Bachelor/ Master's Thesis

Establishing a simulation method for seat cover development

Lear, a global automotive technology leader in Seating and E-Systems, enables superior in-vehicle experiences for consumers around the world. Our diverse team of 165.000 talented employees in 39 countries is driven by a commitment to innovation, operational excellence, and sustainability. Lear is Making every drive better™ by providing the technology for safer, smarter, and more comfortable journeys.

The European Headquarter in Oberding-Schwaig (close to Munich Airport) with 650 employees is the competence center for automotive seat development in Europe. Besides the sales and engineering teams, our trim-shop is further located in Oberding developing the seat trim covers of the next car generations.

In trim development, the seat design surface, designated as STO-surface, is used as starting configuration. A special CAD-software is used to subdivide the trim in different patches. These patches are manufactured and sewed to a seat cover. This cover is assembled to the PU-foam of the seat. In an iterative process, the patches and foam-geometry are adapted to achieve the defined design-surface while no fold are allowed in the trim cover and the right amount of pre-tension must be applied. While many tasks in car seat development are intensively conducted using virtual simulation analysis, the trim-development has been maintained an overall manual process.

The aim of this thesis is to establish a method to simulation the trimming-process of a car seat. The required material data are to be identified and characterized in tests. The approach will be validated by conduction physical tests on a complete seat and comparing the results to simulation. The required experimental data are generated together with the trim engineering team.

Figure 1: Seat foam (left) and trim cover (middle) which are assembled to a car seat (right).

Research focus of the thesis

- Literature research
- Identification and characterization of material properties
- Software incorporation and setup of seat simulation model
- Conduct experiments on complete seat
- Comparison between simulation and experiments
- Documentation

Requirements

- Structured and independent way of working
- Basic knowledge and experience in virtual analysis
- Interest in experimental working

For more details, please contact Thorsten Hans (thans@lear.com, Comfort & Trim Simulation group leader) or Karin Zapp (kzapp@lear.com, HR local team)