	0,76
Coefficient of determination, r²	min 0,97	0,995	min 0,85	0,77	min 0,91	0,81
Y intercept of the regression line, b	±50 min ⁻¹	-13,1	20	23,1	4	3,78

Driveability ETC

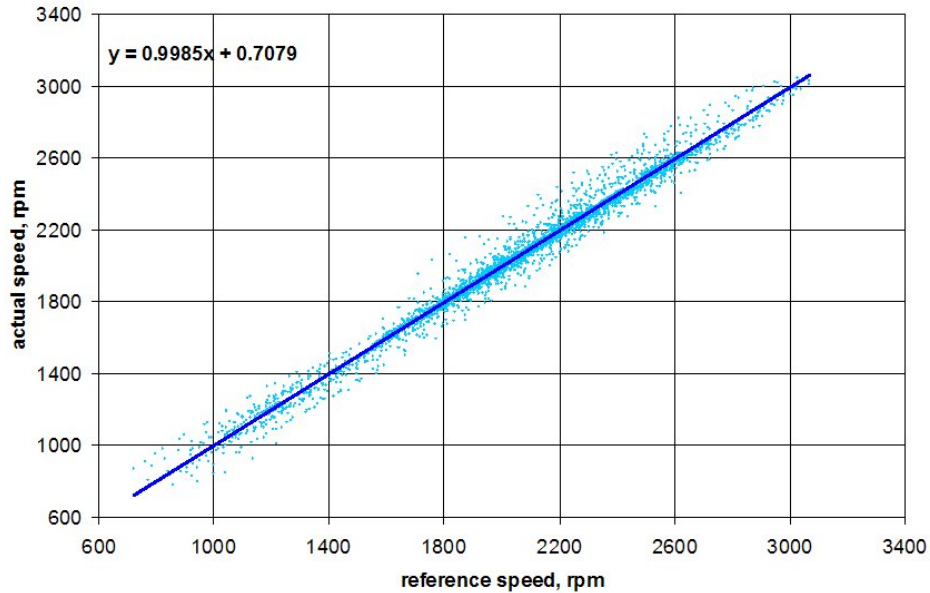
Torque



Power



Speed



	Speed		Torque		Power	
	limit	actual	limit	actual	limit	actual
Standard error of estimate (SEE) of Y on X	max 100 min ⁻¹	28,37	35,36	32,2	6,4	7,30
Slope of the regression line, m	0,95-1,03	0,999	0,83-1,03	0,74	0,89-1,03	0,762
Coefficient of determination, r ²	min 0,97	0,995	min 0,85	0,79	min 0,91	0,81
Y intercept of the regression line, b	±50 min ⁻¹	0,708	20	21,92	4	4,42

LOAD/SPEED PATTERN

