

Abstract Submitted
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Spall Response of Annealed Copper to Direct Explosive Loading

SIMON FINNEGAN, MALCOLM BURNS, GLENN WHITEMAN, AWE — Taylor wave spall experiments were conducted on annealed copper targets using direct explosive loading. The targets were mounted on the back of an explosive which was initiated using a gas gun plate impact. The explosive and target were separated by a layer of foam in order to reduce the peak amplitude and strain rate of the Taylor wave pulse. This technique creates a high stress state, with a lower strain rate than an equivalent plate impact experiment, within the target. An advantage of using a gas gun is that the explosive run to detonation following impact can be studied separately. Four shots were performed on two differently annealed batches of copper to investigate the effect of annealing on the spall response. One pair of targets was annealed at 1123 K for 4 hours and the other pair was annealed at 723 K for 1 hour. The free surface velocity profiles were recorded using a heterodyne velocimetry (HetV) probe, focussed on the centre of the target. To quantify the effect of the annealing the pullback shapes in the free surface velocity profiles and the calculated spall strengths were compared for the four targets.

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