

when CFST members are damaged by lateral impact (such as train derailment impact, explosion impact, etc.), huge casualties and property losses can occur. Therefore, the rapid evaluation of the dynamic response of CFST members under lateral impact load is a problem that needs to be addressed with high priority. In this work, the impact dynamic responses of CFST columns under different axial compression are studied firstly by using finite element simulations. The impact force-time history curves are obtained for different working conditions. Based on these simulations results, an equivalent single degree of freedom (SDOF) method is developed. The conversion factors, the resistance functions and performance evaluation parameters are also deduced. Extensive comparisons are presented between the model predictions and the finite element simulations. It is found that the theoretical results of the equivalent SDOF method agrees satisfactorily with the finite element simulation results. Therefore, the equivalent SDOF method and performance evaluation parameters derived under the axial compression can be applied rapidly in engineering applications.

043 | Non-destructive testing of light armours made of CFRP after ballistic impacts by IR thermography methods

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Multi-layered composites are frequently used in many military applications as constructional materials and light armours protecting personnel and armament against fragments and bullets. One of the many methods used in non-destructive testing of composites is active infrared thermography. In active thermography it is necessary to deliver energy to the examined sample in order to obtain significant temperature differences indicating the presence of subsurface anomalies. To detect possible defects in composite materials different methods of thermal stimulation can be applied to the tested material, these include heating lamps, lasers, eddy currents, microwaves or ultrasounds. The use of a suitable source of thermal stimulation on the test material can have a decisive influence on the detection or failure to detect defects. Non-destructive testing was carried out using the following sources of thermal stimulation, heating lamp, flash lamp, ultrasound and eddy currents. The paper presents the possibility of applying IR thermography methods for detecting defects in ballistic covers made of carbon fiber reinforced composites used in the construction of military vehicles.

070 | Temperature effect in 2 phase ceramic based composite during impact conditions

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Cermet Materials (CM) are often used for manufacturing of different cutting tools. They have very good mechanical, wear and thermal properties. In our opinion, the dynamic load is still not enough thoroughly analysed, and the impact load as well. The tools are subjected to different dynamic effects. We have taken into account complex spatial distribution of cermet phases, grain/binder interfaces modeled by interface elements, possibility of cracks appearance within binders using interface elements as well, and rotation of brittle grains. The main goal of the presentation is to develop further previously formulated models of two-phase composite [1-4] to capture effects of temperature due to impact. The source of the thermal loading is the conversion of plastic work into heat [5, 6]. The increase of temperature takes place in the Co interfaces. We investigate adiabatic and fully coupled solutions. We note differences in the behaviour of the samples when the thermal loading is not considered. We have found that the thermal softening effect in the interface material is important as well. We enhance the description of the damage mechanism in the presence of temperature increase.

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