One of the keys to Schlemmer Group’s success is the high quality of our products. We use ANSYS software to virtually test cable protection systems and reduce the number of expensive prototypes. The software contributes to our zero-defect goal and to meeting certification standards in a cost-effective manner.

Bodo Waterstraat  
Head of Engineering  
Schlemmer GmbH
Cable protection systems actively guard against temperature changes, mechanical compression and abrasion, chemical damage by fuel or oil, and electromagnetic interference. These protective hoses combine flexibility for simple installation and use in moving assemblies, with stiffness that guarantees protection against mechanical damage.

**Business Challenges**
Bending and crush tests help to determine stiffness and deformation behaviors of cable protection hoses. Bending tests evaluate the hose behavior under combined tension and bending, while crush tests provide the information to protect cables when the hose is under mechanical compression. Both tests require production of expensive prototypes. Simulation conducted early in the concept phase of a new product provides information valuable to reducing the number of prototypes. To simulate large deformations as well as material behavior and nonlinear contact of the hoses requires robust nonlinear capabilities.

**Technology Used**
ANSYS® Mechanical™

**Engineering Solution**
- Model and simulate bending and crush tests using ANSYS Mechanical software
- Define the hose as nonlinear elastic–plastic material
- Perform simulation with large deformation and nonlinear contact and compare results for alternate designs

**Benefits**
- ANSYS Mechanical allows simple and fast setup for contact definition and nonlinear simulation.
- Robust contact algorithms in the software deliver short solution time and require little user input.
- Because the behavior of hoses is very sensitive to material selection and testing conditions, simulation allows engineers to study various conditions to improve the final design and, therefore, reduce the number of expensive prototypes.
- Improving product robustness assists Schlemmer in maintaining its leadership and quality in cable protection systems.

**Company Description**
The Schlemmer Group develops, produces and sells its traditional portfolio of cable protection systems for automotive and industrial applications consisting of corrugated, smooth and protective tubes, manifolds and connector interfaces, plus customized cable ducts and cable conduits. Other business segments include connection systems with gland technology, mechatronics systems with probes and sensors, and air and fluid systems with conveying lines, line systems and reservoirs. In addition, turning parts play an important role in expanding the company’s business.

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