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Longitudinal Fracture Propagation of Explosive Loaded Metal Shells HAIBO HU, TIEGANG TANG, BAYI HU, Institute of Fluid Physics, CAEP
— Longitudinal fracture propagation behavior in self-organized shear bands is discussed. Shear fracture can propagate longitudinally tens of mm, while recovery observations show that fracture surface is consisted of shear fracture cells in mm length. They locate approximately along a given generatrix and coalesce longitudinally at some stage of growth breaking through shell wall. Analysis on alignment phenomenon of shear initiations, considering up-stream shear initiations influence, is given. Early shear initiations can influence sites of shear instability on neighboring down-stream section by changing local stress field within a time gap sufficient for mechanical wave propagation. It leads to shear initiation in given orientation and location along given generatrix in competition with random shear initiations. Knowing conditions for such mechanism keep on work layer after layers, not to be broken, is of importance. Simulate multi shears coalesce using a mono fracture growth model is not advisable, while to simulate the growth of tongue like shear cells individually, calculating instantaneous stress field in 3-D space is a tremendous work. To approximate such kind of process for credible modeling is important. For fragment size distribution predication, in well known models there is not adequate consideration of longitudinal propagation factor, which depends on material parameters and loading conditions.

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