

PROB. 14-33

FIND WORK DONE BY DIVERS: WOMAN DIVES FIRST

$$M_1 = 180 \text{ LB}, M_2 = 120 \text{ LB}, M_3 = 300 \text{ LB}$$

WORK-ENERGY PRINCIPLE:

$$T_1 + U_{1-2} = T_2 \Rightarrow U_{1-2} = T_2 = \frac{1}{2} M_2 U_2^2 + \frac{1}{2} (M_1 + M_3) U_3^2$$

FROM PROB. 14-3,

$$U_3 = 3.2 \frac{\text{ft}}{\text{s}}, U_2 = 16 - 3.2 = 12.8 \frac{\text{ft}}{\text{s}}$$

$$U_{1-2} = \frac{1}{2} \left( \frac{120 \text{ LB}}{32.2 \text{ ft/s}^2} \right) \left( 12.8 \frac{\text{ft}}{\text{s}} \right)^2 + \frac{1}{2} \left( \frac{180 + 300}{32.2} \right) \left( 3.2 \right)^2$$

$$U_{1-2} = 381.6 \text{ ft-LBF}$$

MAN DIVES NEXT:

$$U_{1-2} = T_2 - T_1$$

$$T_1 = \frac{1}{2} (M_1 + M_3) U_3'^2, T_2 = \frac{1}{2} M_1 U_1^2 + \frac{1}{2} M_3 U_3'^2$$

FROM PROB. 14-3,  $U_3' = 9.2 \frac{\text{ft}}{\text{s}}, U_1 = 16 - 9.2 = 6.8 \frac{\text{ft}}{\text{s}}$

$$T_1 = \frac{1}{2} \left( \frac{180 + 300}{32.2} \right) \cdot (3.2)^2 = 76.32 \text{ ft-LB}$$

$$T_2 = \frac{1}{2} \left( \frac{180}{32.2} \right) (6.8)^2 + \frac{1}{2} \left( \frac{300}{32.2} \right) (9.2)^2 = 523.5 \text{ ft-LB}$$

$$U_{1-2} = 523.5 - 76.32 = 447.2 \text{ ft-LB}$$