Delft University of Technology (TU Delft) has grown from its founding in 1842 as the Dutch Royal Academy to become the highest-ranked technical university in the Netherlands and one of the top technology institutions in Europe.

With over 16,000 undergraduate students, many of whom participate in the university’s industrial design and mechanical engineering programs, TU Delft is committed to pursuing technological research and innovation. By challenging students to transform a fascination with technology into the development of unique solutions to everyday problems, TU Delft believes it will help inspire and prepare the designers and engineers of tomorrow.

Achieving that goal requires an emphasis on design projects in addition to theoretical class work, according to Anton van Beek, professor of mechanical engineering in TU Delft’s Department of Precision and Microsystems Engineering. “Design education in mechanical engineering focuses on system design,” van Beek explains. “We want our students to work closely together as part of multidisciplinary design teams—as they would in industry—on real design projects. Providing them with effective design, prototyping, and communication tools is vital to facilitating teamwork and making the educational experience successful.”

TU Delft had used a different 3D CAD/CAE package until the 2009–2010 academic year, when the university replaced it with SolidWorks® Education Edition design and SolidWorks Simulation analysis software. “We switched to SolidWorks because of the staff effort required to support our students in learning how to use the previous CAD package,” van Beek recalls. “We also discovered that most of our graduate students, who had learned the former CAD system during their undergraduate study, chose SolidWorks software when given the choice in pursuit of their master’s degrees. They found SolidWorks to be easier to use and more efficient, and in this case, we learned from them.”

**Challenge:**
Utilize a 3D mechanical design package that provides more time for student design projects, produces students who are better prepared for engineering careers, and reduces the effort required to support it.

**Solution:**
Implement SolidWorks Education Edition design software along with SolidWorks Simulation design analysis tools.

**Results:**
- Cut student time-to-CAD proficiency by 50 percent
- Reduced lecturers required from five to one
- Improved quality of student design projects
- Certified students in CAD and SolidWorks Simulation
The university implemented 6,000 SolidWorks Education Edition licenses in the Industrial Design and Mechanical Engineering departments to reduce student-training time, decrease the level of staff support required, and increase the time that students spend on design projects.

**Becoming proficient in half the time**

Since implementing SolidWorks software, TU Delft has realized dramatic improvements in the time it takes students to become productive with the software. “Because of the short learning curve with SolidWorks compared to our previous modeling software, there is now more time for students to get practical experience in the design process,” van Beek says.

“With SolidWorks, we have seen the time that it takes for students to become proficient with CAD cut in half. They are also able to leave the software for a period of time, then come back to it and pick it up immediately,” van Beek adds. “The result is that students are more actively designing and coming up with more thought-out and innovative designs.”

The usability improvements provided by SolidWorks software have allowed TU Delft to reduce the number of lecturers required to teach CAD from five to one. “Some of our lecturers were retiring, and we noted that many of our students were able to use SolidWorks on their own,” van Beek points out. “Now, we have only one lecturer, who is supported by five student assistants. This is less costly and also provides the student assistants with valuable experience.”

**Integrating simulation early**

TU Delft is also taking advantage of integrated SolidWorks Simulation tools to introduce students to analysis concepts sooner than in the past. “The moment that we switched to SolidWorks, we began exploring the possibilities for integrating SolidWorks Simulation in the curriculum.” Van Beek says. “We successfully introduced Simulation during first-year courses at the same time that we introduced SolidWorks.

“When students have the opportunity to compare the analytically derived stresses and strains with results obtained using SolidWorks Simulation, they learn more autonomously,” van Beek notes. “The certification programs offered by SolidWorks for design and simulation are also a great advantage in helping students build their curriculum vitae for entry into the real engineering world.”

**From robot waiters to air-powered scooters**

SolidWorks software supports TU Delft design competitions, which are popular with students and motivate them to apply and understand engineering concepts. These competitions include developing a robotic waiter that can transport and serve drinks (www.robokelner.nl), and scooters that are entirely powered by compressed air (www.airped.nl).

“Our students are really enthusiastic about design competitions,” van Beek says. “With SolidWorks design and simulation tools, they can focus on mechanical engineering instead of getting bogged down in CAD and can see how their work applies in the real world.”

As a result of using SolidWorks design and simulation tools, TU Delft students gain more experience with actual engineering projects and spend less time with learning the CAD system, which makes them better prepared to become designers and engineers.