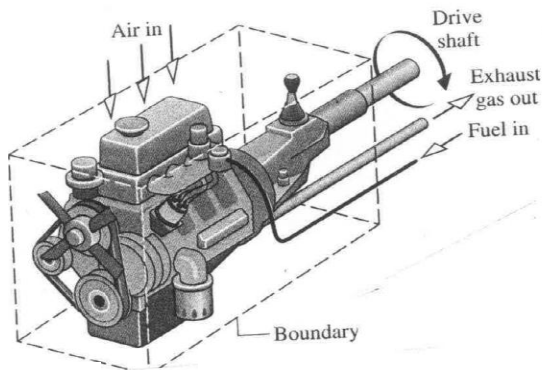


PROBLEM 2.41

KNOWN: Operating data are provided for a V-6 automobile engine.
FIND: Determine the percentage of the developed power that is transferred to the driveshaft and discuss.

SCHEMATIC & GIVEN DATA:



Driveshaft:
① Rotational speed
= 4700 RPM
② Torque = 248 ft·lbf
Engine develops 226 hp

ANALYSIS: Using Eq. 2.20, the power delivered to the drive shaft is

$$\begin{aligned}\dot{W} &= \tau \omega \\ &= (248 \text{ ft} \cdot \text{lbf}) (4700 \frac{\text{rev}}{\text{min}}) \left| \frac{2\pi \text{ rad}}{1 \text{ rev}} \right| \left| \frac{1 \text{ min}}{60 \text{ s}} \right| \left| \frac{1 \text{ hp}}{550 \text{ ft} \cdot \text{lbf/s}} \right| \\ &= 221.9 \text{ hp}\end{aligned}$$

The percentage of the power developed by the engine that is delivered to the driveshaft is

$$\% = \frac{221.9 \text{ hp}}{226 \text{ hp}} = 0.98 \quad (98\%)$$

Frictional and like effects account for the difference.