

## Damage for single-layer reticulated domes subject to explosive blast loads based on CONWEP

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In this paper based on ANSYS/LSDYNA CONWEP package, efficient analysis of reticulated domes subjected to explosive blast loads is carried out. Based on the explosive blast loads of the structures calculated by CONWEP, the blast response of structure can be obtained. In order to provide a better understanding of the dynamic behaviour of single-layer reticulated domes subjected to explosive blast loads, a number of analyses are carried out on structures with different standoff distances ( $R$ ), explosive weights ( $W$ ), rise-span ratios ( $f/L$ ) and other parameters. An equation for a structural damage factor is proposed to evaluate structural damage quantitatively. The damage states for single-layer reticulated domes are defined based on their structural dynamic performance and corresponding damage factors. Structural reliabilities for different standoff distances are obtained using Monte-Carlo Analysis. A typical protective measure is bollards which are used to help ensure a minimum standoff distance. To illustrate the cost-effectiveness of such a protective measure, structural damage states and various losses, including direct and indirect economic loss and maimed and fatality loss, are considered for assessing the risk reduction, costs and benefits. It was found that the bollards are significant for preventing structural progressive collapse or severe damage, and the optimal standoff distance can be determined.