



Experimental and numerical investigation of crash structures using aluminum alloys

By Hamidreza Zarei

Cuvillier Verlag Mrz 2008, 2008. Taschenbuch. Condition: Neu. Neuware - Concerns have been raised for many years about the quality and safety of the vehicles as well as their contribution to the air pollution that endangers public health. Several vehicle safety standards have been developed for different crash scenarios. To improve air quality and reduce vehicle's emissions, there are high interests to amend vehicle fuel consumption through producing light weight vehicles. These improvements should not menace vehicle safety. Vehicle designers achieve safety and fuel economy advances through using lightweight materials like aluminum alloys, high strength steels, tailored beams and composite materials in the vehicle's structures. In this research, finite element crash simulation of a vehicle model is considered to characterize the energy absorption capacity of the vehicle's frontal structure. Crashworthiness optimization technique is implemented to reduce the weight of selected frontal elements while vehicle safety performance is improved. Crush performance of the two most effective vehicle's frontal crash elements, namely, crash box and bumper beam is investigated by a comprehensive experimental and numerical study in axial, oblique and bending crush conditions. The energy absorption mechanisms of these elements are characterized briefly and multi design optimization MDO technique is implemented to maximize...



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