

Frontal impact on truck cabin structure using FE modeling

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<https://doi.org/10.1088/1757-899x/1220/1/012051>

Abstract

This study aimed to investigate the component structural behaviour and response under overturned truck crash that subsequently collides with road-side pole or tree. The safety of the truck occupants in an accident is very important and should be considered in the process of cabin design. Specific focus will be on the structural integrity of the truck cabin in response to a collision with a cylindrical pendulum. In the past, dynamic analysis was done by real world testing. Nowadays crash simulation is proven to be much more efficient by being a virtual representation of destructive crash impact and providing opportunities to reduce the number of physical prototypes consumed for design verification, thus reducing development time. According to cab strength tests (ECE R29), the cabin body of the truck shall be attached to the chassis in such a way that in the event of impact it ensures a sufficient survival space and eliminates the risk of injury. This paper investigates the FE (finite element) simulation of a frontal impact on the cabin structure to validate the cabin according to the ECE regulation 29 tests. The study also includes the assessment of the energy absorption capabilities of the cabin during the pendulum impact. The pendulum impact was carried out using Ansys LS-Dyna explicit solver to evaluate the cabin strength under the loads.

Keywords: frontal impact, occupants safety, cabin strength

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**The XXXI-st SIAR International Congress of Automotive and Transport
Engineering
"Automotive and Integrated Transport Systems" (AITS 2021),
28th-30th October 2021, Chisinau, Republic of Moldova
Conference Series: Materials Science and Engineering, 2022, Vol. 1220, Nr. 1**

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