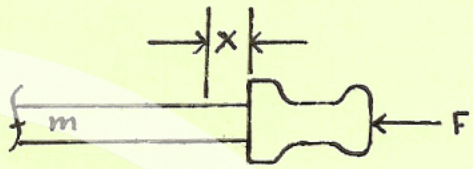
DELTA GEAR, INC.	TITANIUM VS. STEEL FIRING PINS	16 MAY 2010

PROBLEM: IS THERE A SIGNIFICANT DIFFERENCE IN PERFORMANCE FOR A STEEL VS. TITANIUM AR15/M16 FIRING PIN?

GIVEN:

FORCE OF HAMMER STRIKE

$F = 5\,lb. = 22.24\,N$



MASS OF A STEEL & TITANIUM FIRING PIN

$m_S = 8g$

$m_{Ti} = 5g$

DISTANCE OF FIRING PIN TRAVEL

$x = 3.38\,mm$

SOLUTION:

$* \quad F = ma \Rightarrow a = \frac{F}{m}$

$a_S = \frac{22.24\,N}{0.008\,kg}$ $\qquad$ $a_{Ti} = \frac{22.24\,N}{0.005\,kg}$

$a_S = 2780\,\frac{m}{s^2}$ $\qquad$ $a_{Ti} = 4448\,\frac{m}{s^2}$

$* \quad x = at^2 + \cancel{v_0}^{0}t \Rightarrow t = \sqrt{\frac{x}{a}}$

$t_S = \sqrt{\frac{0.0038\,m}{2780\,\frac{m}{s^2}}}$ $\qquad$ $t_{Ti} = \sqrt{\frac{0.0038\,m}{4448\,\frac{m}{s^2}}}$

$\boxed{t_S = 0.001103\,sec.}$ $\qquad$ $\boxed{t_{Ti} = 0.000872\,sec.}$

A DIFFERENCE IN LOCKTIME OF ROUGHLY 0.00023 sec.

CONCLUSION:

TITANIUM FIRING PINS CAN COST UP TO FIVE TIMES MORE THAN A STEEL FIRING PIN, WHICH IS NOT JUSTIFIED BY EITHER ITS WEIGHT SAVINGS OF 3g OR ITS 0.00023 sec. FASTER LOCKTIME.

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