Momentum and Energy Conservation solutions

1. 730 N/9.8 = 74.5 kg man

74.5)(0 m/s) + 1.2 )(0 m/s ) = 1.2 (5 m/s) + 74.5 (Vf)

Vfman = -0.081 m/s 5.0 m/0.081m/s = 62 s to reach edge

1. 0.005(300 m/s) = 102 kg (vrecoil) 1000N/9.8 = 102 kg

vrecoil = 0.015 m/s

1. 1200kg)(25 m/s) + 9000kg(20 m/s) = 1200(18m/s) + 9000(Vf)

Vftruck = 20.9 m/s

KE initial ½ 1200(25)2 + ½ 9000(20)2 = 2.18 x 106 J

KE Final ½ 1200(18)2 + ½ 9000(20.9)2 = 2.16 x 106 J

Lost 20,000 J

1. 0.5kg(4m/s) = -[(3kg)(vf)] = – 0.667 m/s

To get a velocity of 4.0 m/s: ½ (0.5) 42 = 0.5 (9.8)(h) h = 0.82 m

1. mgh = ½ mv2 block 1 = 9.9 m/s

5(9.9) = 0 = 5(vf) + 10(6.6) vf = – 3.3 m/s

½ (5)(-3.3)2 = 5(9.8)(h) h = 0.55 m

1. Skip
2. 20,000(3.0 m/s) + 40,000(1.2 m/s) = 60,000 (vf) vf = 1.67 m/s

KE Before: ½(20,000)(3)2 +1/2 (40,000)(1.2)2 = 118,800 J

KE After: ½ (60,000)(1.67)2 = 97,200

ΔKE = – 21,600 J

1. (0.300 kg)(– 2.5 m/s) + (0.0225kg)(35.0 m/s) = (.300) (0) + 0.0225 (v)

V = 1.67 m/s