9. $h_1 = .011m$ $h_2 = ?$ (h = compression length)

$d_1 = 1.93m$ $d_2 = 2.2m$

a.)

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$mgh_1 = \frac{1}{2}mv_1^2$

$\frac{2mgh_1}{m} = v_1^2$ $v_1 = \sqrt{2gh_1}$

$mgh_2 = \frac{1}{2}mv_2^2$ $v_2 = \sqrt{2gh_2}$

$D_1 = V_1 \cdot T$ $D_2 = V_2 \cdot T$

$1.93m = V_1 \cdot T$ $2.2 = \sqrt{2gh_2} \cdot T$

$1.93m = \sqrt{2gh_1} \cdot T$ * Ts cancel

$\frac{1.93m}{2.2m} = \frac{\sqrt{2gh_1}}{\sqrt{2gh_2}}$

$.8773m = \frac{\sqrt{2gh_1}}{\sqrt{2gh_2}}$

$\sqrt{2gh_2} = \frac{\sqrt{2gh_1}}{.8773m}$

$\sqrt{2gh_2} = \frac{\sqrt{2(10m/s^2)(.011)}}{.8773m} = .535$

$2(10m/s^2)h_2 = .535^2$

$20h_2 = .2858$

$h_2 = .0143m$

(1.43 cm)