

## Modeling Cables and Wire Harnesses

I-DEAS® contains general functionality for the modeling of path-based entities such as cables, tubes, and flexible hoses. I-DEAS Harness Design™ software is a specialization of that capability for design, routing, and documentation of cables and wire harnesses. Its use within I-DEAS software 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 I-DEAS.
- Create or use an existing connector catalog.
- Read a wirelist (optional) into a harness component of the assembly.
- Match the connectors and splices 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 (check and avoid interference, etc.).
- Unfold harness to 2D or 3D formboard.
- Create manufacturing documentation.
- Associatively update the above based on wirelist or assembly changes.

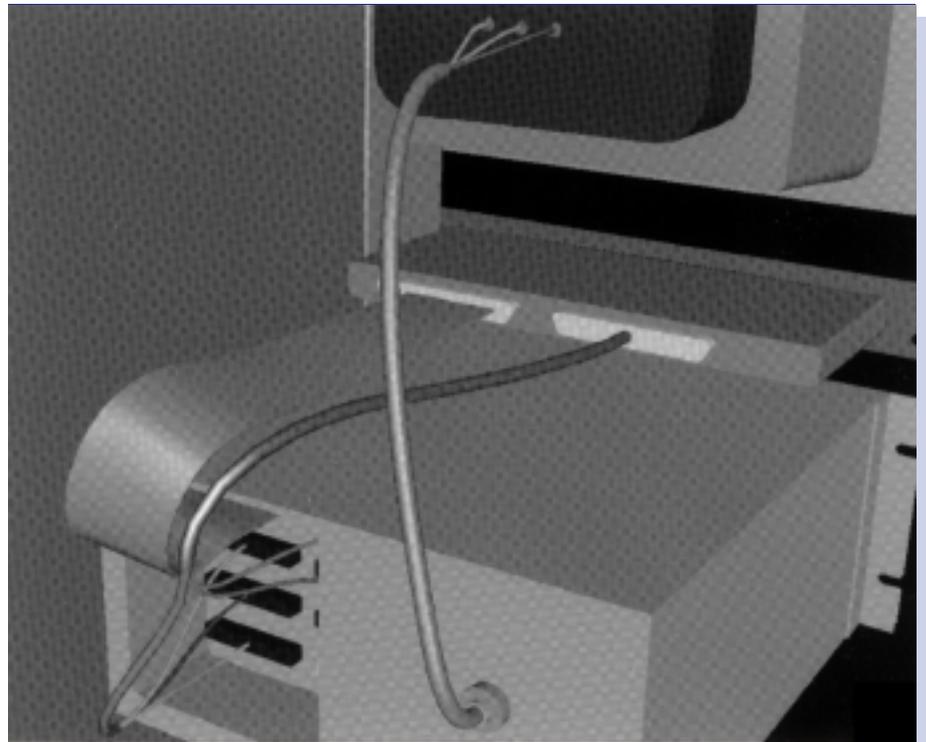
### Productivity Tools

I-DEAS 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.

### Routing

I-DEAS 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 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.
- Unique variational shape design technology is available for easy, 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.



*I-DEAS Harness Design software allows you to conduct harness design at the system level in the assembly modeling environment.*

- 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 I-DEAS Harness Design software:

- 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 path 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, I-DEAS 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.

### Dynamic Integration

I-DEAS software provides a unique capability to view compliant electrical schematics (e.g., LCable from Mentor Graphics), and perform cross-highlighting between electrical entities and their mechanical counterparts in I-DEAS. This “source view” capability significantly improves your ability to resolve correspondence between electrical and mechanical databases and reduces data duplication overall.

### Features and Functions

I-DEAS Harness Design is built on the Core Master Modeler software which lends it the following general capabilities:

- Solids-based
- Real-time shaded image displays
- Team environment
- Variational interaction
- Assembly relations and associativity
- Mechanisms and configurations support
- Part catalogs
- Mass property calculations
- Interference checking

Functionality built on the I-DEAS foundation for path-based design includes:

- Connectivity list input and updates
- Connectivity checking
- Connector catalog definition
- Quick-solids display and dynamic modification
- Channel routing
- Length computation and reporting

### Prerequisite

Core Master Modeler  
-or-  
I-DEAS Product Design Package  
-or-  
I-DEAS Artisan™ Package

### For More Information

For more information, contact your local SDRC representative or call 1-800-848-7372.