

I-94

A falling pole-vaulter of mass m lands on a cushion at speed v . The pole-vaulter sinks a distance d into the cushion before stopping. Determine the force exerted on the pole-vaulter due to the cushion (F_{cushion}) as a function of m , v , d , and g .

Motion Diagram

Free-Body Diagram



Motion Information

Event 1:

$t_1 =$

$r_1 =$

$v_1 =$

$a_{12} =$

Event 2:

$t_2 =$

$r_2 =$

$v_2 =$



Mathematical Analysis

Questions

If $v = 0$ m/s, what should F_{cushion} equal? Does your function agree with this observation?

If $d = 0$ m, what should F_{cushion} equal? Does your function agree with this observation?

What would be worse for the pole-vaulter, hitting the cushion at twice her original speed or sinking half of the original distance into the cushion?

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