

Internship report

In the projects related with composite materials, the characterization material and the simulation of the tests for it are frequently requested. Since these experimental tests use standardized geometries and loading conditions, the generation of their related numerical models is possible to be automatized.

In this internship, a tool for the model generation of experimental coupon tests was implemented in MatLab. In this case, the tool can be designed for being able to generate models in different solvers by one same methodology. The tool implemented in this case was related to the characterization of the delamination between layers in carbon-reinforced composite materials. Models generated were meant to reproduce the tests in two different scenarios: Detailed models in ABAQUS to study the damage process and how the different parameters in the simulation affect at the damage zone and their effects over the general behaviour if the specimen. The other scenario of modelling was the simulation of the delamination tests in Pam-Crash, but accomplishing with the meshing requirements in the automotive industry.

The tools were developed simultaneously with a customer related project in which these kind of simulations were meant to be performed. This gave the opportunity to integrate the student in a productive team and in the schedule of the project. The undertaking of the student in the tool implementation allowed to use not only the models generated even the tool itself, by the engineers in the project. This increased the scope of the project to the phase of the first user-feedback interactions, allowing the improvement of the tool. A better understanding of the material and its adaptation to the automotive industry simulations was obtained. The automatic generation allowed the solution of a widely higher number of models and thus, a better service for the customer was provided.

The student showed a good attitude in the work, and a great capability of resolution in understanding how the numerical methods are applied in the automotive industry. A good integration in the project team is observed, specially useful in the user-feedback phase of the project, where the needs of the engineers to improve their work were understood.

In conclusion, the objectives of the project were broadly accomplished, and the student showed a good attitude in the development of the work, integration with the team and completely fulfilling with the expectations of the company.

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