

Abstract Submitted
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Rate Dependent Shear Failure and the Scaling Effect in Long Rod Penetration YEHUDA PARTOM, Retired — Long rod penetration tests show a scaling effect that cannot be explained by rate dependent strength. We propose here that this scaling effect may be explained by rate dependent failure. We start by revisiting the well known result, that long rod penetration efficiency depends on the strain to failure of both projectile and target materials. We then make the strain to failure depend on strain rate, using the overstress concept. In this way the effective strain to failure increases with strain rate. As strain rate increases with decreasing scale, we get that penetration efficiency decreases with decreasing scale, as observed in tests. In the paper we show results of hydrocode runs that demonstrate the relation between strain rate sensitivity of the strain to failure, and the scaling effect in long rod penetration.

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