MA2604 - Drive Autodesk® Inventor® with the Top Down: Alternative Assembly Modelling Techniques

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Class Summary & Learning Objectives

How to create reliable predictable, parametric assembly models using Autodesk Inventor’s ‘Alternative’ modelling techniques.

By the end of this presentation...

- Bottom Up V.s Top Down, what’s the difference?
- How will Top Down design benefit me?
- What tools are available for Top Down design?
- What else do I need to know?
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‘Setter out’ – Specialist woodworking Draftsman

CAD Geek
Design Intent

We want assembly models that are:

- Quick to build ✓
- Reliable ✓
- Predictable ✓
- Easy and quick to edit ✓

*Before you can model your design you must design your model*
Assembly modeling techniques

Bottom up (Traditional)

Control File (Derived)

Top Down (Adaptive)
Bottom up: Traditional

Workflow:

- New part file
- Sketch geometry
- Sketch constraints
- Dimension parameters
- Features
- Save it
- Add it to an assembly
- Constrain the parts in place

Let’s try it!
Bottom up: Traditional

Cons:
- No relationships between parts
- Not easy to build or edit large assemblies

Pros:
- No relationships to manage between parts
- Easy to add data for your BOM/Parts list
In place: Linking parameters

Workflow:
- Create parts
- Place in assembly
- Edit parts in place
- Link parameters
- Save it

Let’s try it!
In place: Linking parameters

Cons:
- Circular relationships
- Relationships aren’t easy to discover
- Parts can’t be used in other assemblies

Pros:
- Simple
- Can be added to existing components
In place: Adaptive

Workflow:
- Start with an assembly
- Create your parts from within the assembly
- Create relationships between parts with adaptive geometry

Let’s try it!
Top Down: Adaptive

Cons:
- Adaptive references can be tricky to manage
- Not easy to build or edit large assemblies

Pros:
- Works with surfaces & neutral format parts
- Quick to build – great for goal finding
Skeletal Model: Derived

Workflow:
- Start with a single ‘Control’ part
- Add parameters, work features & blocks
- Derive the control part into the parts of the model
- Create the features at the part level
- Combine into an assembly

Let’s try it!
Skeletal Model: Derived

Cons:
- Working with just geometry is not intuitive
- Building parts without context = lots to coordinate
- Building part models can be time consuming
- Time consuming to add data for BOM/Parts list

Pros:
- Lightweight derived parts (compared to multi bodies)
- Assemblies can be laid out in 2D to see how they function before time is invested in 3D modelling.
Multi body design part: Derived

Workflow:

- Start with a single ‘design’ part
- Add parameters, work features, blocks
- Create features and solids
- Derive the solids out into an assembly

Let’s try it!
Multi body design part: Derived

Cons:
- Must be built in a structured manner
- Lots of relationships between parts to manage
- Derived multi bodies = large part files
- Time consuming to add data for BOM/Parts list

Pros:
- No constraints!
- Quick and easy to design complex models
- Quick and easy to make parametric edits
Real Life: A Hybrid Approach

Skeletal model → Assembly → Subassemblies → Content centre

- iPars & Virtual parts
- Multibodies
Case studies
Top down: iLogic

Workflow:

- Create parts with named parameters
- Add iLogic code
- Place iLogic parts into assembly & constrain as usual
- Run the iLogic rule to resize

Let’s try it!
Top down: iLogic

Cons:
- Understanding iLogic
- Strict code for parameter naming
- Must use correct templates

Pros:
- Parametric assemblies without linking parts
- Interchangeable components
Summary

- You can now create predictable, reliable parametric assembly models with Autodesk Inventor.
- You know how to model in a structured manner and when to keep it simple.
- You now know how to use derived modelling techniques to collaborate with your colleagues.

So Get on with it!
Q&A

Thanks for attending!

Don’t forget to download the handout for more details of today’s tools and strategies.

And check out this virtual class for a video presentation:
MA5956-V: Drive Autodesk® Inventor® with the Top Down: Alternative Assembly Modelling Techniques Master Class

Please fill out your class evaluations!!