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New technology to protect structures and armored vehicles against terrorist attacks

الإساليب الحديثة في تدريع وحماية المنشآت والمركبات ضد الهجمات الإرهابية

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Abstract

The use of explosives to attack structures and vehicles has been increased during the last few years. The terror attacks lead to death of innocent people and to destroy the building (civilian and military). The armored vehicles and the structures should be protected from explosives attacks using light weight sandwich structure and composites materials.
The protection system against blast effect is highlighted using composite structures and composite materials to protect vehicles and structures. Blast field test is conducted. The response of the light composite structure and composite materials is studied using finite element analysis (FEA). The blast field test is used to verify the numerical model. The composite structure strengthened by aluminum foam (ALF) is used to protect the bottom of the armored vehicle and the structures against the blast wave propagation. The ALF and the cylindrical aluminum tubes are used to fill the space at the sandwich structure as a light weight material.
This study presents a comparison between the results obtained by both the field blast test and the FEA to validate the accuracy of the finite element model. The effects are expressed in terms of displacement-time history effect on the sandwich steel panels and the structures as the explosive wave propagates. The results obtained by the field blast test have a good agreement with those obtained by numerical model. The composite materials improve the performance of the sandwich structure under the impact of blast loading. The light weight sandwich structure and the composite materials could be used as mitigation system to protect the bottom of the armored vehicles and the structures against blast hazard.

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