Title: Multi-disciplinary optimisation (MDO) Design of Front Bumper System

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Currently the bumper system is developed through a wide variety of individual virtual test methods, the majority of which also have to be verified with physical testing. This paper will describe a new process that produced a one combined virtual process to encompass the full bumper as a system development method by creating One model for a bumper as one system with multiple attributes and requirements and using only one code “LS_DYNA and LS-OPT”.
To facilitate this, improvements are required in both CAE prediction confidence and test method interactions for the following requirements: low speed impact, pedestrian leg impact, thermal stability, stone chipping, firmness feel and NVH. The benefit of this approach is to reduce bumper system cost and mass through integrated system design strategy, at early stages, considering all requirements together and have a potential to reduce reliance on physical testing.