

# **Penetration Probability Distribution over Size of Space Debris**

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The population of dangerous debris particles in low Earth orbit is growing, resulting in a need for improved risk assessment and risk management of critical space station elements from their hypervelocity impact threat. The paper is devoted to a model for double-plate structures' penetration probability distribution over space debris size. The model is based on space debris environment models and four ballistic limit equations of double-plate structures. The model provides data for ballistic limit analysis and helps to reduce the cost in space debris shielding structures design. Discussion and analysis of the results from different ballistic limit equations are provided. Simplified model is established for the purpose of fast estimation. Also presented is the size of space debris which is most dangerous to an on-orbit space vehicle. It was found that the most dangerous debris size is very closer by using different ballistic limit equations. Moreover, to highlight the main area that affects the penetration probability distribution, the sensitivity of the model upon different parameters involved is analyzed.