

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Environmental Effects and Spacecraft Protection (6)

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MATERIALS ANALYSIS OF HYPERVELOCITY IMPACT AND PROTECTING SPACECRAFT OF
SPACE DEBRIS

Abstract

Nowadays impact protection research activities concentrate on quantifying the expected failure rates and failure characteristics of manned and unmanned spacecraft due to space debris and meteoroid impacts. It is more envisage by doing the investigation and reducing the design margins required for no structural damage, as required by manned and unmanned modules in a long term space missions. In this research constraint parameters are selection of particular materials and verify the structural protection of spacecraft model which is validate with Columbus and ATV configurations and extends to study the consequence of hypervelocity impacts are a function of incident angle and projectile, impact velocity, target material, and the shape and mass of the projectile. The obtained results of hypervelocity impacts, the projectile velocity surpass the speed of sound within the target material and also shock wave that circulate across the material is reflected by the surfaces of the target, and overturn its direction of travel. The superimposition of progressing and replicate waves can escort to confined stress levels that exceed the material's strength, thus causing cracks and/or the separation of spalls at momentous velocities.