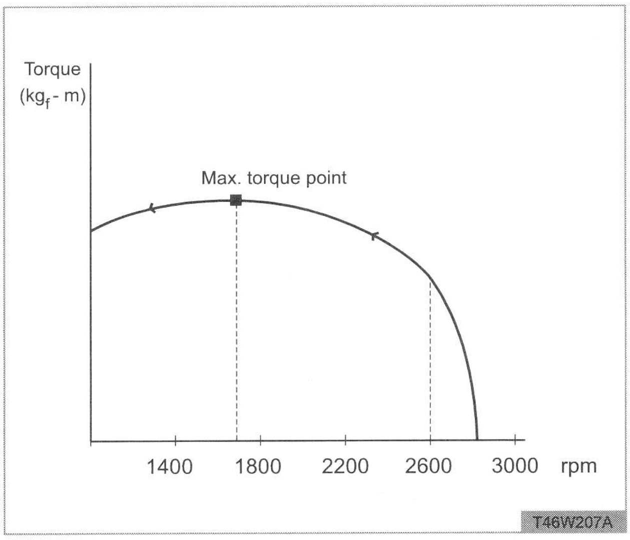
2.3 ENGINE PERFORMANCE CURVE ANALYSIS

A. TORQUE

When applying the rotating resistance to the flywheel, the engine speed drops and the rotating force of flywheel increases.
Torque curve shows this force as a graph.



When running the engine at full speed without load, the engine rotates at approx. 2,800 rpm as shown in the figure. When the resistance is applied to the flywheel by braking with some kind of dynomometer, the rotating force of the dynomometer increases (arrow direction) as shown in the figure. In this case, the engine speed gradually decreases. When the engine speed reaches approx. 1,700 rpm, the torque starts to decrease. In other words, this point (1,700 rpm) is the maximum torque point.

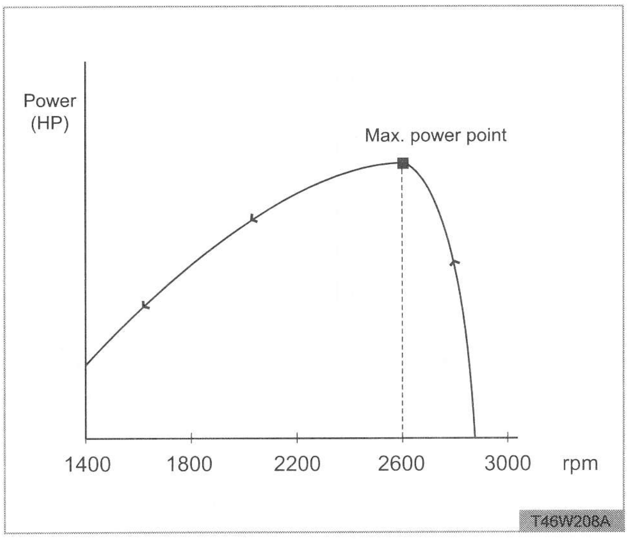
B. BRAKE HORSE POWER (HP)

The power is proportional to the rotating force (torque) and the rotating speed (RPM). Its formula is as follows:

$$\text{Power (HP)} = \frac{\text{Torque } (Kg_f\text{- m}) \times \text{rpm}}{726.3}$$

$$1\text{kw} = 1.341 \text{ HP}$$

If substituting the torque and RPM in the left figure for the above formula and getting the power value, the below curve is provided. As shown in the below figure, when the power reaches the maximum point at 2,600 rpm, the power starts to drop. This is because the rpm drops sharply even the torque increases gradually.



C. S.F.C (SPECIFIC FUEL CONSUMPTION)

The unit used here is "g/HP-hr".

For example, 192g/HP-hr means that 192g of fuel is consumed by 1 horse power when running the engine for 1 hour.
This can be converted as follows:

Since the fuel consumption at full power in the power curve (4B243) is 192g/HP-hr, the fuel consumption for 44 horse power is 192g x 44/hr = 8.448 kg/hr.

When converting this value to volume value,
8.448 ÷ 0.835 ℓ/hr = 10.12 ℓ/hr

Because: Diesel fuel 1 ℓ = 0.835 kg