

Comparison of steel and aluminium hood with same design in view of pedestrian head impact

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ABSTRACT

Material selection for automotive closure parts is influenced by different aspects such as costs, weight and structural performance requirements. For automotive hoods, the weight aspect for front wheel driven cars with front engine is very important because of the total mass distribution. Unlike other automotive closure parts, hoods must also fulfil requirements for pedestrian safety.

A European Commission regulation demands special structural, energy absorbing requirements in case of an accident with a pedestrian for cars, which are sold in Europe, Asia and Australia. To receive approval after 2005, all cars must provide an optimised energy absorbing frontal structure.

Within this paper, a test procedure has been executed on two identical hoods, one of steel and one of aluminium. The energy absorbing behaviour of hoods is measured by two different head impactors, one child and one adult head impactor.

The aim of these tests was to compare the general pedestrian friendliness of steel and aluminium, used as hood material. The tests were conducted on a car that is still available on the market with either a steel or aluminium hood, both having the same design. Knowing that the hood design was not developed to meet pedestrian safety requirements, the results compare the application of both steel and aluminium to assess which hood material is favourable for pedestrian protection.

Finally, first steps of an engineering approach for pedestrian friendly hood design will be shown.