

34. (a) We require

$$\frac{1}{2}kx_m^2 = \frac{1}{2}mv_m^2 \implies k = m\left(\frac{v_m}{x_m}\right)^2$$

where  $m = 0.130$  kg,  $v_m = 11200$  m/s and  $x_m = 1.50$  m. This yields  $k = 7.25 \times 10^6$  N/m.

(b) The force required to produce an elongation  $x_m$  if the spring constant is  $k$  is  $kx_m = 1.087 \times 10^7$  N. Dividing this among  $N$  persons, each one exerting a force of 220 N, requires  $N = 1.087 \times 10^7 / 220 \approx 49400$ .