NX I-deas Harness Design

Capabilities for modeling wire harnesses and cables

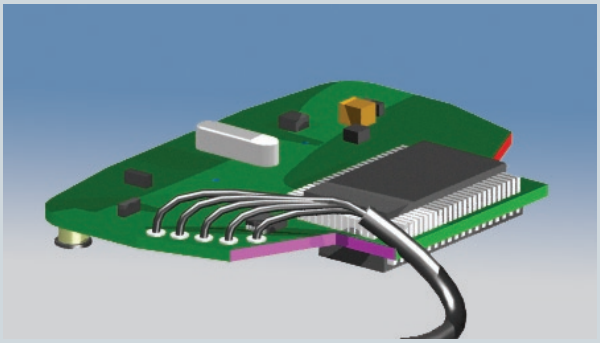
Benefits
- Freeform flexible path shapes are easily routed through complex physical environments
- Extended wirelists enable synchronization with ECAD content

Features
- Harness path shapes can be unique in each configuration while path lengths are consistent across configurations
- Wirelists can be used to define bundle diameters or user-defined bundle diameters can be entered
- Sub-Harnesses allow for easy creation and modification of options and variants
- Harnesses can be flatted for quick and easy formboard creation

Summary
NX™ I-deas™ Harness Design software enables the modeling of path-based entities such as cables, tubes and flexible hoses with enhanced functionality specific to the design, routing and documentation of wire harnesses and cables. Its use within NX I-deas allows you to conduct harness design at the system level in the assembly modeling environment without needing to wait for physical prototypes.

Process
To create a harness, you would:
- Create the context assembly in NX I-deas
- Create or use an existing connector catalog
- Read a wirelist (optional) into a harness component of the assembly
- Match the connector and splice IDs in the wirelist to parts in the assembly
- Create bundle paths
- Assign wires to the paths
- Add dressings (e.g., tape, bindings, braiding, shrink tube, etc.) for bundle protection
- Display solids of the bundles and dressings
- Dynamically manipulate bundle paths to check and route around interferences
- Unfold harness to 2D or 3D formboard
- Create manufacturing documentation
- Associatively update the above based on wirelist or assembly changes

Productivity tools
Harness Design focuses on the routing and change management aspects of harness design with a unique technical approach that increases productivity of the tasks listed here.



Harness Design allows you to design harnesses at the system level in the assembly modeling environment.

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Routing

- Harness Design incorporates a bundle path concept so that the user routes the bundle path instead of individual wires or cables in the bundle. If a wirelist is used, the wires are automatically assigned to the bundle path and the bundle diameter is computed and displayed by the system. If the connectivity is changed such that new wires are introduced and old wires are not required, the update to the paths is automatic. This is in contrast to traditional systems that require modeling and assignment of individual wires even where the routing along existing bundle paths should be obvious.
- If a wirelist is not used, you can still model harness geometry using user-defined bundle diameters.
- Variational shape design technology is available for smooth creation and manipulation of bundle/cable orientation (or placement) between connectors. For example:
  - Two connectors in 3D space can be joined with a straight line and then tangency constraints placed on the entry vector into each connector. The line changes to a curve which can be automatically smoothed and whose length can be easily controlled.
  - 3D wire bundles can be oriented in real-time (in the context of your 3D assembly) using simple mouse movements to "drag" them to a new location.
  - Pass-through points can be assigned to curves even after the curve has been created to correspond to bundle fastener location.

Change management

Two types of changes are anticipated in Harness Design:

- Change to the electrical connectivity (i.e., a new wirelist)
- Change to the mechanical assembly

A harness design update based on changes to the electrical connectivity does the following:

- Routes any new wires using existing bundle paths where possible
- Updates bundle diameters, including associated wound and braided dressings
- Maintains connector assignments when these are correct in the new list
- Identifies unassigned connectors and wires
- Reports any changes in wire lengths back to the electrical design system
- Checks any conflicts based on separation codes, min/max wire lengths and bend radii

If the mechanical assembly changes, Harness Design provides the following mechanisms to update the wire harness:

- Bundle paths can be associatively linked with the assembly instances. Thus, if an assembly instance moves, the bundle path can move with it
- Multiple configurations of a harness ("as-designed," "in-service," "for manufacture," etc.) are linked by the length constraints on the bundle paths. All configurations can be updated for a change in length

Prerequisite

Core Master Modeler or Product Design package or Artisan package

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