

LEAD TIME REDUCTION - FAST AND EASY SETUP OF STRUCTURE LOAD CASES USING ANSA

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ABSTRACT

During the virtual development of a new car body structure, various load cases have to be simulated to evaluate the performance of the vehicle. For each change in the simulation model these load cases have to be set up and evaluated again, which causes a high lead time.

The aim of the presented project is to create script-based semi-automation tools within the ANSA environment that help the user to reduce this lead time. Additionally, the created programs should be fast to learn and reduce the number of potential errors compared to the conventional process.

The implementation was done for five typical load cases of the body-in-white (BIW) and the trailer hitch system. For each load case the script starts with a GUI where the user can specify the required inputs. These are, for example, the path of the ANSA model, the weight of the vehicle and load case specific data like the allowable maximum weight of a bicycle carrier. The user can save and load the input for a fast reuse. After the input is complete, the script supports the user during the creation of the corresponding load case. For this, the routines can support in cutting the FE-model, creation of forces and boundary conditions as well as the creation of NASTRAN headers for SOL101, SOL103 and SOL400. In addition, checks are performed on the final model and unnecessary entities are deleted automatically.

By implementing the described programs in ANSA, the lead time of approximately 2 hours per load case could be reduced to a maximum of 30 minutes. Due to the hardcoded formulas and calculations, the robustness against mistakes and oversights could be improved. A study showed that learning the use of the tools could be done through a help file because it is self-explanatory even for a less-experienced user.

Nevertheless, it should be avoided to provide the scripts to users without experience and understanding of the load cases as this could lead to fundamental errors in the results impossible to be caught by the scripts.