SIEMENS

NX

Siemens Infrastructure Logistics

A better way to design harnesses and route cables

Industry

Industrial machinery

Business challenges

Developing complex, custom machines

Need to control development costs

Keys to success

Electrical routing tools integrated with mechanical design software

Concurrent cable and mechanical design

Virtual design reviews

Cable design re-used in technical publications

Results

Accurate wire lengths

22 percent less rework

Fewer physical prototypes

Optimized designs

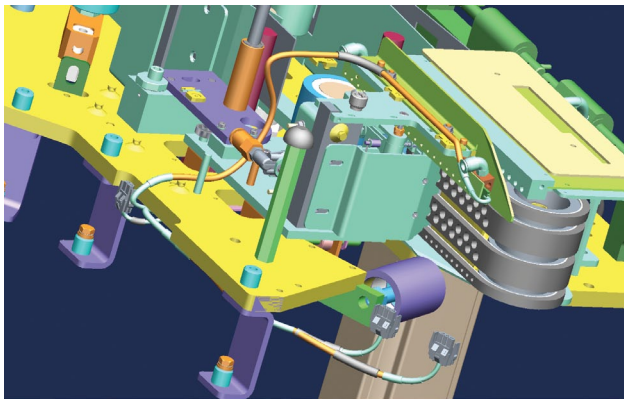
Using NX routing functionality allows for earlier cable and harness design along with an improved level of collaboration between mechanical and electrical engineers

Automation for the post office

The Infrastructure Logistics division of Siemens AG is a leading supplier of postal service automation solutions. From high-speed, automated mail sorters to international mail networks, the division's turnkey postal processing centers excel at getting any type of mail from sender to recipient quickly, reliably and economically. The Infrastructure Logistics office in Texas builds mail sorting equipment for the United States Postal Service.

Mail sorting machines are large, complex and very fast-moving, incorporating functionality for material flow, optical character recognition, printing bar codes and so on. Typically they are custom-built. One of the challenges with these machines is keeping development costs under control, and one of the main ways this is done is by making design and manufacturing as efficient as possible.

As part of this effort, the 80 mechanical engineers in the Texas facility have used NX™ software from Siemens PLM Software since 1999 (when the software was called Unigraphics). Until recently, however, electrical engineers used a different program, 2D AutoCAD® software, for cable

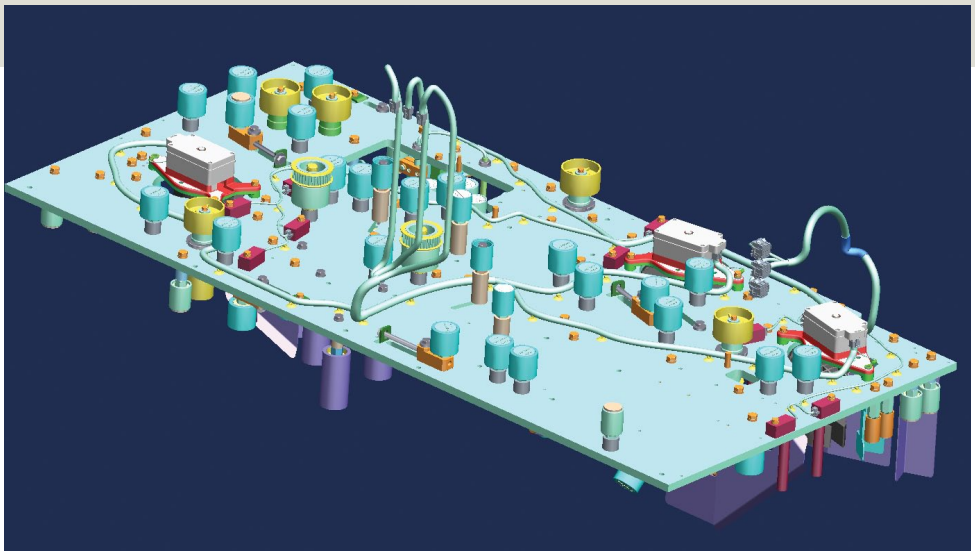


and harness design. Having independent systems meant that there was no automated integration between the electrical and mechanical design efforts. It also meant that the two tasks could not be fully implemented in parallel; electrical engineers had to do the physical portion of the harness design after a prototype of the machine had been built.

"The logical aspects of cable and harness could be executed, based on general assumptions and past experience, but finalization of the physical aspects had to wait until there was a prototype in the lab," explains Daniel Gaigalas, senior business system analyst – IT for Infrastructure Logistics. "Because harness design finalization happened late in the process, there was a lot of pressure to get it done and not much time to do it. This could result in late changes, which often meant getting vendors to make last-minute changes as well."

"With NX, engineers now move directly to pre-production design, eliminating the time and effort of built-by-hand prototypes."

Daniel Gaigalas
Senior Business System Analyst
IT Infrastructure Logistics Division
Siemens AG



Electrical-mechanical collaboration

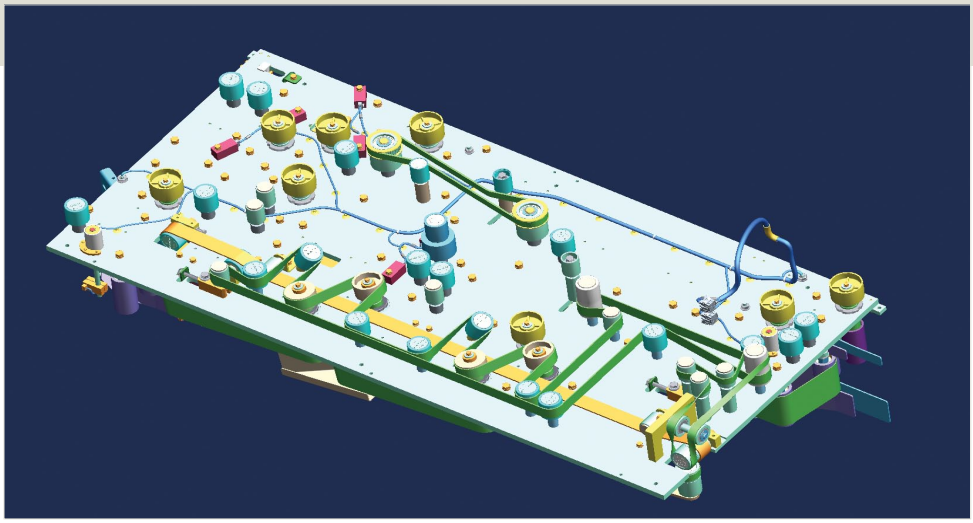
After attending conferences and hearing how other companies were using the electrical routing functionality of NX to streamline this aspect of equipment design, Infrastructure Logistics decided to implement the technology for its cable design process. A Siemens PLM Software consultant came for three days to provide training and help with set-up.

The new process begins with an electrical engineer entering component information, logical connection data and conductor color/numbering information into an Excel® spreadsheet that is used as the data input source for NX. A mechanical engineer supervises the NX wiring drawing expert who routes the cables/harnesses. Any mechanical rework to components causes rerouting of module harnesses with new lengths. This is accomplished easily because the data is in the form of parametric models. Therefore the data updates automatically. After rerouting by the NX wiring drawing expert, NX is used to automatically generate new wire lengths for updating bills of materials (BOMs). This simplifies the harness release process.

From the start, cable designers found they could use NX to attain accurate cable lengths. "On that first project, we used the electrical routing functionality simply to run the center lines of the cables and get their lengths," Gaigalas recalls. "One guy thought that all the lengths were all too short by 15 millimeters so he added that amount to each cable. When he put them on the machine, they were all 15 millimeters too long. So engineers began to trust the technology."

Accurate wire lengths go a long way toward avoiding rework in the shop. Another important benefit of using NX electrical routing is that, with electrical and mechanical engineers using the same software, cable and harness design can be done concurrently with mechanical design. "In the past, we fully integrated each other's designs until the prototype was available," Gaigalas says. "Now we collaborate earlier in the process, when it's easier to make changes."

Integrating the logical design with the physical is now possible much earlier in the development process. This early collaboration enables a level of design optimization that wasn't possible in the past. "When mechanical engineers go through a design review they also see the cables, so it's easier for them to move things around or add components. Their changes automatically update the wire length data for associated cables," Gaigalas says. "As a result, there are more possibilities to iterate a design in order to get the best solution." Because electrical engineers are no longer trying to do their work as quickly as possible at the end of



Solutions/Services

NX
www.siemens.com/nx

Teamcenter
www.siemens.com/teamcenter

Customer's primary business

Siemens Infrastructure Logistics supplies solutions for postal automation and airport logistics.
www.siemens.com/distribution-logistics

Customer location

Arlington, Texas
United States

the design process, they also have more time to try different cable layouts for optimization of the design.

Downstream advantages

Infrastructure Logistics also uses Teamcenter® software from Siemens PLM Software. In addition to mechanical computer-aided design (CAD) data, the Teamcenter database includes the electrical connectors and wires used in cable design. Having this information in Teamcenter permits fast searches, which serves as another way of streamlining the development of the sorting machines.

Since adding the NX electrical routing functionality, Infrastructure Logistics has reduced its need for physical prototypes. "In the past, we would build a set of harnesses by hand to prove the design," Gaigalas explains. "They would then remove them and give them to drafters to document while building another set for the machine. With NX, engineers now move directly to a documented pre-production design; documents are then used by suppliers to create the prototype items. The benefit in this area is two-fold: it permits proving the documentation and eliminates the need for the second set of prototype harnesses."

Using NX routing functionality also provides the potential to save time and money in the preparation of technical publications. In the past, the people who produced the documentation imported NX assembly models into AutoCAD, where they would draw the cables by hand, working from photos or sketches of the actual machine. Now that NX assembly models also include cables, this tedious process can be eliminated.

The move to an integrated process enabled by the use of NX and Teamcenter was "a very positive change," according to Gaigalas. "With increased collaboration around the virtual design and minimizing effort left to the last minute, we have a more efficient process – with fewer problems and fewer prototypes – that results in accurate, interference-free assemblies," Gaigalas concludes.

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