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I-DEAS NX Associative Copy

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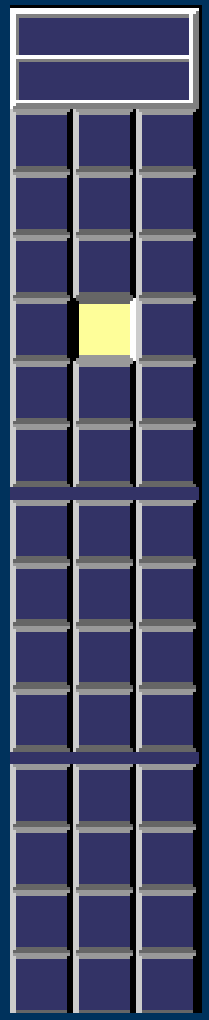
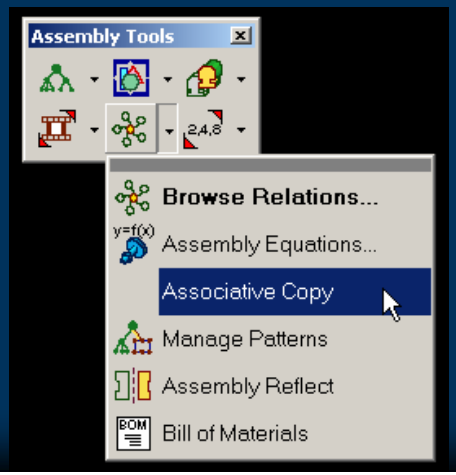
Introduction

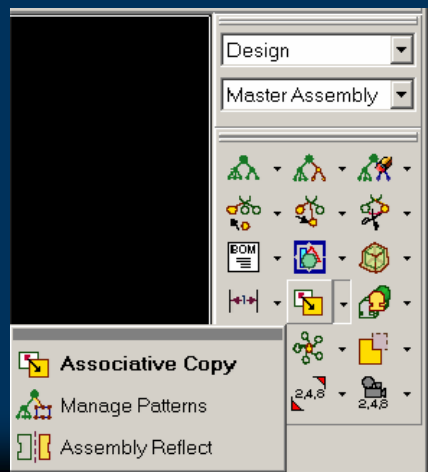
From the I-DEAS Help Library

- Use *Associative Copy* to copy surfaces and/or reference geometry from one part instance (the *source* instance) to another instance (the *target* instance). This must be done within a common parent assembly (the context assembly).
- *Associative Copy* copies a history tree node from the source part to an associative copy feature (ACF) which is added to the history tree of the target part. The ACF contains all the selected geometric information from the source part.
- Updating the target incorporates changes to the copied surfaces. This associativity allows the source part designer to maintain some control of design intent in the target part.



- To create an associative copy you must:
- be in the Assembly / Product Modeling task
- have an assembly on the workbench with the source part instanced
- for position dependent copies, make sure the configuration you want to contain the associative copy relation is active





Benefits

- ☑ Save modeling time & effort
- ☑ Reduce overall number of parts
- ☑ Ability to enforce design intent

Benefits

Smaller History Trees

- ☑ Save modeling time & effort
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- ☑ Ability to enforce design intent

Ensure that parts mate and
align properly

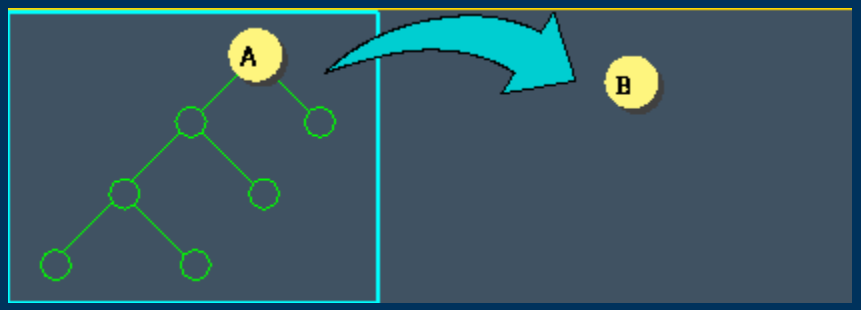
Benefits

Smaller History Trees

- Quicker Updates
- Easier to handle

Ensure mating condition

- Constrain Bolt Patterns to mating parts
- Keeps underlying part the same therefore underlying dimensions are associative



Save Time

Smaller History Trees

Eliminate Modeling Mistakes

- ☑ Save modeling time & effort
- ☑ Reduce overall number of parts
- ☑ Ability to enforce design intent

Eliminate Duplicate Work

Ensure that parts mate and align properly

Eliminate Mistakes

- Symmetric parts that need to stay symmetric
  - Copying parts and then reflecting is error prone for design changes
  - If design changes need to happen, one now has to update two parts
- Bolt patterns
  - Update source triggers a flag that the mating part needs updating
  - No need to ensure one types in the numbers correctly, just press update
- Control Design Intent
  - Boundary Condition

Benefits

Smaller History Trees

Make use of Part Families

Eliminate Modeling Mistakes

- ☑ Save modeling time & effort
- ☑ Reduce overall number of parts
- ☑ Ability to enforce design intent

Eliminate Duplicate Work

Eliminate Redundant Parts

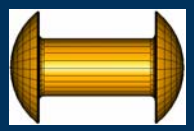
Ensure that parts mate and align properly

Useful Applications for Associative Copy

- Controlling Design Intent for Multiple Parts
  - Boundary Envelope
- Cutter Parts/Geometry
- Modeling Symmetric Parts
- Castings ⟷ Finished Parts
- Different States of Same Part
- Finite Element Analysis

Useful Applications

- Multiple parts may be derived from same casting
- Castings may be derived from machined part
  - Eliminate need to start from scratch
  - Ensure material safe condition
    - A bit more work filling in machined features
- Cutter Parts / Geometry
- Different States of same part
  - Rivets

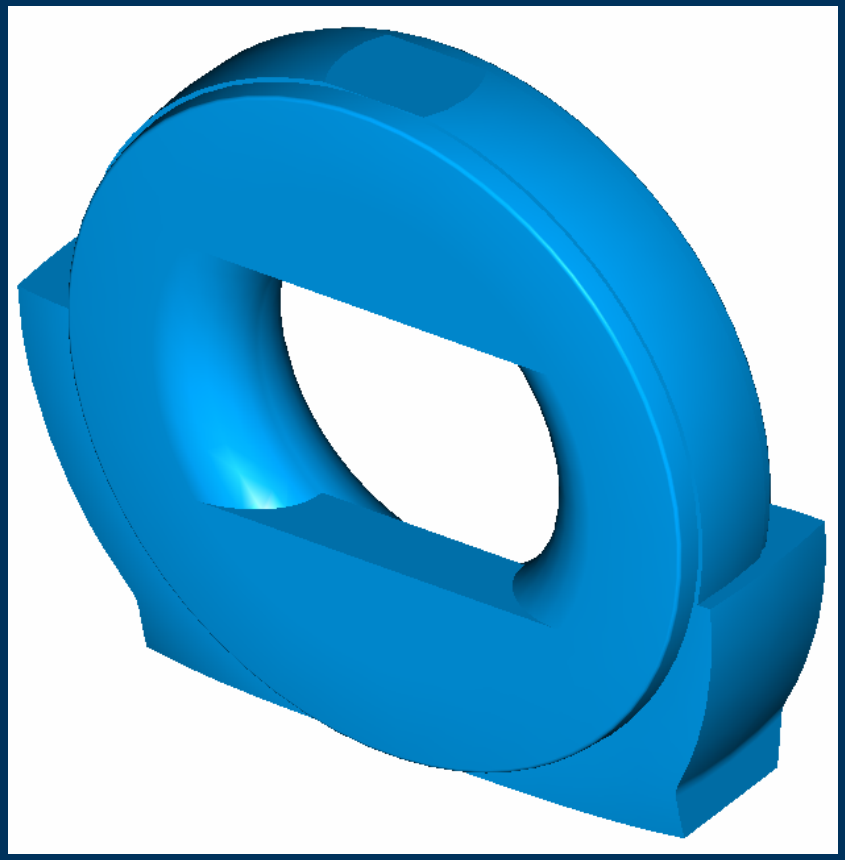


- FEA
  - Mating Associativity to Original Part

Useful Applications
Controlling Design Intent

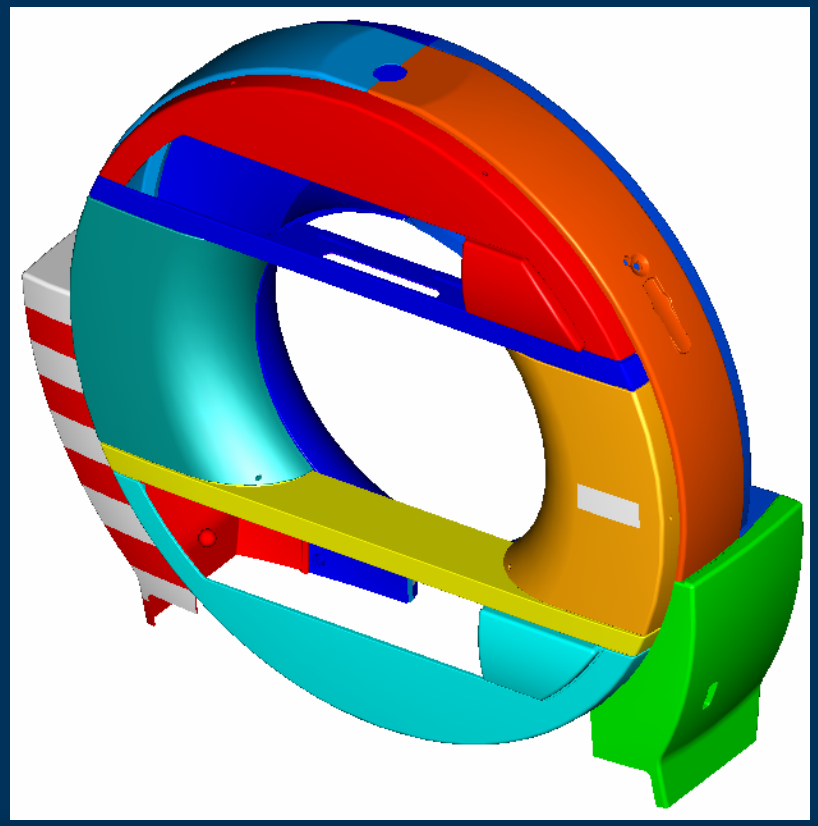
- Symbia - SPECT / CT Diagnostic Imaging Camera
  - Create Mating Covers
    - 70+ parts that fit together
    - Some parts move relative to each other
    - Schedule pressures
      - Eliminate mistakes
      - Covers – last to be designed therefore always on the “Critical Path”
  - Ensure Industrial Design is achieved

Symbia ID Control



ACS – Gantry Envelope

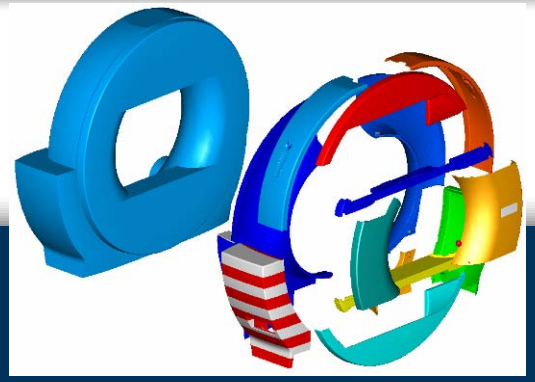
ACT – 13 Associated Covers



Lessons Learned

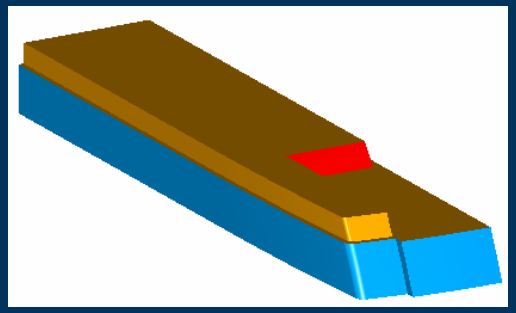
- Seams – Placed in the middle and covers on either side are offset (if no definitive break then reference planes assigned to envelope)
- Position Dependency Chosen
  - Assembly constraints should not be used in design assemblies if context assembly is utilized because it will cause an unsolvable loop
- Orientation – Global Modeling techniques used and orientation maintained
  - no need for assembly constraints
  - Anytime Covers are added to assemblies, they're always aligned
  - ACR – ASM also serves as a "light weight" envelope easily accessible

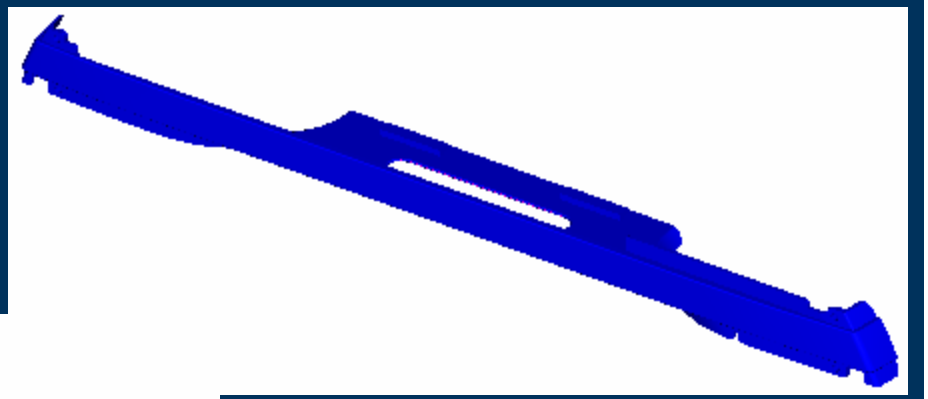
Lessons Learned

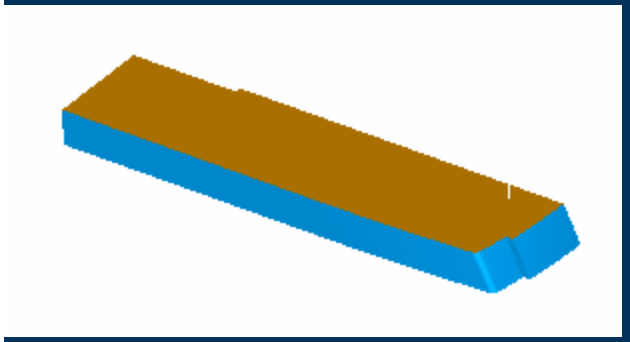


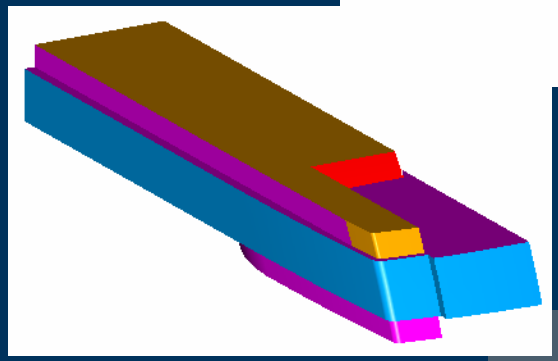
- Avoid fillets on ACS (Envelope)
  - Covers were shelled and fillets constantly failed
  - Splitting covers is easier with definitive edges
  - Fillets prone to loose association – If this happens at the envelope level than all parts off of the envelope will be out of date when fillets are re-defined
- Use the “BORN” method prior to ACR
  - Did not do this for 1st part of Symbia
    - ACT part went bad late in design and new part was needed
    - Part had to be started from scratch and duplicate part # and history tracking issues arose

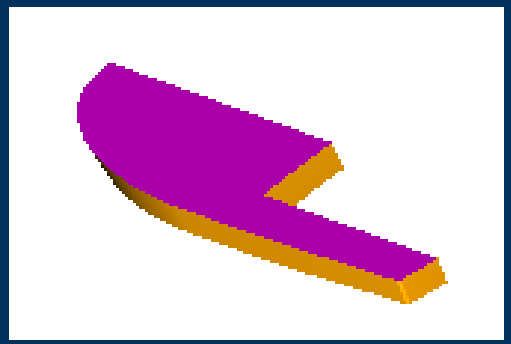
Multiple ACR Utilized on one part

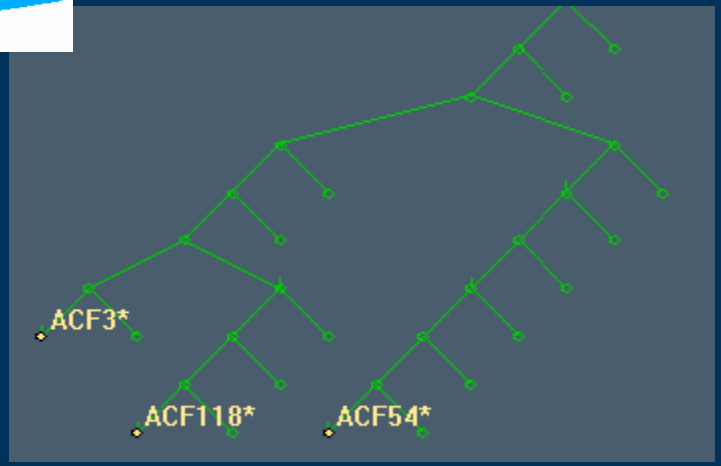












Sales Pitch is over, therefore…

- Seems simple enough, however
  - Different user unaware of target dependencies
  - Different user is unaware of the ACF node
  - Context Assemblies that contain Associative Instances can be broken if you don't pay attention
  - Usage of Associative Assemblies in Design Assemblies should be avoided
    - If used, careful attention must be given to assembly configurations

☛ Careful consideration should be given to Associative Copy parts and assemblies

Caution

- Linking Drawings to Associative Assemblies should be avoided
  - You'll get out of date instances due to parts that have nothing to do w/ drawing you're working on
  - Careful attention to configuration
  - Initial placement of views may be outside of view border (Origin from envelope is origin of part)
- ID Control desired for numerous parts (Symbia)
  - Leave fillets off the source part)
    - Create an ACT part w/ the master fillets that can then be referenced on all the other parts
  - Only include features common to multiple parts

Mitigate the risk
Properly Identify AC

- **AC** - Associative Copy
- **ACS** - Associative Copy Source: This is a part that contains the original geometry to be associatively copied to a target part.
- **ACT** - Associative Copy Target: This is a part that contains the AC geometry that came from a source part.
- **ACR** - Associative Copy Relation: This is the relationship between the ACS and the ACT that exists within a *Context Assembly*. For our purposes we the Context Assembly will be referred to as the ACR.
- **ACF** - Associative Copy Feature: This is a node in the history tree of the target part that references the AC geometry from the source part.

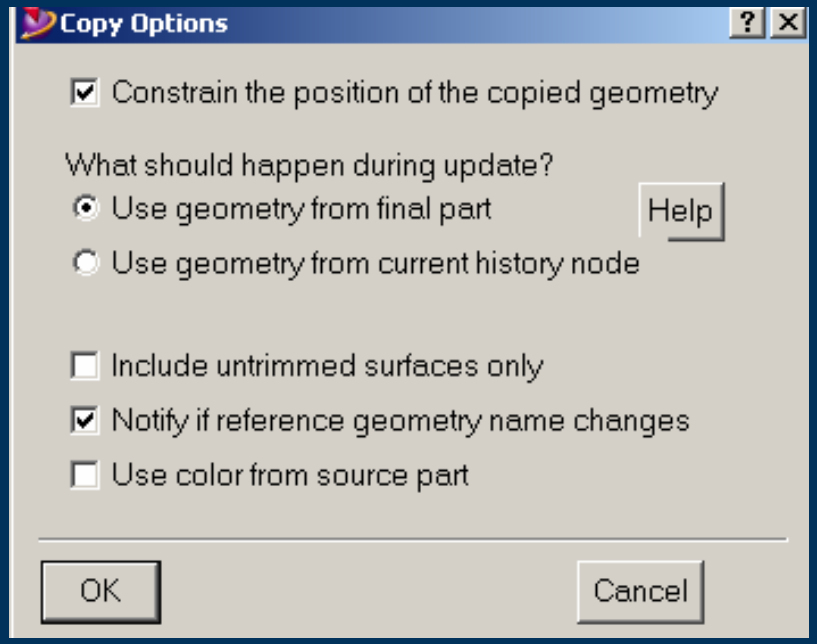
Caution

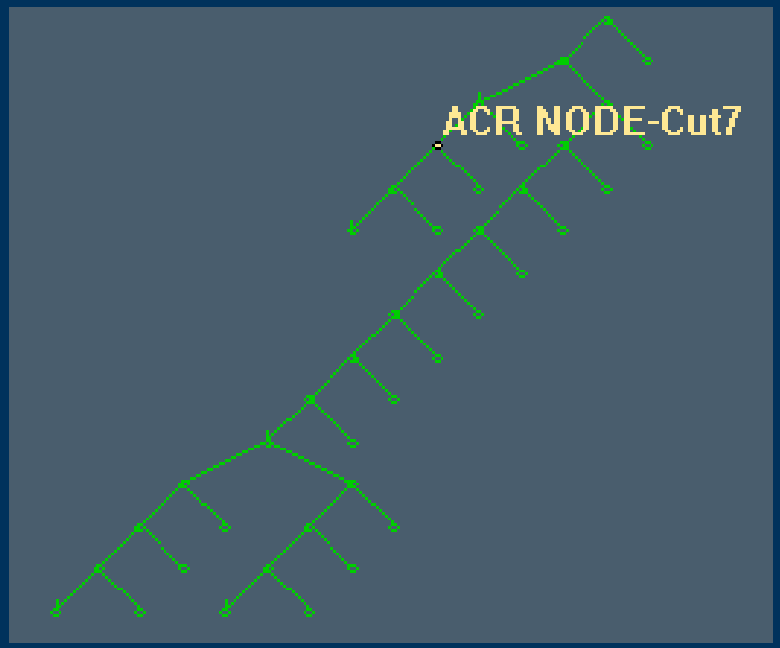
- Properly Identify Assemblies and parts
  - ACR-Assembly Symbia Principal
    - Part # 12345678_acr
  - Bkt-Top_Cover_Support_LH
    - Part # 12345678_acs

      Identifies part as having dependencies
  - Bkt-Top_Cover_Support_RH
    - Part # 12345678_act
- Add empty part to assembly (BORN Technique)
  - Avoid ACF being your first node
  - Aids constraints for complex surface parts

House Keeping

- Rename nodes that are used from node within history tree rather than final





Tips

- When encountering ACF
  - Use the info icon in the history tree to identify source part, source assembly, source configuration
    - Valuable information displayed in the list window
  - Browser Relations
- Copying ACR Assemblies
  - Use the copy icon in managed bins is preferred – gives the user more control
  - Referencing and ACR Assembly and then turning all items to local copy is less preferred

A - associative copy relation (ACR)
The context assembly is on the workbench.
B - ACR, context assembly in bin
The context assembly is not on the workbench.
C - ACR, context assembly is not in the model file (dimmed)
D - Green, up-to-date
E - Magenta, out-of-date
F - Yellow, ancestor is out-of-date or you must get the context assembly from the library

- If ACR are to be used for FEA
  - Good practice to place fillets/chamfers at the end of the history tree
    - Use copy option from node
- Prune and Suppressed item affect ACR updates
- When updating, ensure “include associative copy” is checked under the update options
- Try to limit context assemblies containing ACR
  - Assembly should contain both ACS, ACT, and ACR
  - Easier to control and maintain

- Changing Context Assemblies
  - Manage bins !?
  - DEMO

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