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# CAE Based Certification for Safety Regulations: Bus Rollover – A Case Study

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ABSTRACT

India has been moving very fast in implementation of various safety standards as per the safety roadmap developed for Automotive Industry. This has lead to considerable increase in the efforts not only in the development but also in the certification.

CAE based methodologies for structural analysis have improved considerably in last decade and are now very commonly used for development of vehicle structures. CAE based methodologies can be used very effectively for certification of products against safety standards requiring only structural performance. Use of CAE can very well address the issue of certifying a large number of product variants without the need for large number of costly physical tests. CAE can also be used for selection of the worst case variants.

CAE based certification is already allowed in some of the safety standards including ECE R66 (Strength of Superstructure). This methodology was successfully used for certification of buses against similar requirements of Indian Regulation (AIS-031). The CAE methodology was validated through physical testing as this was the first such instance. Additionally, correlation with limited component level physical validation was used to ensure high confidence in CAE results.

Based on the above experience, this paper proposes a generic methodology for certification using CAE including the worst case variant selection, test loadcase selection and the necessary component testing for CAE Model validation. This process was successfully used for certification of the Front Underrun Protection Device (FUPD) as per Indian Regulation (AIS-069). The paper then discusses various other safety standards for which CAE based certification is possible.