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The dynamic interaction of steel projectiles striking aluminum alloy plates at normal incidence has been investigated for geometrically simple projectiles. Observations on the penetration craters formed by flat-nose projectiles and certain idealized stress wave considerations lead to a theory of cavity formation. This can be formulated quantitatively as the relationship of the depth of penetration to (1) impact velocity, (2) certain functions of the characteristic impedances of the target and projectile materials, and (3) an empirically determined dynamic elastic limit. This theory agrees with measurements for small projectiles traveling at velocities between 300 and 850 meters/sec. Velocity ranges of dominantly elastic and dominantly plastic target behavior can be identified. (Author's abstract)

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