

Instructor's Guide to Teaching SolidWorks Software Lesson 8

School's Name
Teacher's Name
Date



Families of Parts

- Many times parts come in a variety of sizes.
- This is called a family of parts.
- It is not efficient to build each version individually.
- Design Tables simplify making families of parts.

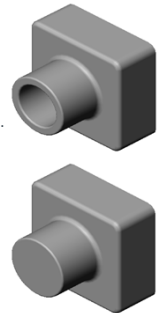


Design Table Overview

- Design Tables are used to create different configurations of a part.
- What is a Configuration?
 - A configuration is a way to create a family of similar parts within one file.
 - Each configuration represents one version of the part.
- Design Tables automatically change the dimensions and features of an existing part to create multiple configurations. The configurations control the size and shape of a part.

Design Table Overview

- Design Tables can control the state of a feature.
- The state of a feature can be *suppressed* or *unsuppressed* (also called *resolved*). A suppressed feature is not rebuilt or displayed.
- Design Tables requires Microsoft Excel application.



Center hole suppressed

Design Tables Require

	box_width	box_height	knob_dia	hole_dia	fillet_radius	Depth
1	120	120	70	40	15	30
2	120	120	90	40	15	30
3	120	120	110	40	15	30
4	120	120	130	40	15	30
5	120	120	150	40	15	30
6	120	120	170	40	15	30

Dimension and/or Feature names
or special keywords

Configuration

Values

Tip: Rename features and dimensions before creating a design table.

Rename Features and Dimensions

- Feature and Dimension names used in a Design Table should be renamed to better describe their function.
- Which is easier to understand?
 - D1@Cut-Extrude1
 - Width@Oval_Slot



To Rename a Feature

- Click-pause-click on *Extrude1* in the FeatureManager design tree (do not double-click).
- Tip: Instead of the click-pause-click technique, you can select the feature, and then press the function key F2.
- The feature name is highlighted in blue, ready to be edited.
- Type the new name, *Box*, and press Enter.



7



Rename the Other Features Used in the Design Table

- Rename *Extrude2* to *Knob*.
- Rename *Cut-Extrude1* to *Hole_in_knob*.
- Rename *Fillet1* to *Outside_corners*.

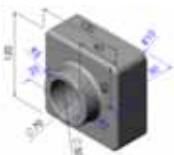


8



To Display Feature Dimensions

- Right-click the *Annotations* folder, and select Show Feature Dimensions from the shortcut menu.



9



To Hide All the Feature Dimensions for a Selected Feature

- Right-click the feature in the FeatureManager design tree, and select Hide All Dimensions from the shortcut menu.

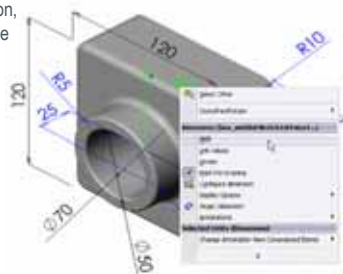


10



To Hide Individual Dimensions

- Right-click the dimension, and select Hide from the shortcut menu.

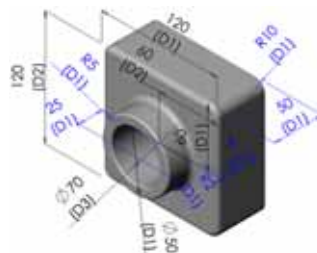


11



To Display Dimension Names

- Click Tools, Options.
- Click General on the System Options tab.
- Click Show dimension names.
- Click OK.



12



To Rename a Dimension

1. Display the dimension.
 - Either double-click the feature to display its dimensions.
 - Or, right-click the **Annotations** folder, and select **Show Feature Dimensions**.
2. Click the 70mm diameter dimension, and in the PropertyManager, rename the dimension to *knob_dia*, then click OK.

Note: "@Sketch2" is automatically added to the dimension name.

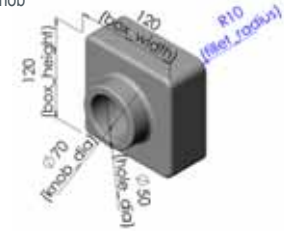


13



Rename these Dimensions

- Height of the box to *box_height*.
- Width of the box to *box_width*.
- Diameter of the hole in the knob to *hole_dia*.
- Radius of outside corners to *fillet_radius*.

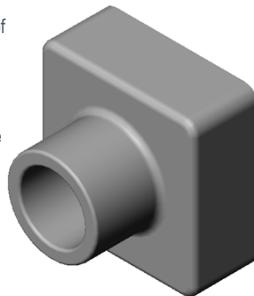


14



Design Intent

- The depth of the *Knob* should always be equal to the depth of the *Box* (the base feature).
- The *Knob* should always be centered on the *Box*.
- Dimensions alone are not always the best way to capture design intent.



15



Linking Values

- The **Link Values** command relates dimensions to each other through shared variable names.
- If the value of one linked dimension is modified, then all of the linked dimensions are modified.
- **Link Values** is excellent for making feature dimensions equal to each other.
- This is an important tool for capturing design intent.

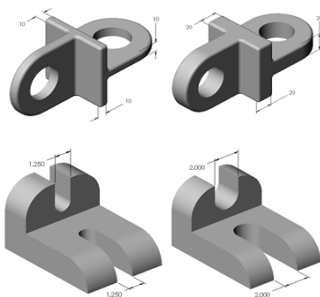


16



Examples of Uses for Link Values

- The thickness of the square and the two tabs is always equal.
- The width of both slots is always equal.



17



Link the Depth of the Box to the Depth of the Knob

1. Display the dimensions.
2. Right-click on the depth dimension for the *Box*, and select **Link Values** from the shortcut menu.



18



Linking the *Box* to the *Knob*

3. Type *Depth* in the *Name* text box and then click **OK**.
4. Right-click on the depth dimension for the *Knob*, and select **Link Values** from the shortcut menu.



19



Linking the *Box* to the *Knob*

5. Select *Depth* from the list, and click **OK**.
6. Both dimensions have the same name and value.
7. **Rebuild** the part to update the geometry.



Tip: Use the CTRL key to select several dimensions at the same time and link them in one step.



20



Geometric Relations

Relate geometry through physical relationships such as:

- Concentric
- Coradial
- Midpoint
- Equal
- Collinear
- Coincident

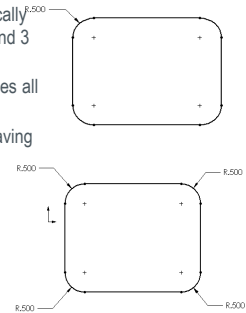


21



Examples of Geometric Relations

- The Sketch Fillet tool automatically creates one radial dimension and 3 **Equal** relations.
- Changing the dimension changes all 4 fillets.
- This technique is better than having 4 radial dimensions.

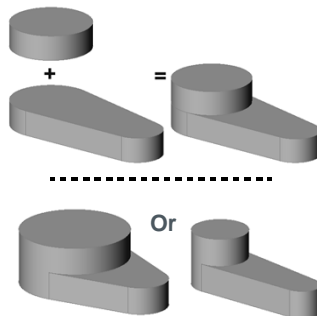


22



Examples of Geometric Relations

- Two features.
- Making the circle for the boss Coradial with the edge of the base ensures that the boss will always be the correct size regardless of how the base changes.



23



To Center the *Knob* on the *Box*


1. Right-click the *Knob* feature, and select **Edit Sketch** from the shortcut menu.

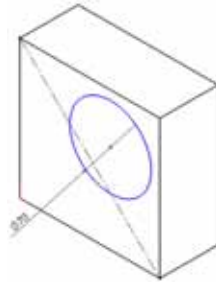


24



Centering the *Knob* on the *Box*


2. Delete the linear dimensions.
3. Notice the circle is blue, indicating it is under defined.
4. Drag the circle to one side. Without dimensions to locate it, it is free to move.
5. Click Centerline , and sketch a diagonal Centerline.



25



Centering the *Knob* on the *Box*

6. Click Add Relation .
7. Select the centerline and the point at the center of the circle.
 - **Note:** If the centerline is still highlighted when Add Relations opens, the line automatically appears in the Selected Entities list and you do not have to select it again.
 - If you select the wrong entity, right-click in the graphics area, and select Clear Selections.

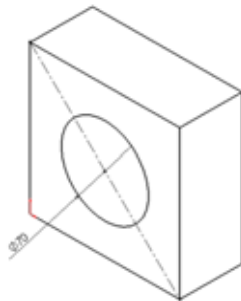


26



Centering the *Knob* on the *Box*

8. Click Midpoint, and then click Apply and Close.
9. The circle will now stay centered on the *Box* feature.

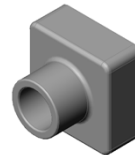


27



Centering the *Knob* on the *Box*

10. Click Rebuild  to exit the sketch and rebuild the part.



28



To Insert a New Design Table

1. Position the part in the lower right hand corner of the graphics area.
2. Click Insert, Design Table.

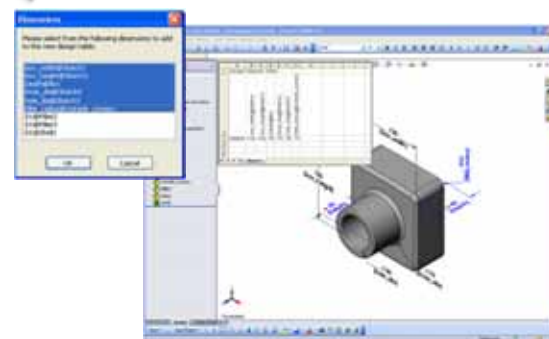
The PropertyManager appears.
3. Select the Auto-create option to create a new design table automatically.



29



Inserting a New Design Table



30



Inserting a New Design Table

- An Excel worksheet is displayed in the part document window.
- Excel toolbars replace the SolidWorks toolbars.
- By default, the first configuration is named Default. You can (and should) change this to something more meaningful.



31



Review of a Design Table's Format

Dimension and/or Feature names or special keywords go in this row.

	A	B	C	D	E	F	G
1	Design Table for: Tutor3	box_width@Sketch1	box_height@Sketch1	knob_dia@Sketch2	hole_dia@Sketch3	fillet_radius@Outside_corners	Depth@Knob
2		120	120	70	50	10	50
3	blk1	120	90	50	40	15	30
4	blk2	90	150	60	10	30	15
5	blk3	120	120	30	10	25	90
6	blk4						

Configuration names go in this column.

Values go here.



32



Inserting a New Design Table

- Double-click the *box_width* dimension.

The full dimension name is inserted into cell B2. The dimension value is inserted into cell B3. The next cell, C2, is automatically selected.

	A	B
1	Design Table for: Tutor3	
2		box_width@Sketch1
3	Default	120
4		
5		
6		

- Double-click the *box_height* dimension.

	A	B	C
1	Design Table for: Tutor3		
2		box_width@Sketch1	box_height@Sketch1
3	Default		50
4			
5			
6			



33



Inserting a New Design Table

- Repeat this process for *knob_dia*, *hole_dia*, *fillet_radius*, and *Depth*.
 - Note: Since the depth dimensions of the Knob and the Box are linked together, you only need one of them in the design table.

	A	B	C	D	E	F	G
1	Design Table for: Tutor3						
2		box_width@Sketch1	box_height@Sketch1	knob_dia@Sketch2	hole_dia@Sketch3	fillet_radius@Outside_corners	Depth@Knob
3	Default	120	120	70	50	10	50
4							
5							
6							

Excel tip: Dimension names tend to be very long. Use the Excel command Format, Cells, and click Wrap Text on the Alignment tab.



34



Inserting a New Design Table

- Enter new configuration names in column A:
 - Replace Default with blk1.
 - Fill cells A4 through A6 with blk2, blk3, and blk4.
- Fill in the dimension values as shown below.

	A	B	C	D	E	F	G
1	Design Table for: Tutor3						
2		box_width@Sketch1	box_height@Sketch1	knob_dia@Sketch2	hole_dia@Sketch3	fillet_radius@Outside_corners	Depth@Knob
3	blk1	120	120	70	50	10	50
4	blk2	120	90	50	40	15	30
5	blk3	90	150	60	10	30	15
6	blk4	120	120	30	10	25	90



35



To Close the Excel Worksheet


- Click in the graphics area outside the worksheet.
- The system builds the configurations.
- Click OK. The Design Table is embedded and stored in the part document. The design table icon appears in the FeatureManager.
- Save the part document.



36



To View Part Configurations

1. Click the Configuration Manager tab  at the top of the FeatureManager window. The list of configurations is displayed.
2. Double-click each configuration.

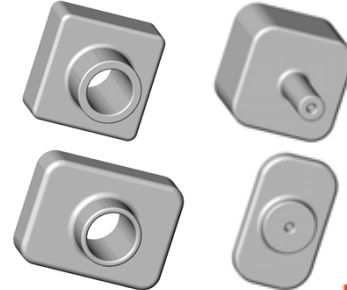


37



Viewing Part Configurations

3. The part is automatically rebuilt using the dimension values from the design table.



38

