AUTODESK UNIVERSITY

Punches, Embosses, and Patterns, Oh My! Creative iFeatures and Punches

Pete Strycharske

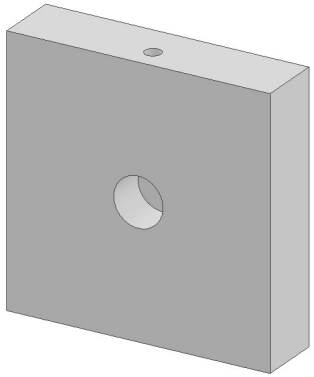
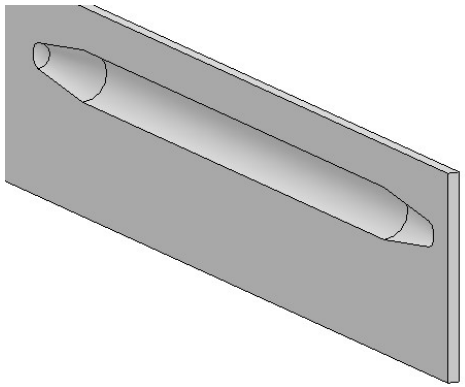
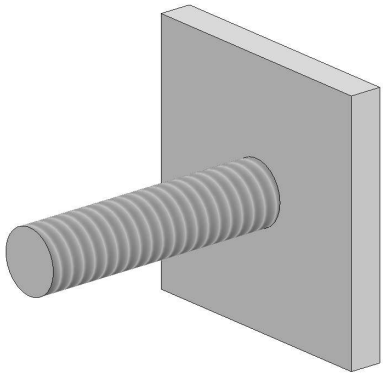
Implementation Consultant: D3 Technologies | @petestrycharske

Who am I???

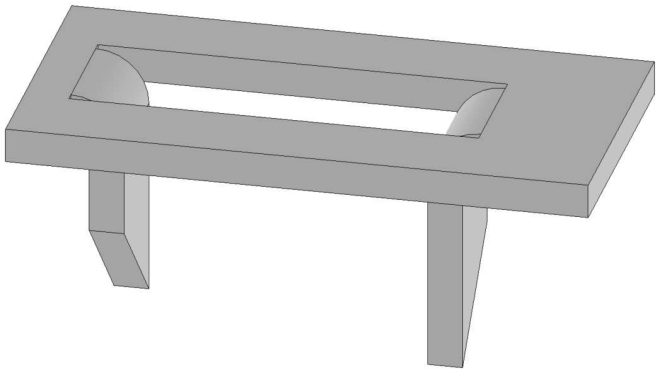
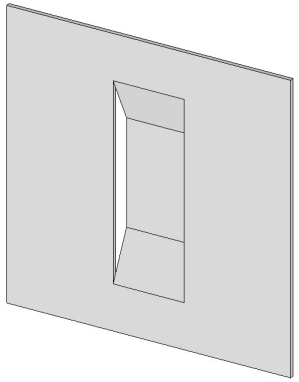
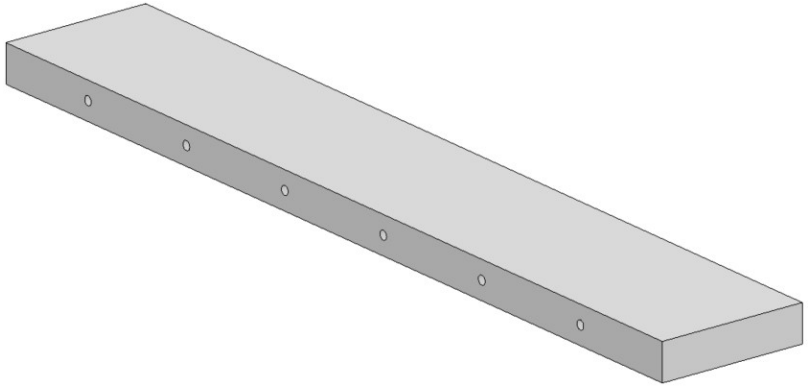
Pete Strycharske: D3 Technologies

Implementation Consultant

- Autodesk Platinum Partner
- Teach classes on Inventor, AutoCAD, Factory Design Utilities and Navisworks
- Provide technical support on Autodesk products
- YouTube content (My wife jokingly calls me a “CAD Influencer”)
- Consult on design workflows and customer content generation
- Love God, working with kids, serving in church, Star Wars, the beach and playing basketball!

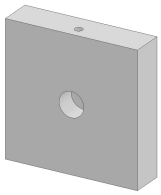
Why are we here?

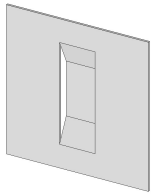
What will we cover?

(What we should know by the end of our time together…)

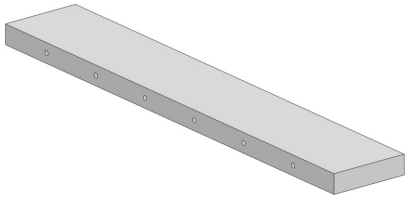
Important Considerations for Any iFeatures and…



Compound iFeatures (operations in multiple directions)



Embossed Sheet Metal Punches (sheet metal operations that involve forming metal in addition to or in lieu of cuts)



Internal iFeature Patterns (feature patterns contained within the iFeature itself)

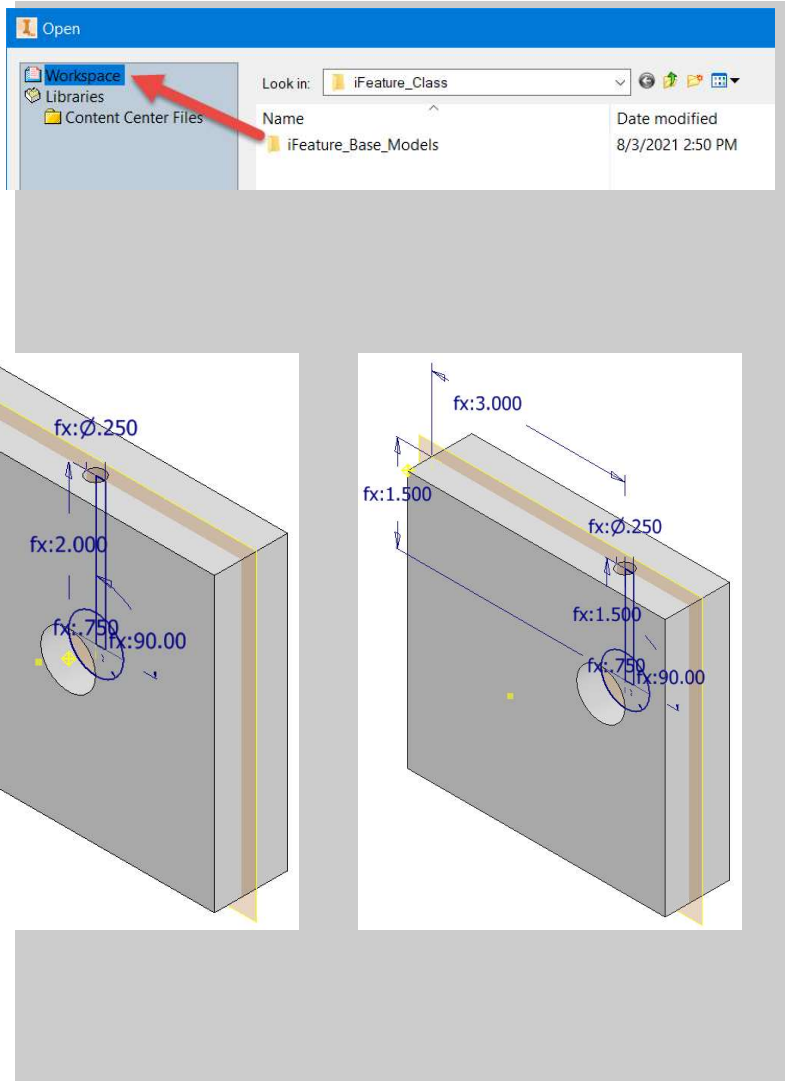
Important iFeature Considerations

Base Feature Library

Store the models used to generate iFeatures

Why build such a library?

- Access for others who may want to work on a particular iFeature
- Easier to correct mistakes for more complex iFeatures and simply republish them
- Possibility of creating one-off or unique configurations of iFeatures

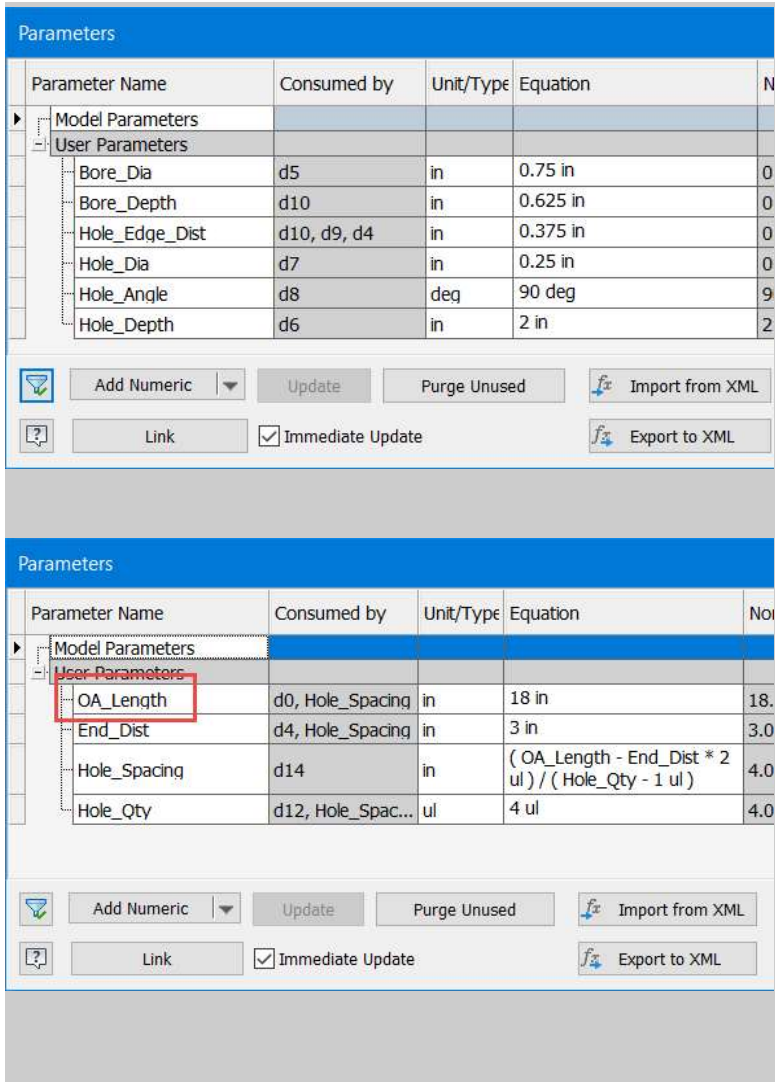


Use Parameters Effectively

Build and name parameters to guide the design

Why is this important?

- Helps users think through a design
- Establishes consistency across many iFeature designs
- Improves user experience when placing and configuring iFeatures
- Useful for linking iFeature parameters to a host model

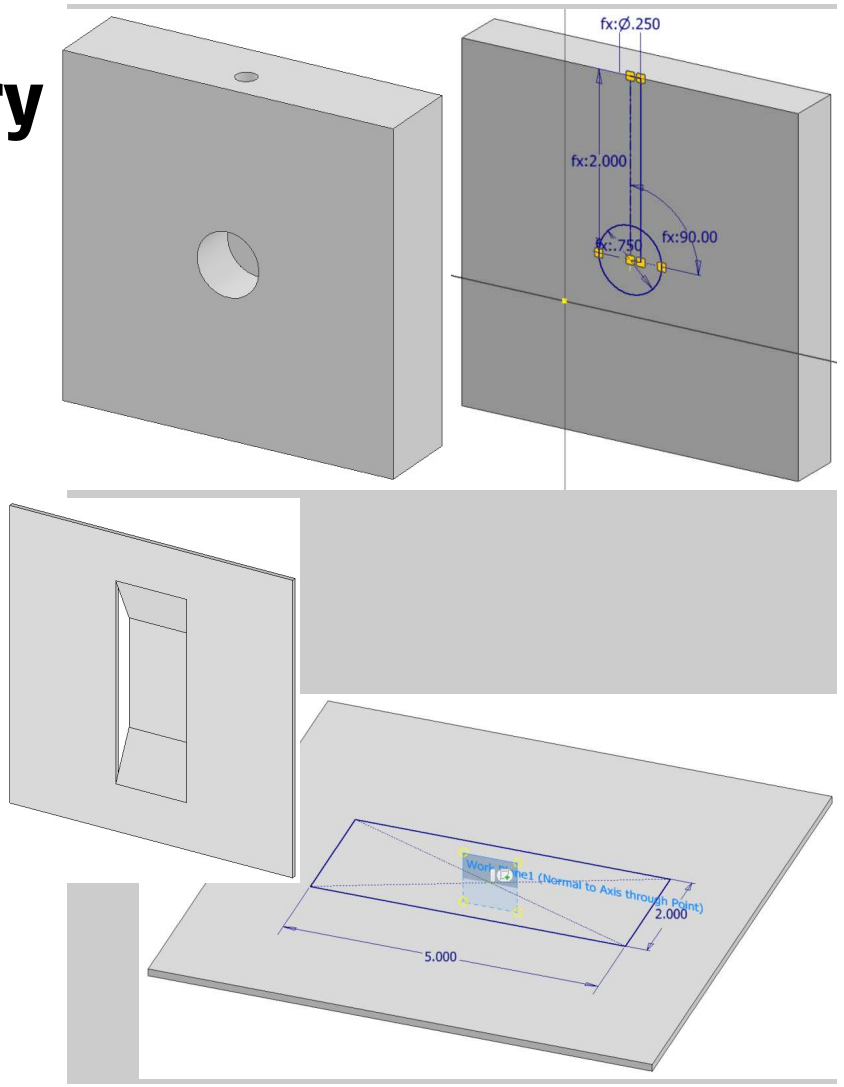


Minimize Reference Geometry

Tie reference geometry to a single design sketch

Why does this mean?

- Utilize a singular geometry reference to position all features
- If possible, drive all features from a single design sketch
- For multiple design sketches, base each new sketch on the initial geometric reference or initial design sketch

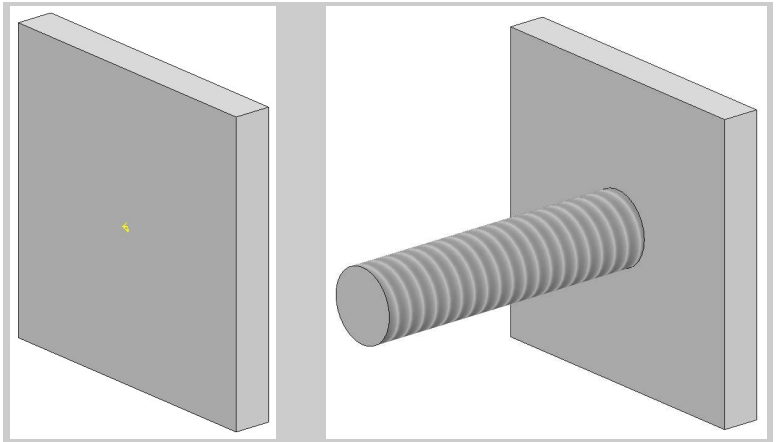


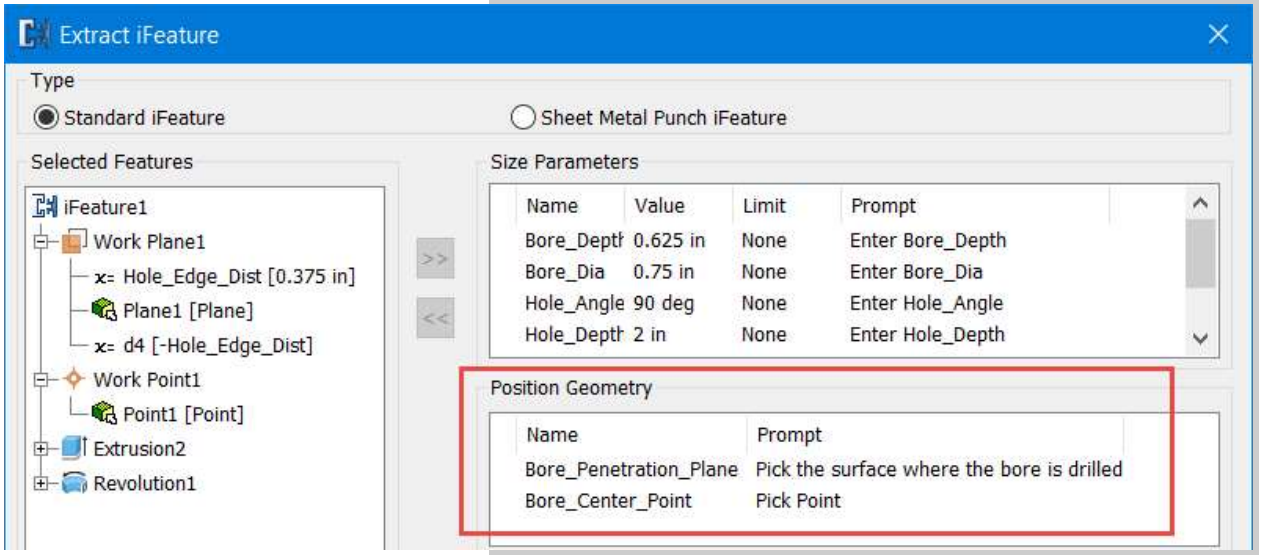
Simplify the Placement

Strive to improve the end-user experience

How is this accomplished?

- Minimize the number of selections required when placing an iFeature
- Rename the placement geometry labels and prompts to clarify desired selections when placing the iFeatures






Example 01
Point Placement
iFeatures

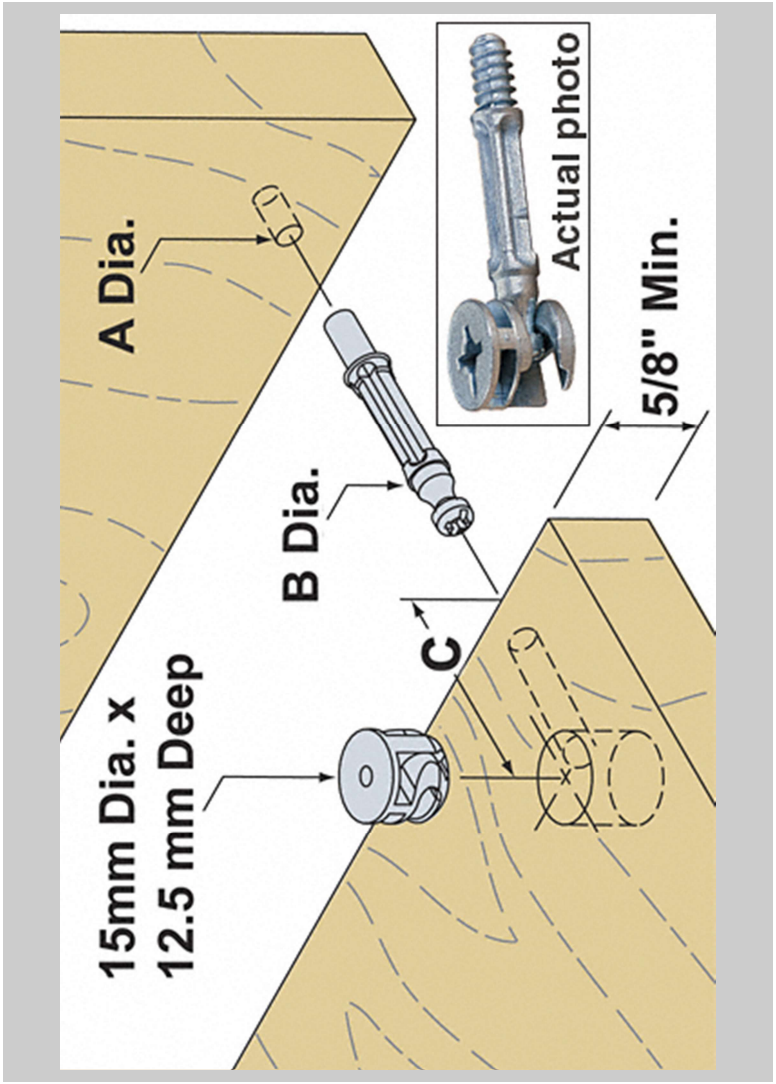

Compound iFeatures

What is a Compound iFeature

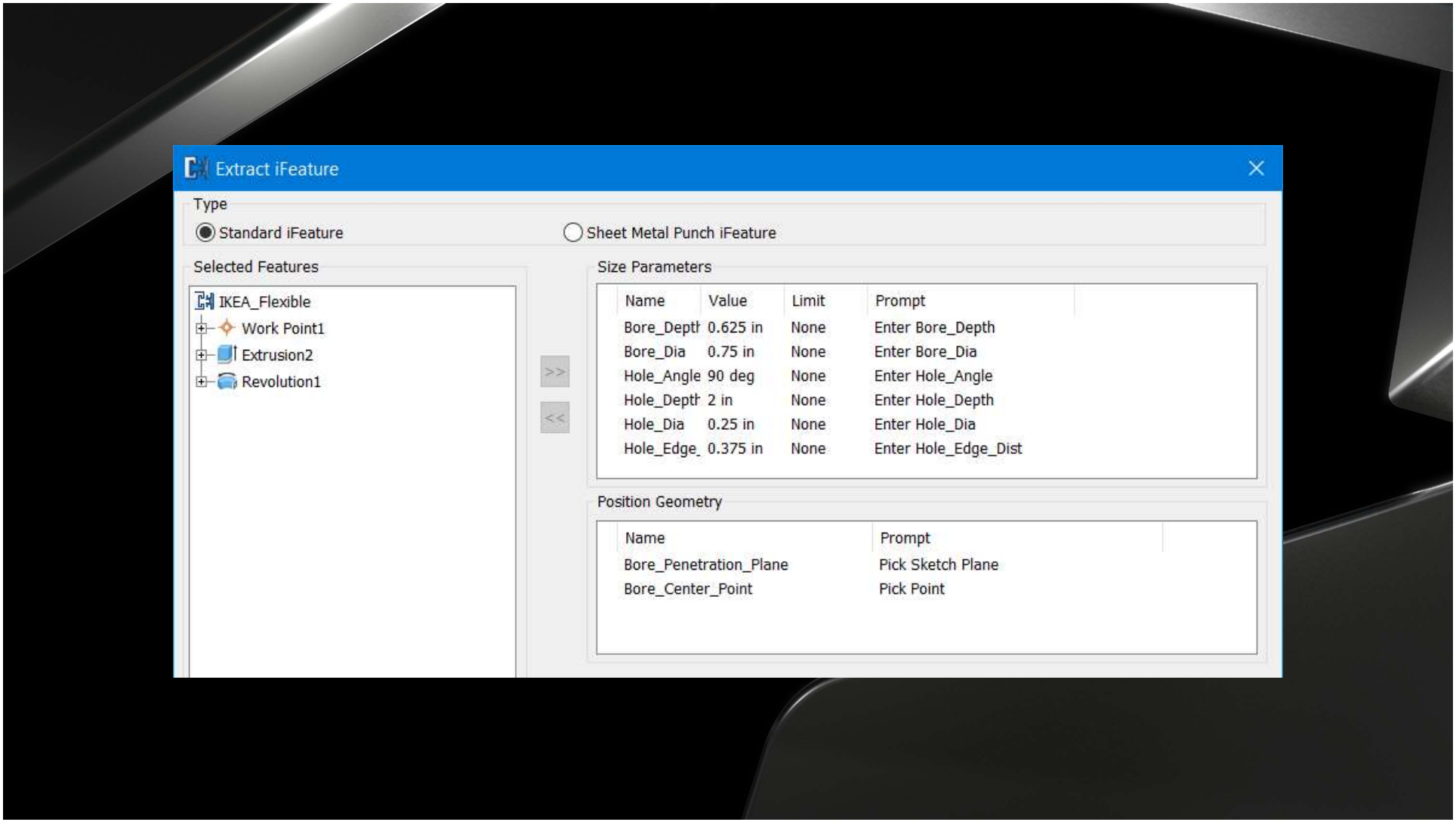
Multi-direction operations

Best practices

- Utilize parameters well
- Work from a single design sketch as much as possible
- Generate multiple features from the singular design sketch



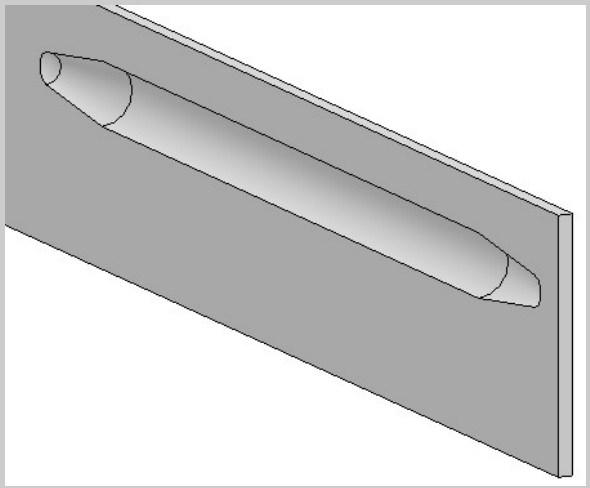

Example 02
IKEA
iFeature

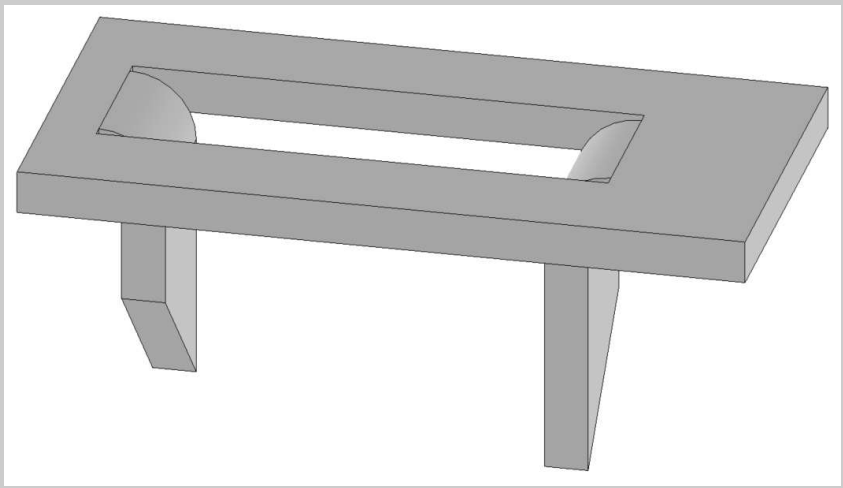

Extract iFeature
Type
Standard iFeature
Sheet Metal Punch iFeature
Selected Features
IKEA_Flexible
Work Point1
Extrusion2
Revolution1
>>
<<
Size Parameters
Name Value Limit Prompt
Bore_Depth 0.625 in None Enter Bore_Depth
Bore_Dia 0.75 in None Enter Bore_Dia
Hole_Angle 90 deg None Enter Hole_Angle
Hole_Depth 2 in None Enter Hole_Depth
Hole_Dia 0.25 in None Enter Hole_Dia
Hole_Edge_ 0.375 in None Enter Hole_Edge_Dist
Position Geometry
Name Prompt
Bore_Penetration_Plane Pick Sketch Plane
Bore_Center_Point Pick Point

Embossed Sheet Metal Punches

What do I Mean by Embossed?

Sheet Metal punches that include an element of forming

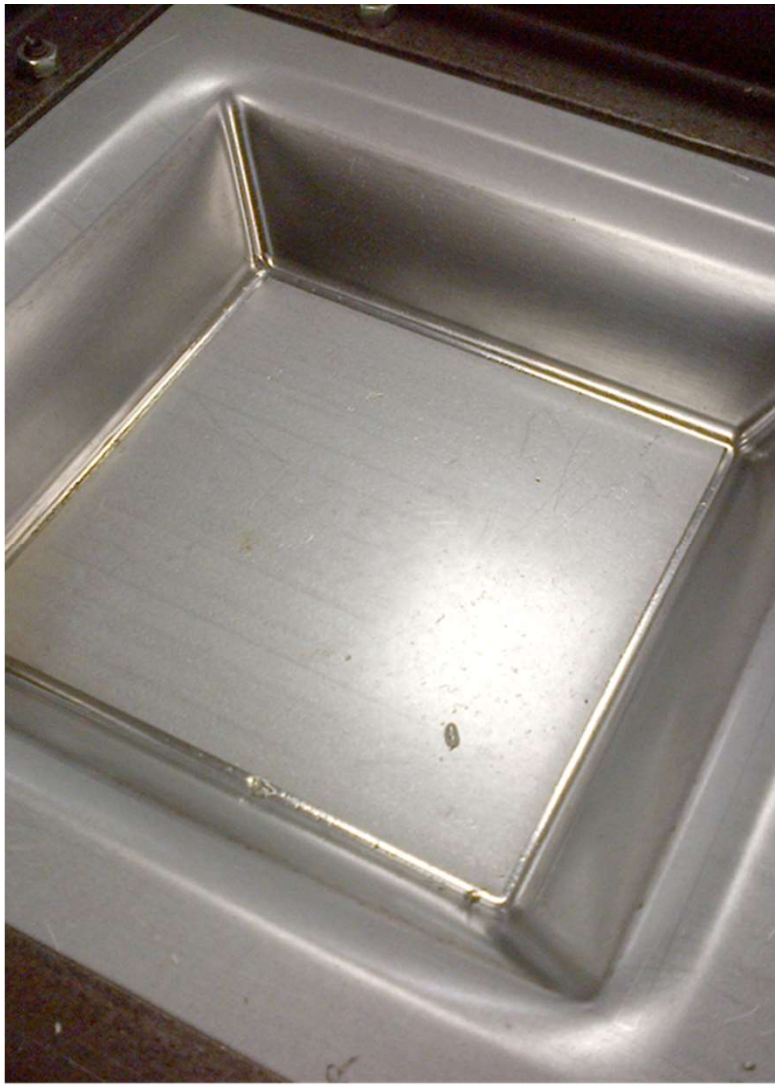




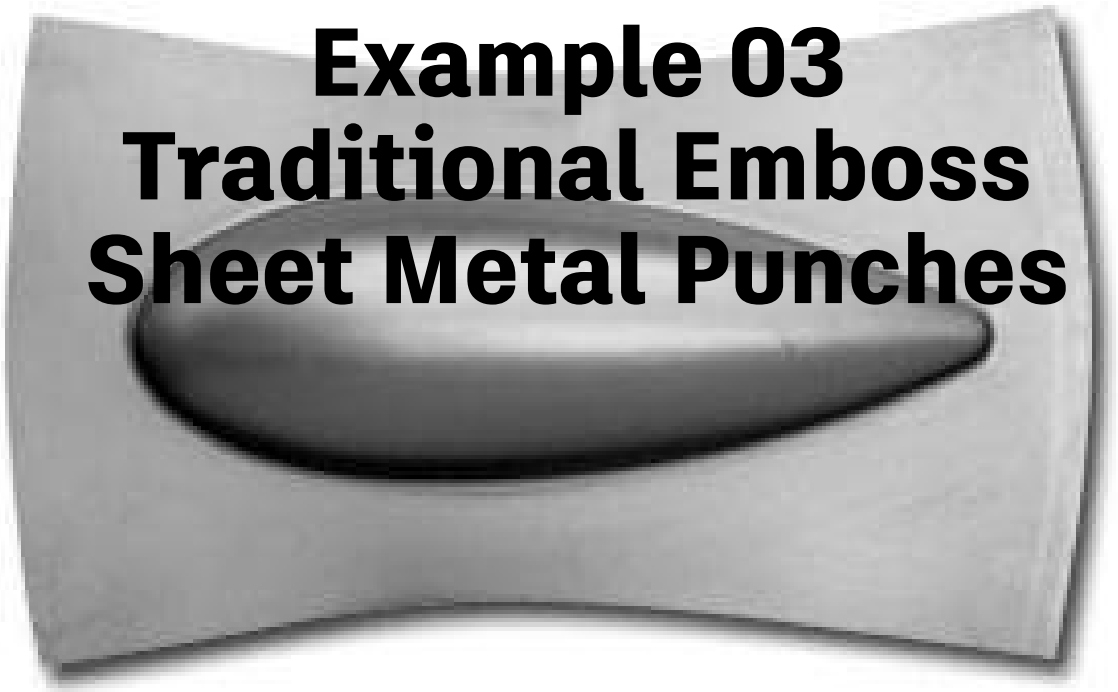
Building Embossed Punches

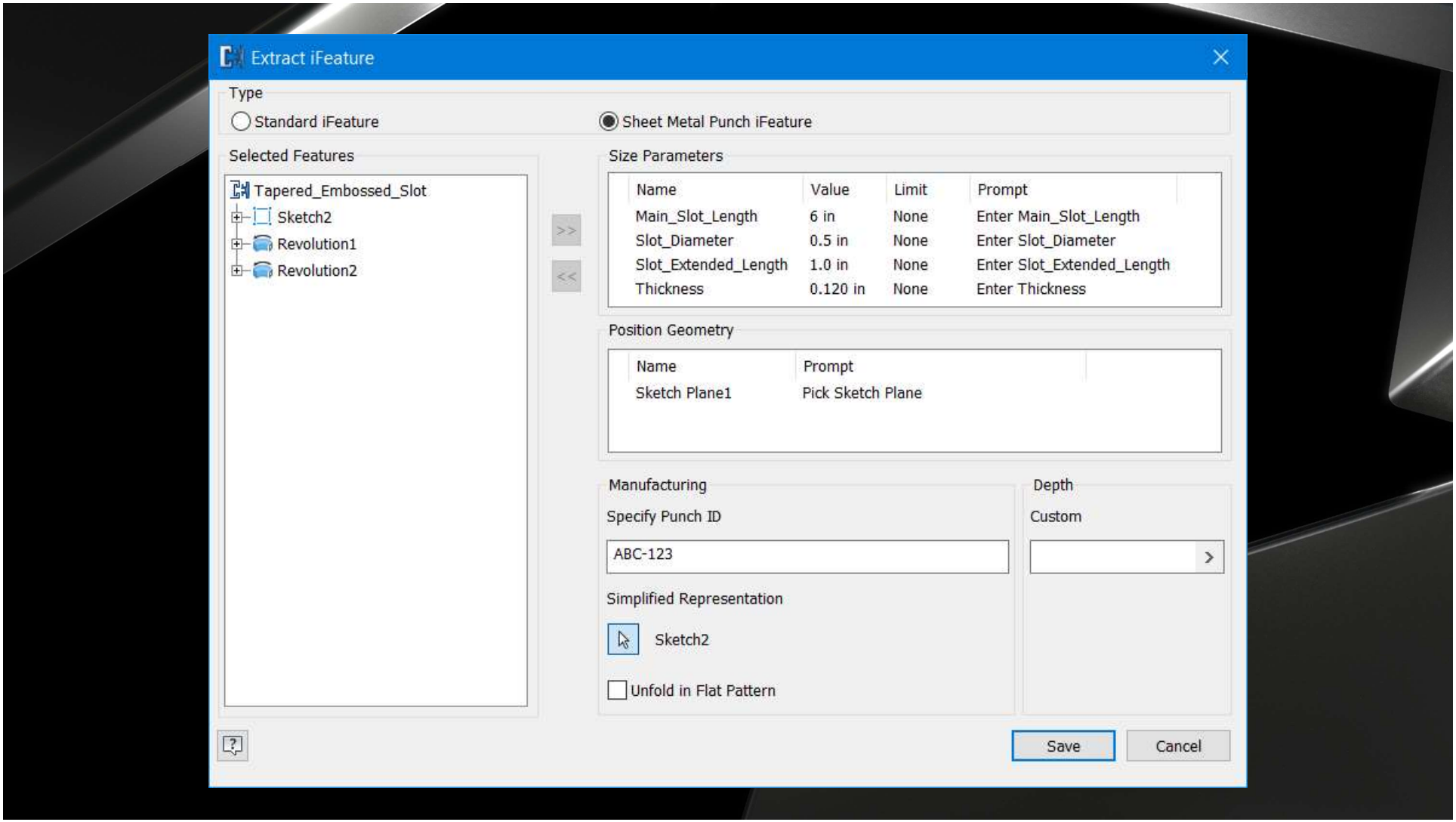
Best practices

- Utilize parameters well
- Work from a single design sketch as much as possible, design sketch **MUST** contain a sketch center point
- Generate multiple features from the singular design sketch
- When necessary, base all secondary sketches and planes, etc. from the main design sketch **ONLY**

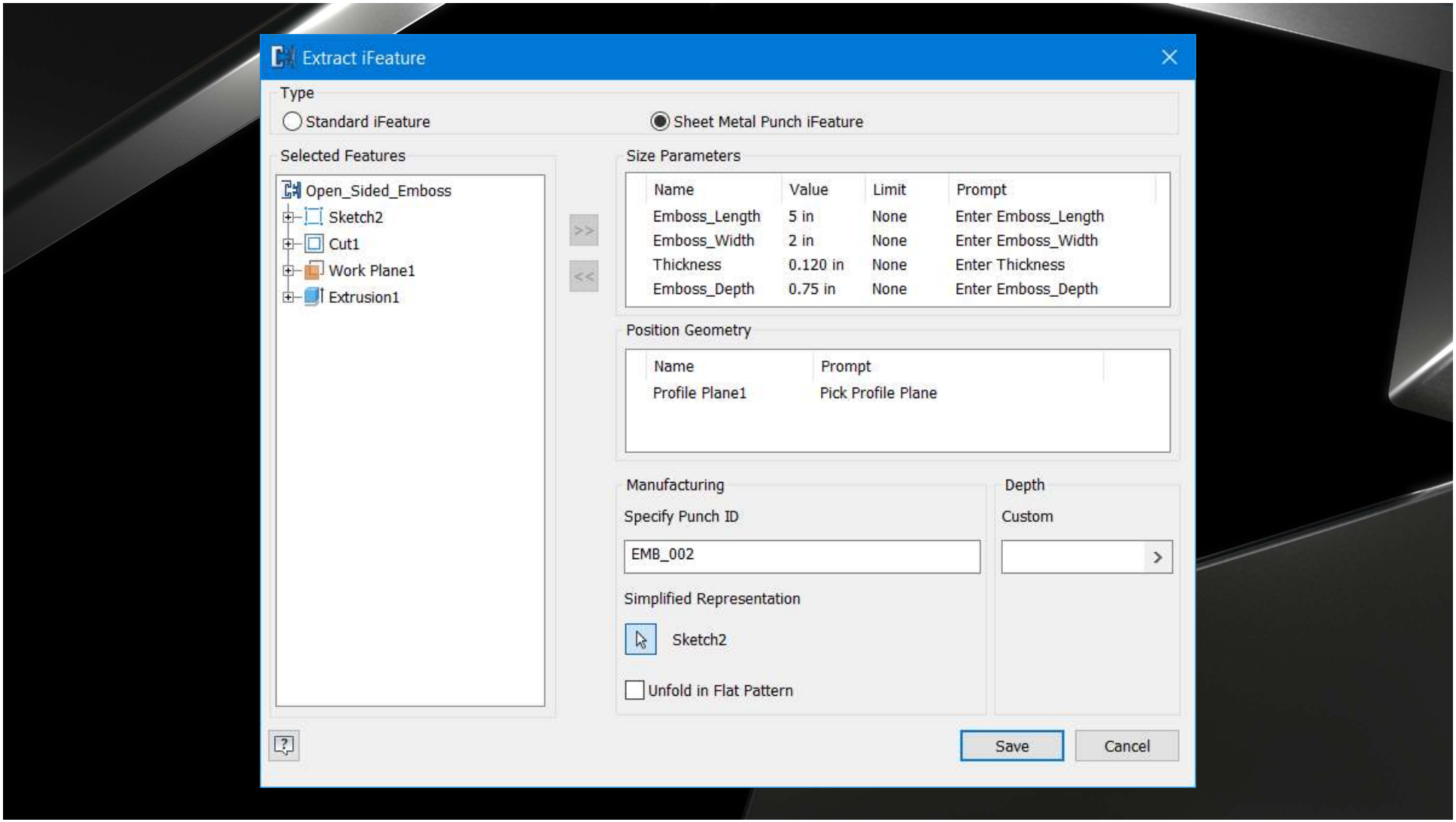


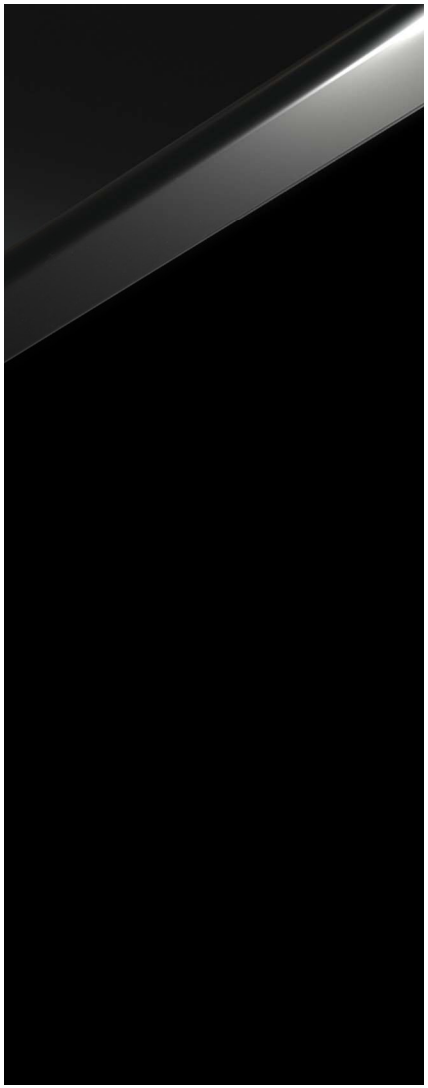
Example 03
Traditional Emboss
Sheet Metal Punches

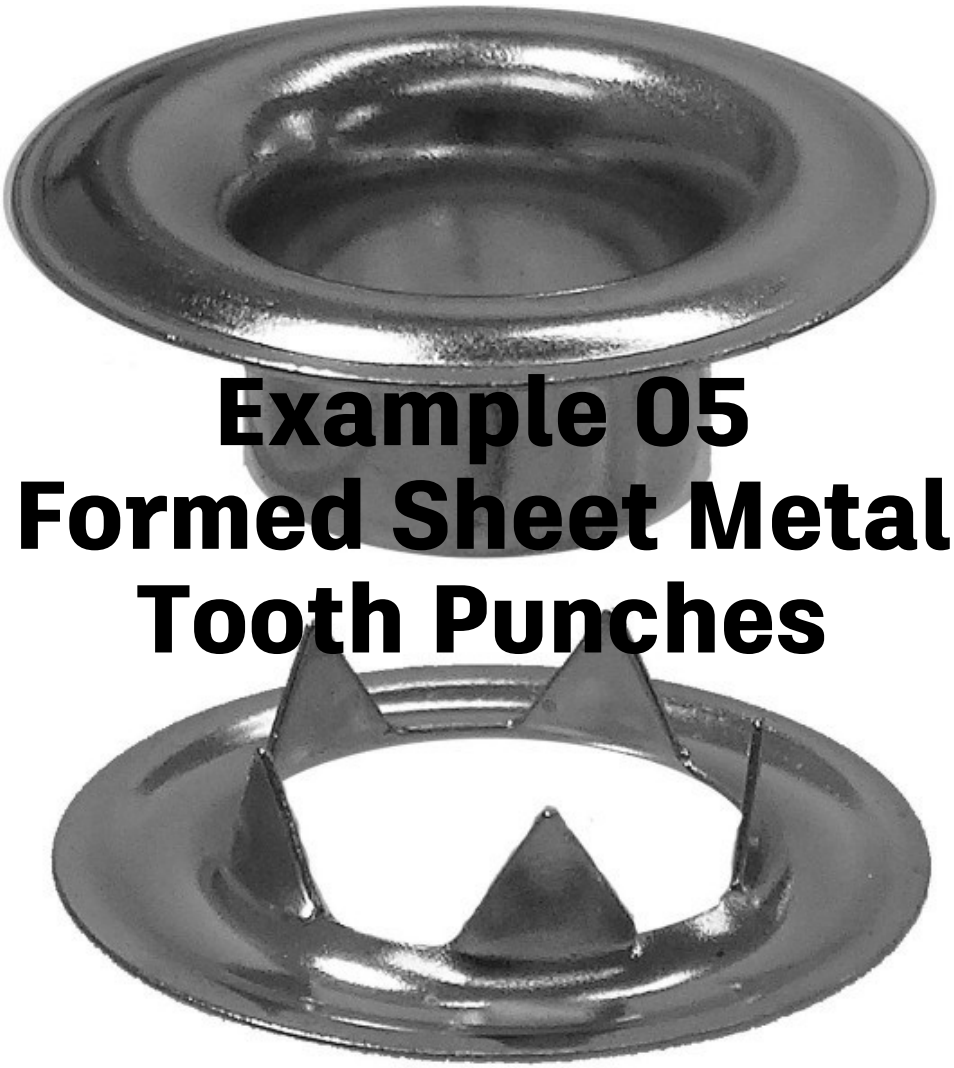



Extract iFeature
Type
Standard iFeature
Sheet Metal Punch iFeature
Selected Features
Tapered_Embossed_Slot
Sketch2
Revolution1
Revolution2
>>
<<
Size Parameters
Name
Value
Limit
Prompt
Main_Slot_Length
6 in
None
Enter Main_Slot_Length
Slot_Diameter
0.5 in
None
Enter Slot_Diameter
Slot_Extended_Length
1.0 in
None
Enter Slot_Extended_Length
Thickness
0.120 in
None
Enter Thickness
Position Geometry
Name
Prompt
Sketch Plane1
Pick Sketch Plane
Manufacturing
Specify Punch ID
ABC-123
Simplified Representation
Sketch2
Unfold in Flat Pattern
Depth
Custom
Save
Cancel

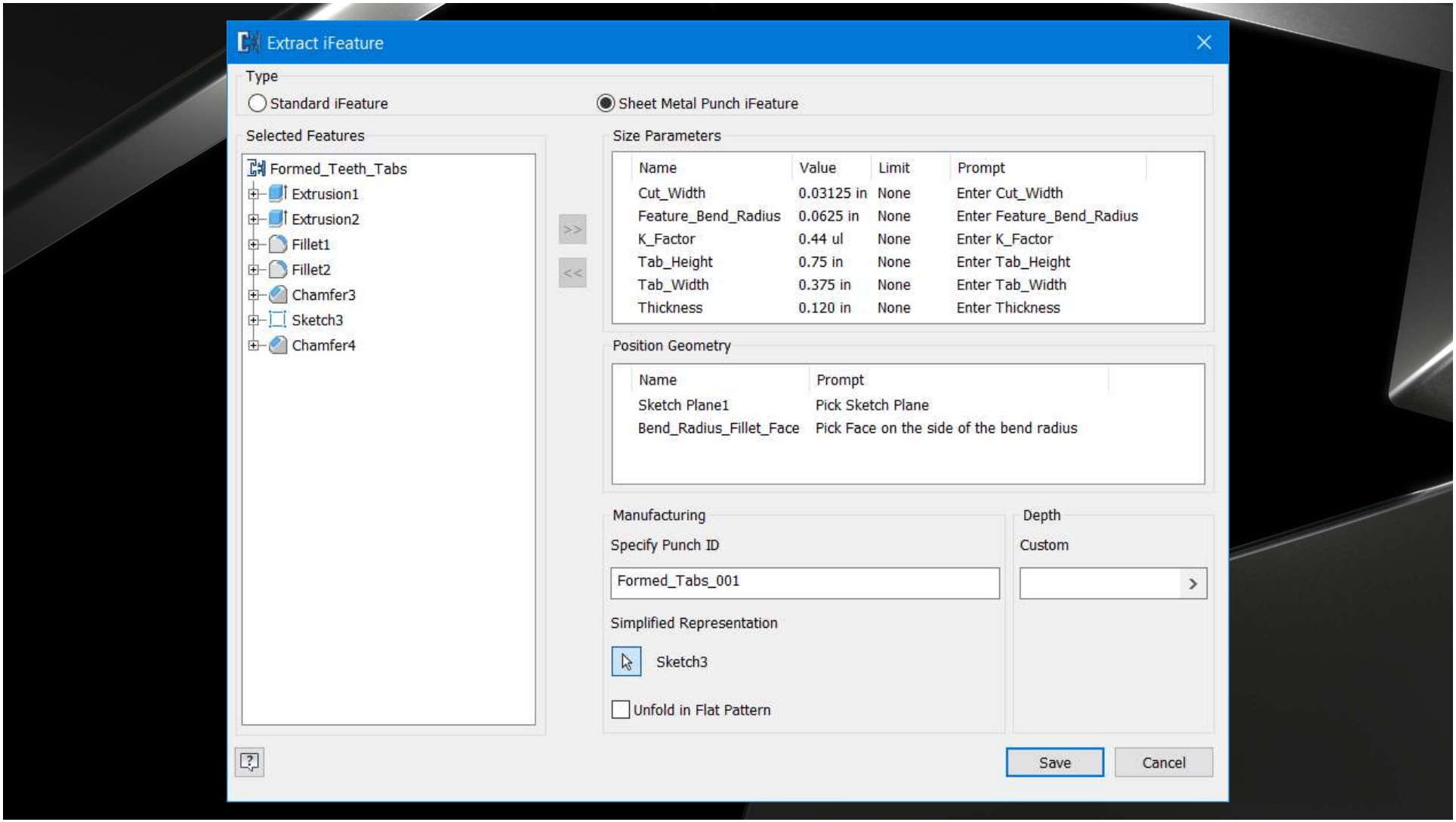
Example 04
Open-Sided Emboss Sheet Metal Punches


Extract iFeature
Type
Standard iFeature
Sheet Metal Punch iFeature
Selected Features
Open_Sided_Emboss
Sketch2
Cut1
Work Plane1
Extrusion1
Size Parameters
Name Value Limit Prompt
Emboss_Length 5 in None Enter Emboss_Length
Emboss_Width 2 in None Enter Emboss_Width
Thickness 0.120 in None Enter Thickness
Emboss_Depth 0.75 in None Enter Emboss_Depth
Position Geometry
Name Prompt
Profile Plane1 Pick Profile Plane
Manufacturing
Specify Punch ID
EMB_002
Simplified Representation
Sketch2
Unfold in Flat Pattern
Depth
Custom
Save
Cancel





Example 05
Formed Sheet Metal
Tooth Punches


Extract iFeature
Type
Standard iFeature
Sheet Metal Punch iFeature
Selected Features
Formed_Teeth_Tabs
Extrusion1
Extrusion2
Fillet1
Fillet2
Chamfer3
Sketch3
Chamfer4
Size Parameters
Name Value Limit Prompt
Cut_Width 0.03125 in None Enter Cut_Width
Feature_Bend_Radius 0.0625 in None Enter Feature_Bend_Radius
K_Factor 0.44 ul None Enter K_Factor
Tab_Height 0.75 in None Enter Tab_Height
Tab_Width 0.375 in None Enter Tab_Width
Thickness 0.120 in None Enter Thickness
Position Geometry
Name Prompt
Sketch Plane1 Pick Sketch Plane
Bend_Radius_Fillet_Face Pick Face on the side of the bend radius
Manufacturing
Specify Punch ID
Formed_Tabs_001
Simplified Representation
Sketch3
Unfold in Flat Pattern
Depth
Custom
Save
Cancel

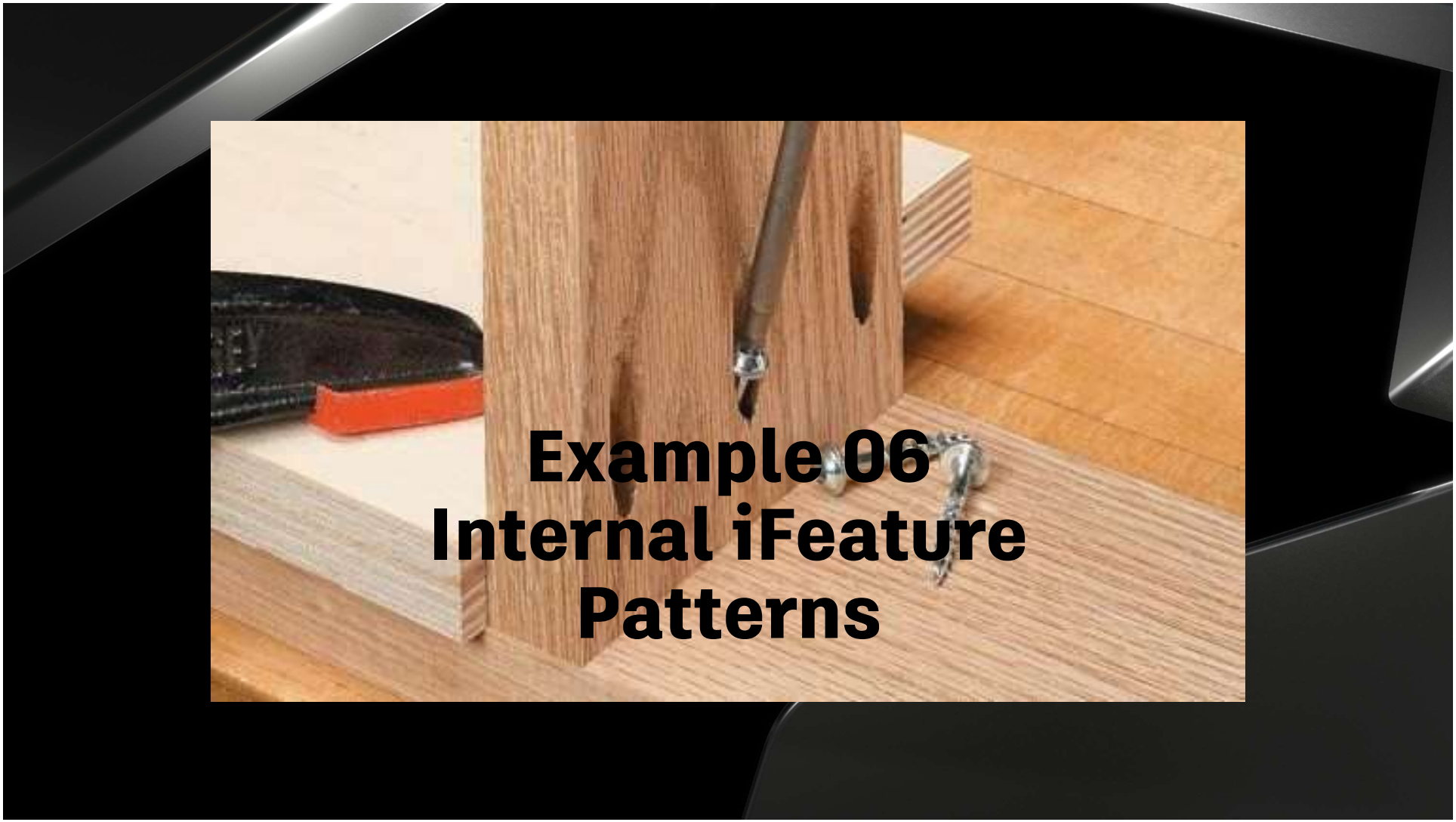
Internal Pattern iFeatures

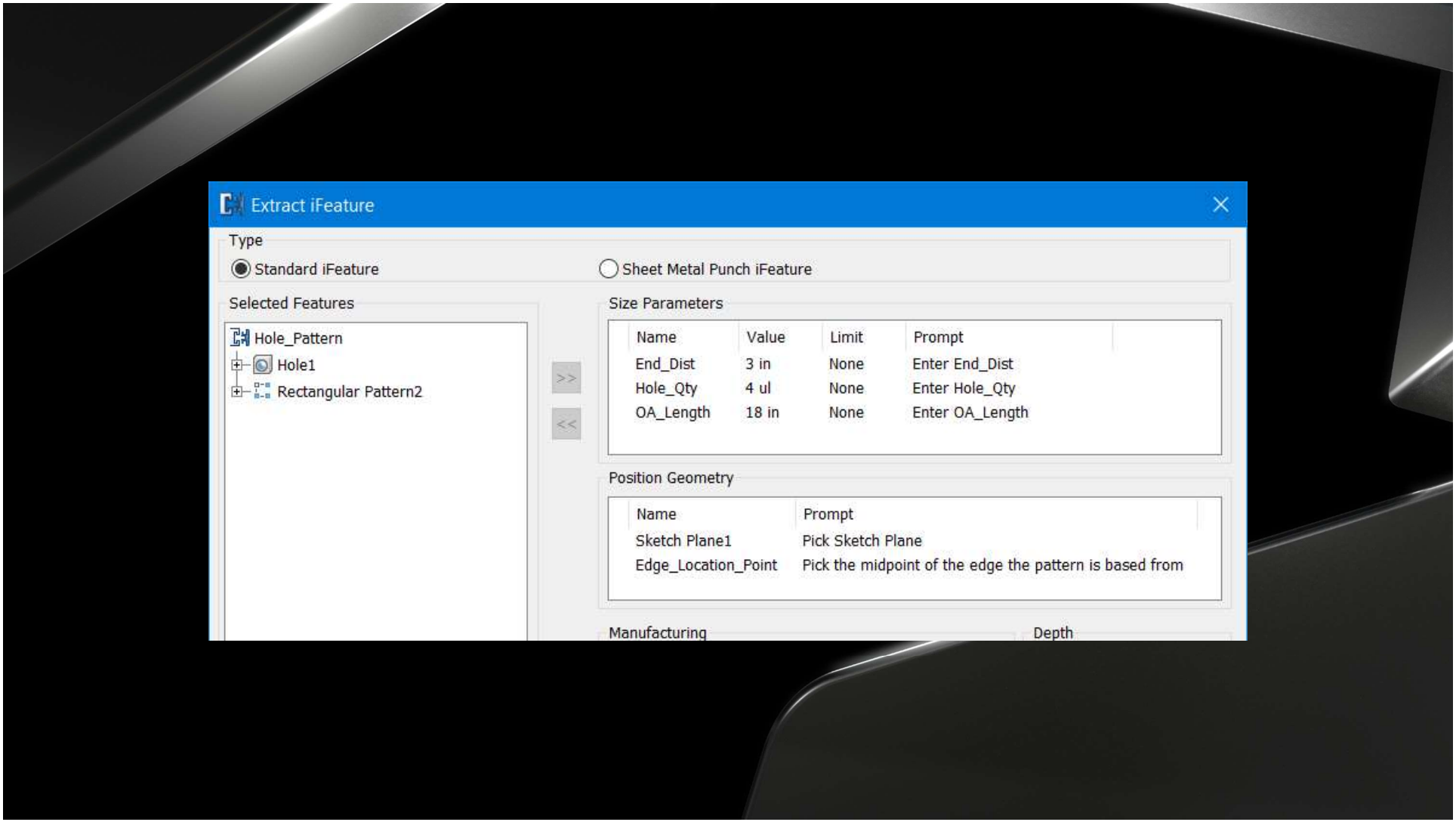
What is an Internal Pattern iFeature?

Patterns that exist within the iFeature itself

Best practices

- Utilize parameters and equations well
- Work from a single design sketch as much as possible
- Generate multiple features from the singular design sketch
- **Only** use design sketch geometry to control the direction of the pattern
- Remove any parameters that contain equations when publishing the iFeature


Example 06
Internal iFeature
Patterns


Extract iFeature
Type
Standard iFeature
Sheet Metal Punch iFeature
Selected Features
Hole_Pattern
Hole1
Rectangular Pattern2
>>
<<
Size Parameters
Name
Value
Limit
Prompt
End_Dist
3 in
None
Enter End_Dist
Hole_Qty
4 ul
None
Enter Hole_Qty
OA_Length
18 in
None
Enter OA_Length
Position Geometry
Name
Prompt
Sketch Plane1
Pick Sketch Plane
Edge_Location_Point
Pick the midpoint of the edge the pattern is based from
Manufacturing
Depth

Special Thanks!

- God for this wonderful opportunity and literally every breath that I take
- Rick VanWort, my current boss, and my former bosses for allowing me the time and space to explore these zany ideas
- All my customers who ask such interesting questions and provided the motivation to explore the particular examples that I shared in this class