TEKNION CORPORATION

Sustaining office furniture design into the 21st century with SolidWorks solutions

As a leading international designer and manufacturer of mid- to high-end office systems and related furniture products, Teknion Corporation knows what change is all about. Today's business settings are dramatically different from those of years past, and the offices of the future constitute a continually evolving landscape. By understanding current trends and anticipating future needs, Teknion has made change a key part of the company's global culture of innovation and growing record of success.

Focusing on the innate possibilities of change in office systems design drives Teknion's product design goals. Achieving its objective to develop products that consistently satisfy and exceed changing market demands, however, requires flexibility, agility, and creativity in product development. According to Product Engineering Manager Claudio Perfetti, that's why Teknion upgraded its AutoCAD® 2D design tools to a 3D development platform in 2001.

"Working in 2D limited our productivity, quality, and innovation," Perfetti recalls. "We needed to handle an increasing volume of configurations—modeling a huge range of options, heights, and widths—while improving accuracy and streamlining manufacturing. Improved design visualization was also a requirement for creating new, cutting-edge concepts. To more efficiently develop furniture systems that are visually and functionally unique, we simply had to take advantage of a 3D design environment."

In evaluating 3D design systems, Teknion wanted more than just a spot solution. "We considered all of the standard characteristics, such as ease of use, design configuration capabilities, and enhanced visualization tools," Perfetti stresses. "But we also wanted a system that would support our efforts for many years to come and invest in a partner that could provide innovations in 3D design tools to sustain the changing nature of our work. We found such a partner in SolidWorks."

Teknion relies on SolidWorks design, product data management, and sustainability solutions to develop office systems furniture products that consistently satisfy and exceed changing market needs.

Challenge:

Develop office systems furniture products on a global scale with an eye toward expanding product lines, supporting sustainability goals, and driving sales initiatives over the long term.

Solution:

Implement SolidWorks Professional design, SolidWorks Enterprise PDM product data management, and SolidWorks Sustainability environmental assessment software.

Results:

- Quadrupled number of product lines
- Reduced development time by 50 percent
- Cut prototyping requirements in half
- Supported sales, collaboration, and sustainable design initiatives

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After evaluating the Pro/ENGINEER®, Solid Edge®, and SolidWorks® CAD packages, Teknion standardized on SolidWorks Professional design software, acquiring 105 licenses to drive its global design efforts. The furniture manufacturer added 50 licenses of the SolidWorks Enterprise PDM product data management system to manage product design data across its geographically dispersed design locations. Most recently, the company began using SolidWorks Sustainability software to include environmental impact factors in its design decisions.

"When we chose SolidWorks, we hoped that the technology would progress in parallel with our product development efforts," Perfetti notes. "Now, it's extremely gratifying to not only see how prevalent SolidWorks has become with other companies we deal with, but also to benefit from the powerful solutions that SolidWorks has introduced."

An ever-expanding product line

Since implementing SolidWorks solutions, Teknion has increased its productivity and quadrupled the number of North American product lines that it offers—from six to 24. The furniture manufacturer has also introduced a number of innovations in office furniture systems design. "SolidWorks has helped us expand our product offering because it enables us to design more quickly, cost-effectively, and innovatively," Perfetti says.

"For example, we are able to use SolidWorks to model all of the configurations that we sell—whether they be in one-inch or six-inch increments—from the initial base design," Perfetti adds. "We can create concepts more quickly and develop more complex geometries, especially for cast and molded components. In addition, we can tackle custom design projects, for customers who want their own unique office systems, more efficiently, without disrupting our standard development work."

Less dependent on prototypes

Before moving to SolidWorks software, Teknion often built prototypes and mockups of furniture designs as a way to avoid the manufacturing retrofits and rework that are so common when working in 2D. Using SolidWorks design visualization, interference-checking, and photorealistic rendering tools, the furniture manufacturer is far less dependent on physical prototyping because designers can visualize, evaluate, and interrogate designs in a virtual prototyping environment.

"With SolidWorks, the trial and error takes place on the computer screen instead of through prototyping or on the manufacturing floor," Perfetti points out. "We still produce prototypes for customer demonstrations or to assess aesthetics. However, using SolidWorks we have cut the number of prototypes that we produce in half."
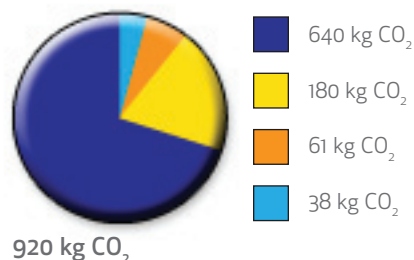
Speeding Marketplace™ to market

Teknion has relied on SolidWorks to drive special "skunkworks" development projects. One such project involved the development of Marketplace, a reinvention of the worktable. Designed by Carl Gustav Magnusson, a world-renowned industrial designer, Marketplace is an open workspace that fosters creativity and collaboration in team-based office environments.
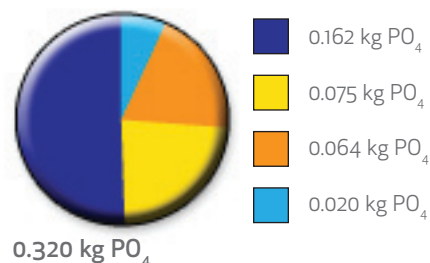
"I was assigned to work on the detailed engineering related to Marketplace in a very compressed timeline," Perfetti explains. "With the aid of SolidWorks, we developed Marketplace in half the time that we would normally allocate to develop a new product."

Environmental Impact
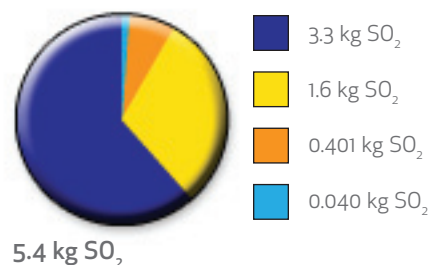
Carbon Footprint

- 640 kg CO_2
- 180 kg CO_2
- 61 kg CO_2
- 38 kg CO_2

920 kg CO_2

Water Eutrophication

- 0.162 kg PO_4
- 0.075 kg PO_4
- 0.064 kg PO_4
- 0.020 kg PO_4

0.320 kg PO_4

Air Acidification

- 3.3 kg SO_2
- 1.6 kg SO_2
- 0.401 kg SO_2
- 0.040 kg SO_2

5.4 kg SO_2

Total Energy Consumed

- 8200 MJ
- 2000 MJ
- 850 MJ
- 41 MJ

1.1E + 4 MJ

- Material
- Manufacturing
- Use
- End of Life
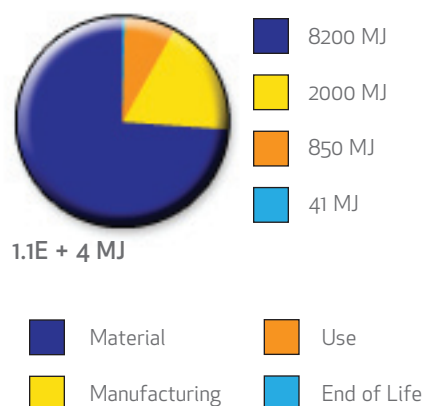
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On products like Marketplace, a modern reinvention of the worktable, Teknion uses SolidWorks design and product data management software to deliver products to market twice as fast.

Managing data globally

As Teknion's product development effort grew, so did its product data management challenges. The furniture manufacturer eventually exceeded the capabilities of SolidWorks Workgroup PDM software and upgraded to the SolidWorks Enterprise PDM system, which Teknion uses to connect several facilities in Toronto where its corporate headquarters is located. "With several engineering teams and manufacturing divisions at different sites working concurrently, we have a real need to control revisions and keep design data locked down and secure," Perfetti notes.

"Our vault currently contains 150,000 files," he continues. "Although furniture designs can differ widely among the design and engineering groups, it's important to have everyone on the same platform, both for quality control and for collaborative work on special projects."

Launching a sustainability program

Over the past decade, sustainability has become an increasingly integral part of Teknion's operations. According to Director of Sustainable Development Programs Doug Hietkamp, Teknion began looking into sustainable design and manufacturing processes as early as 1998.

"Some work was done on sustainability from 1998 to 2001 as part of ISO 14001 certification," Hietkamp says. "Back then, sustainability was viewed more as something we should do rather than as a critical imperative. In 2002, some customers started looking more closely at our environmental programs. That's when we embraced the concept as an organization and decided to implement sustainable programs throughout the organization."

Teknion's sustainability program initially focused on manufacturing impacts. Through recycling and reuse, Teknion doubled the amount of materials it diverted from disposal, from 45 to 90 percent, and reduced the amount of waste sent to landfill by 80 percent. "The economic value of reducing manufacturing waste is significant," Hietkamp stresses. "It costs money when you produce garbage. Once we cleaned up our internal operations, we looked outwardly at the products that we make and their environmental impacts."

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The company became one of the first major manufacturers to have its products become GREENGUARD-certified by UL AQS (Underwriters Laboratories Air Quality Sciences), meeting stringent standards for off-gassing, which involves the emission of formaldehyde and VOCs (volatile organic compounds), more commonly known as the "new-car smell." Teknion also switched from oil- to water-based stains and finishes, and updated its tooling accordingly.

"The next step in the progression is sustainable design," Hietkamp says. "That's where SolidWorks Sustainability software comes in."

Taking advantage of sustainable design

Teknion added SolidWorks Sustainability software to its SolidWorks solution set so its designers have access to environmental impact information, which they can use to guide design decisions. The software allows Teknion designers to estimate the carbon burden, energy consumption, air emissions, and liquid discharges associated with a specific design. They can then use this information to consider which design alternatives are more environmentally sustainable.

"Sustainable design is not always about selecting the 'greenest' option, but rather using environmental assessment information to make choices and evaluate trade-offs," Perfetti says. "It's about comparing the use of stained wood versus laminated surfaces; evaluating the impacts of particle board, steel, or aluminum; or understanding the effects of varying footprints for different products.

"Just as 3D enhances design visualization, SolidWorks Sustainability provides greater insights into a design," he adds. "Teknion is committed to sustainability, so we are using this tool to both evaluate designs and to support sales activities."
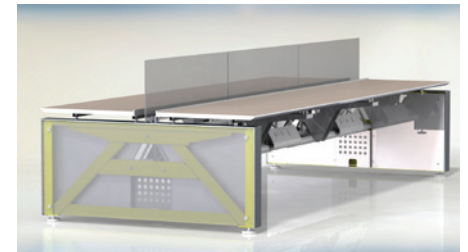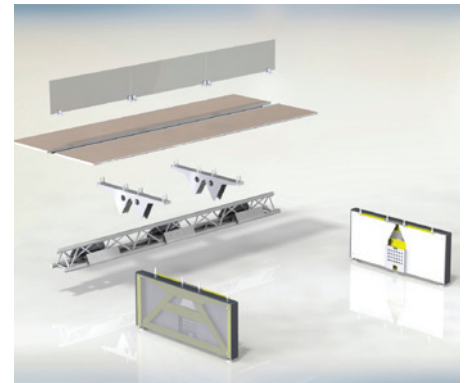
With SolidWorks Sustainability software, Teknion can provide customers with apples-to-apples comparisons regarding material choices, so they can consider environmental impact factors when selecting materials for various furniture components. The ability to provide these insights up front as part of the sales process gives Teknion a competitive advantage.

"We're able to rapidly design custom furniture solutions, use the PhotoView 360 rendering tool to generate photorealistic images, and provide environmental impact information to our sales team to help them win the order," Perfetti says. "In one instance, we were able to show a customer who wanted to know the environmental implications of using either glass or acrylic for a privacy screen that there wasn't much difference from an environmental standpoint, so they could base their decision on other considerations.

"With SolidWorks solutions, we have progressed from designing products more efficiently to managing global design data more effectively to considering the environmental ramifications of our products," Perfetti adds. "It's clear that we chose the right partner to support our long-term product development goals."

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Claudio Perfetti
Product Engineering Manager

Just as SolidWorks 3D design and rendering tools enhance design visualization, SolidWorks Sustainability software helps Teknion lessen the environmental impacts of its products.

Teknion

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