Wire harness lifecycle management

Integrated design and management of electrical wire harness and cabling

Benefits

- Accelerate development schedules through an integrated logical/physical design flow
- Increase quality through systems engineering and requirements management
- Decrease design cost though wire harness design re-use
- Improve reliability using an integrated design and verification flow across domains
- Lower manufacturing costs by managing cross-domain data
- Enable cross-domain collaboration using NX software's wire harness visualization

Business challenges

- Interoperability across multiple tools that generate the product's logical, physical and BOM data
- Multi-disciplinary process requiring teams to communicate across disciplines
- Difficulty in determining precise routing and length of cable
- Data consistency required across multiple tool and design disciplines

Summary

Teamcenter® software provides an integrated solution for designing and manufacturing electrical wire harnesses and interconnect cabling. Wire harness design requires inputs from multiple domains as part of its multi-disciplinary development process. Design teams can use the Teamcenter environment to create, manage and configure all of the development process' logical, physical and BOM data. By leveraging Teamcenter as the single source of product and process knowledge and integrating both internally developed and third party tools, companies can accelerate their time-to-market and reduce development cost.

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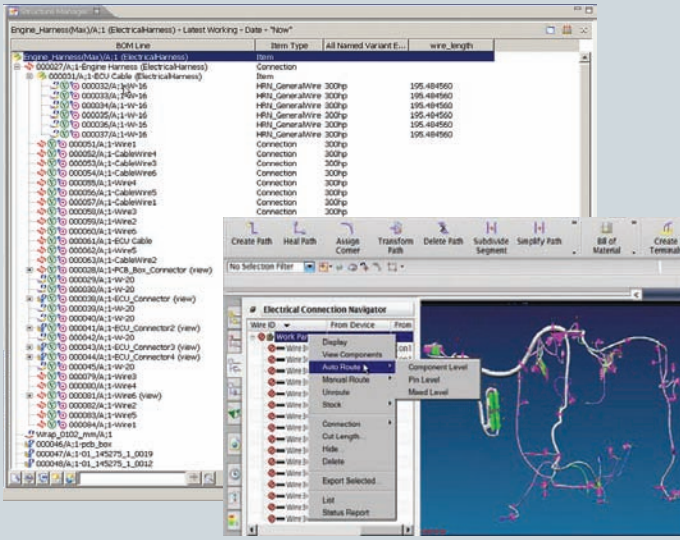

Teamcenter provides a comprehensive wire harness lifecycle management solution that extends from initial inception through creation, analysis, manufacturing, service and end-of-life disposition. The solution enables electrical and mechanical design teams to collaborate on wire harness designs and create complete and accurate digital mockups that contain both mechanical and electrical components. These digital prototypes eliminate the need for expensive physical prototypes.

The integrated wire harness lifecycle management solution leverages the Teamcenter robust requirements management, workflow management, configuration management, change control and manufacturing management functionalities, enabling design teams to accelerate time-to-market and reduce development cost.

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Business challenges *continued*

- Inability to coordinate and manage workflow and change processes
- Clear understanding of the requirements and system environment required by design teams
- Difficulty in re-using existing designs and components across

Features

- Seamless integration of logical and physical design processes
- Route generation, wire length determination and design rule validation using NX
- Cross-domain collaboration and visualization
- Secure, single source of product and process knowledge
- Systems engineering and requirements management
- Workflow and change management
- Wire harness design and component re-use
- Accurate configuration and BOM management
- Automated formboard documentation generation in NX
- Ability to define and configure multiple options and variants from a single wire harness design

Today's business challenges

Many everyday products require some type of physical connection between their internal components or to connect one piece of electronic hardware to another device. Maintaining development schedules, costs, quality and product reliability targets while developing this interconnect requires manufacturers to manage a wire harness lifecycle that is integrated with the electronic and mechanical stages of the design process.

Using an integrated environment to accelerate development

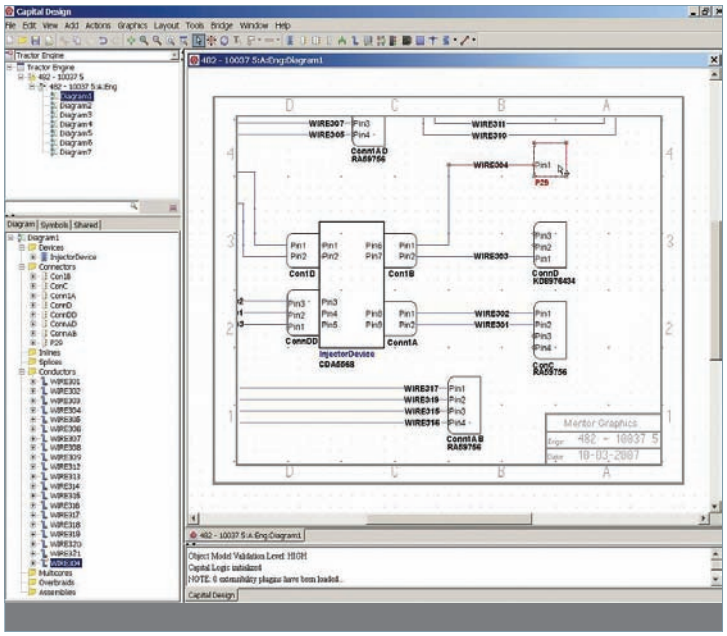
To facilitate logical design, the Teamcenter solution is integrated with key third-party solutions, including CIM-Team E3 Series and Mentor Graphics' Capital Harness (CHS). This flexibility allows manufacturers to tailor the solution to their own electrical design processes and tools.

To ensure best-in-class support for the physical design process, Teamcenter can integrate with a variety of third-party mechanical CAD systems, as well as with Siemens PLM Software's NX™ design system (NX Electrical Routing). NX eliminates the need to build a physical prototype and reduces product development time by allowing designers to perform interface checks, validate design rules, visualize the routing pattern in 3D and trace the location of specific wires and connections.

Using a mechatronics data model based on various aspects of the STEP and KBL standards, Teamcenter transfers, stores and manages all of the logical, physical and BOM data a single secure location. In addition to managing the data, Teamcenter enables design teams to define wire harnesses consisting of multiple configuration options and variants from a single wire harness design. This robust data management capability enables design teams to improve design efficiency, increase re-use and reduce scrap.

Increasing productivity by leveraging a single knowledge source

Design teams leverage Teamcenter to gain timely access to logical design data, such as connector pin-outs, signals and ports, as well as electrical metadata (such as voltage). As the physical design process progresses, other data – such as routing topology, wire length, harness diameter and connectors – is added. To ensure that the correct pieces of data are available to manufacturing, Teamcenter stores all wire lengths and attributes, connectors, plugs and other BOM entities and makes this information available for easy extraction.



Using workflow and change management to reduce rework
Teamcenter enables design teams to establish effective workflows and change processes that maximize design productivity and minimize the time needed to create a fully verified wire harness design. In the Teamcenter environment, design teams are able to easily identify what aspects of the wire harness have changed, determine where changes will be incorporated and quickly assess what other parts of the wire harness will be affected.

Decreasing costs through design re-use
The Teamcenter robust data management capabilities and enhanced wire harness design support enables design teams to store, catalog and re-use existing wire harnesses, components and processes. Users can quickly identify a wire harness candidate in Teamcenter, modify it to meet the new connectivity requirements and accurately validate it against the design rules. This approach accelerates the design process and lowers manufacturing cost.

Using systems engineering and requirements management to improve quality
The Teamcenter wire harness lifecycle management solution enables design teams to reduce rework and maintain development schedules by employing a systems engineering methodology. By using Teamcenter to facilitate this approach, design teams can decompose the product into a number of functionally partitioned systems, which are easily understood, effectively managed and correctly implemented.

Early in the design process, design teams must account for issues such as electro-magnetic interference (EMI), voltage drop, temperature, enclosure constraints, wire bend allowance and flexing, as well as other harsh environment- or use-related issues. Design teams can leverage the Teamcenter requirements management capabilities to trace their implementation decisions to documented product requirements, thereby increasing overall product quality and reliability.

Contact
Siemens Industry Software
Americas +1 800 498 5351
Europe +44 (0) 1276 702000
Asia-Pacific +852 2230 3333

www.siemens.com/teamcenter

X5 13815 8/11 B