TURKU UNIVERSITY OF APPLIED SCIENCES
CREATING MANUFACTURING SYSTEM MODELS WITH SOLIDWORKS EDUCATION EDITION

Loading station (fully functional)
TUAS utilized SOLIDWORKS® Education Edition design software on the project. TUAS uses SOLIDWORKS in its curriculum, and the fact that Fastems also uses SOLIDWORKS made it the obvious choice. The team leveraged SOLIDWORKS Education Edition design software, including SOLIDWORKS Simulation analysis, SOLIDWORKS Enterprise PDM product data management (PDM), eDrawings® design communication, and PhotoView 360 photorealistic rendering solutions.

**OVERCOMING TECHNICAL CHALLENGES**

Producing a fully functional scale model of a Fastems FMS required the team to overcome numerous technical challenges involving validation, production, and communication. The project wasn’t as simple as just downscaling existing Fastems SOLIDWORKS models to one-tenth their size; it required students to remodel and produce the system’s many sheet metal and machined parts. Many of these parts were produced on 3D printers that were created as a result of previous student projects. Students also relied on PhotoView 360 photorealistic rendering and eDrawings design communication tools to facilitate interaction between project management, engineering, and manufacturing teams.

“Fastems’ models were used only as the basis for the students’ design work,” Liikkanen points out. “The visible parts of course had to look exactly like the original system, but the technical inside of the model is very different from the original. The big challenge was not just modeling but developing techniques to make internal systems—for instance, the mechanical elevator and forklift—work properly at such a small scale.”

**Challenge:**
Collaborate with local companies, such as Fastems Oy Ab, to provide students with real-world experience in the development of small-scale yet fully functional flexible manufacturing systems for use at trade fairs and international exhibitions worldwide.

**Solution:**
Implement SOLIDWORKS Education Edition design software, including SOLIDWORKS Simulation analysis, SOLIDWORKS Enterprise PDM product data management, eDrawings design communication, and PhotoView 360 photorealistic rendering solutions.

**Benefits:**
- Produced first functional scale model of FMS
- Gave students practical application experience
- Received critical input for optimizing educational programs
- Facilitated employment and placement efforts

“Fastems prototype project has been challenging, and there have been numerous changes during design. SOLIDWORKS has helped our project be on time. There have been over 20 students working with the project and file-sharing has been easy with EPDM. We also got amazing material for customers with PhotoView.”

— Jussi Liikkanen, Research Leader
SIMULATION ENSURES STRENGTH
To ensure system performance, the TUAS team used SOLIDWORKS Simulation tools to conduct structural and motion analysis studies. The studies helped to optimize the strength of structural components as well as to accurately simulate the motion of the system’s moving parts.

“The reason we have been using simulation this intensively was partly because the structures of the scale model are so small,” Liikkanen stresses. “We needed to know if they were solid enough. Furthermore, we needed to analyze the motion of the moving parts to understand their effect on system performance.”

MANAGING STUDENT CONTRIBUTIONS WITH EPDM
The TUAS Future Product Processes research group relied on SOLIDWORKS Enterprise PDM (EPDM) software as the organizational backbone for the project. The students were divided into project management, development, and production teams, with the Development Team leveraging SOLIDWORKS tools for mechanical design, simulation, and visualization. “The Development Team used EPDM as its common collaboration tool for accessing project information and communication,” Liikkanen notes. “The system ensured that they always had easy access to the data they needed and that the information was always up-to-date.”

The students are now developing additional FMS models for Fastems. “Development and production of the new models are much easier because we now have all the SOLIDWORKS models from the first project stored in EPDM and can reuse them, which saves time,” Liikkanen says.