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Crash behavior of telescopic crash box with aluminum foam

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The objective of this paper is to improve the energy absorption performance of crash box that are placed behind the bumper in automotive vehicles. In order to maximize the absorbed energy, new telescopic box geometry with aluminum foam-filled is introduced. Impact progressive collapse behaviors of the two boxes were simulated using the explicit finite element code, Ls-Dyna. Impact behaviors and energy absorption capacity of empty and foam filled telescopic boxes were compared. It is numerically observed that the telescopic crash box is not easily folded and absorbs impact energy similarly to the conventional one. Also, numerical simulation shows that in terms of achieving maximum energy absorption, telescopic crash geometry and filling the box with aluminum foam can be preferable to thickening the box wall. Finally, it is found that energy absorption capacity of telescopic crash box with aluminum foam is 47% higher than the empty box.

Biography

Ahmet Serdar Onal has received his BSc degree in Mechanical Engineering from Pamukkale University and MSc degree in Mechanical Engineering from Uludag University. He is a PhD candidate at the Mechanical Engineering Department of Uludag University, Engineering Faculty. He is interested in the subject of hot stamping process (PhD), industrial waste heat recovery systems based on ORC, 100% quality control systems, electrical resistance welding of boron alloyed steels, production line optimization, crash worthiness optimization of energy absorption structures. He is currently working as a R&D New Technology Engineer at the Beyçelik Gestamp R&D Center, Turkey.

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