Document details

‹ Back to results | 1 of 2 Next ›

Export Download Print E-mail Save to PDF Add to List More... ›

Full Text View at Publisher

Applied Mechanics and Materials
Volume 575, 2014, Pages 952-955
3rd International Conference on Materials Engineering and Automatic Control, ICMEAC 2014; Tianjin; China; 17 May 2014 through 18 May 2014; Code 106361

The head injury mitigation of an adult and child pedestrian in a frontal vehicle impact using response surface methodology (Conference Paper)

Venkatason, K.[a] Sivaguru, S.[b] Abdullah, K.A.[b] Idres, M.M.[b] Shah, Q.H.[b] Wong S.V.[c]

[a]University Technology Of MARA, 40450, Selangor, Malaysia
[b]Department of Mechanical Engineering, International Islamic University Malaysia, Jalan Gombak, 50728 Kuala Lumpur, Malaysia
[c]Malaysian Institute of Road Safety Research (MIROS), Lot 125-135, Jalan TKS 1, Taman Kajang Sentral, 43000 Kajang,Selangor Darul Ehsan, Malaysia

Abstract

View references (13)

This work aims at achieving an optimized vehicle front-end profile for improved protection for both adult and child pedestrian groups. A seven parameter simplified vehicle front end model is used in which the Central Composite Design(CCD) is utilized to generate a Plan of Experiments for the adult and child pedestrian cases each. Head Injury Criteria (HIC) results from the simulations are tabulated as the response function f(y). The Response Surface method is used to obtain mathematical models for all cases for which optimization is carried out. A close correlation is obtained between the predicted response and the response observed via simulation for the optimized models. The optimized vehicle front-end profile for the adult pedestrian group is shown to be different than that of the optimized profile for the child pedestrian. Moreover, the study shows that both optimized profiles are not mutually applicable for safety. A simple weighted biasing method is used to obtain responses that minimize the response for both adult as well as child pedestrian groups mutually within a single profile. The final optimized model is shown to achieve a safe vehicle front-end profile which equally caters for both adult and child pedestrians. © (2014) Trans Tech Publications, Switzerland.

Author keywords

Crash kinematics | Head injury mitigation | Pedestrian dummy | Response surface methodology

Indexed keywords

Engineering controlled terms: Automation | Computer simulation | Control | Mathematical models | Process control | Surface properties | Vehicles

Central composite designs | Child pedestrians | Head injuries | Head injury criterion (HIC) | Pedestrian dummies | Response functions | Response surface method | Response surface methodology

Engineering main heading: Pedestrian safety

Metrics

0 Citations in Scopus

0 Field-Weighted Citation Impact

PlumX Metrics
Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

Cited by 0 documents

Inform me when this document is cited in Scopus:

Set citation alert › Set citation feed ›

Related documents

Optimisation of vehicle front-end geometry for adult and pedestrian protection
Kausalyah, V., Shasthri, S., Abdullah, K.A.
(2014) International Journal of Crashworthiness

Development and optimization of passenger car front profile using polynomial response surface method
Kausalyah, V., Shasthri, S., Abdullah, K.A.
(2016) ARPN Journal of Engineering and Applied Sciences

Validation of pedestrian impactor testing upon hybrid vehicle front end profile
Kausalyah, V., Shasthri, S., Abdullah, K.A.
(2014) International Journal of Vehicle Systems Modelling and Testing

View all related documents based on references

Find more related documents in Scopus based on:

Authors › Keywords ›