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破片和冲击波毁伤圆柱靶的数值仿真

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摘要: 采用动态显式非线性有限元软件对破片和冲击波对圆柱靶的毁伤试验进行了数值仿真。将破片和冲击波作用分离开来进行研究, 既简化了模型又保证了仿真精度。通过圆柱靶冲击波毁伤试验, 检验了圆柱靶材料模型及其参数选取的合理性和网格收敛性。将仿真结果和试验结果进行了比较, 证实了仿真模型的合理性和有效性。计算结果表明: 在一定的弹-靶作用距离下, 采用破片和冲击波联合作用加载, 可以有效地形成圆柱靶的解体毁伤。

关键词: 圆柱靶; 有限元; 冲击波; 毁伤作用

中图分类号: O38

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Simulation of Cylindrical Shell Damage by Fragments and Shock Waves

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Abstract: Numerical simulation for damage tests of cylindrical targets under fragments and shock waves was investigated by use of a nonlinear dynamic explicit finite element method. The damage action was modeled by separating the fragment and shock wave loading, which makes the model simple and ensures the simulating precision. The rationality of selection of material models and the stability of mesh division are verified by damage tests of cylindrical shell under shock wave. The simulation results were compared with the experimental results to validate the rationality and practicability of simulation model. The calculated results indicate that the fracture damage of cylindrical shells can be created effectively by fragment and shock wave loading together under a warhead target action distance.

Key Words: cylindrical target; finite element method; shock wave; damage action

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