KeyCreator Lesson KC2115

Creating a Cast C-Clamp Frame

While the cast C-Clamp frame illustrated to the right looks complex, the construction is really quite simple.

We'll start with a new file in View 1. (The Top View.)





Click on the CREATE RECTANGLE BY WIDTH HEIGHT Icon. Use any anchor option.

Type 6 for the Width, 5 for the Height. Using the Cursor Option, click anywhere on the screen.

Next, click on the CREATE ARC BY THREE POSITIONS Icon. Using the EndEnt Option, click on the top, right corner of the rectangle.

Next, click on the Offset Option.

Using the CtrMid Option, click on the right side of the rectangle to establish a base position.

Type 0.5 for the X value and hit the ENTER Key three times.

Then, using the EndEnt Option, click on the bottom, right corner of the rectangle.





Your screen should now look like this:

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Click on the FILLET WITH TRIM Icon.

Type 1.5 for the Radius

Create fillets at the top, left corner of the rectangle and between the top of the rectangle and the top of the arc that you just made.

Then, delete the right side and bottom of the rectangle.





Your screen should now look like this:



Now, switch to View 2. (The Front View.)



Select a new Construction Color.

Click on the CREATE RECTANGLE BY WIDTH HEIGHT Icon. Use any Anchor Option. Type 1 for the Width and 0.3 for the Height.

Using the Cursor Option, click above the left end of the geometry on the screen. (Your path created earlier looks like a single horizontal line right now since you are viewing it on edge.)





Next, click on the CREATE LINE PARALLEL AT A DISTANCE Icon.

Type 0.125 for the distance.

Click on the top edge of the rectangle and then just below it.

Next, click on the CREATE LINE AT AN ANGLE Icon. Type –5 for the angle. Click on the left side of the rectangle near the bottom end and then, using the EndEnt Option, click on the bottom end of the left side.





Your construction should look like this:

Click on the TRIM FIRST Icon.

Click on the oblique line that you just made and the on the top edge of the rectangle. (This extends the line up so it touches the top edge.)

Now, click on the XFORM MIRROR COPY Icon.

Click on the oblique line that you just created and hit the ENTER Key.

Click on the 1 Pos V Option on the Conversation Bar. Using the AlongE Option, click on the left end of the top edge of the rectangle. Type 0.1 for the distance.

This creates a second oblique line to the right of the first.



Your construction should look like this:





Next, click on the TRIM DOUBLE Icon.

Click on the top edge of the rectangle between the two oblique lines. Then, click on the two oblique lines.

Your construction should now look like this:

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Click on the XFORM MIRROR COPY Icon.

Select the two oblique lines and the short horizontal line that connects their top ends and hit the ENTER Key.

Use the 1 Pos V Option on the Conversation Bar.

Using the CtrMid Option, click on the bottom edge of the original rectangle.

Your construction should now look like this:





Delete the two remaining vertical lines.

Then, use the TRIM BOTH Function to trim the inner oblique lines to the top, horizontal line.





Your finished profile should look like this:

Now, switch to the Isometric View. (View 7.)





Click on the XFORM OLD-NEW MOVE Icon.

Select the entire profile that you just created and hit the ENTER Key. Using the CtrMid Option, click on the bottom horizontal line of the profile.

Hit the ENTER Key. Then, using the EndEnt Option, click on the front, left end of the path geometry that you created at the beginning of the exercise.

Click on the SWEEP Icon.

A Dialog Box appears. We don't need any of the advanced options so just hit the ENTER Key.

Select the closed profile that you just made and hit the ENTER Key. Then, select the path that you made at the beginning of the exercise.







Click on the CONSTANT RADIUS BLEND Icon. A Dialog Box appears.

Type 0.025 for the Radius and use the Blend Along Smooth Edges Option. Click on the two inner corners at the bottom of the inside sloped faces and hit the ENTER Key. Click on the BACKUP Button. The Dialog Box reappears. Type 0.075 for the Radius. This time, select the four top edges of the swept geometry and hit the ENTER Key.

Now, switch to the Front View. (View 2.)





Click on the XFORM MIRROR COPY Icon. Select the solid and hit the ENTER Key.

Click on the 1 Pos H Option on the Conversation Bar. Using the EndEnt Option, click on the bottom edge of the solid.

This gives you the bottom half of the swept geometry.

Click on the BOOLEAN UNION Icon. Select the two solids and hit the ENTER Key.





Switch back to the Isometric View. (View 7.)

Now, click on the EXTRUDE FACE Icon. Type 1 for the Distance.

Click on the end face at the right, front end of the swept geometry.

This extend the swept solid a little further.



Now, switch to the Top View. (View 1.)





Click on the CREATE HORIZONTAL LINE Icon. Using the EndEnt Option, click on the bottom, left end of the swept geometry.

This creates a line that crosses over the extended right end of the swept geometry.





Click on the TRIM FIRST Icon. Click on the solid above the horizontal line. Then, click on the line.

The swept solid is now trimmed off with both ends aligned. (This is essential so that we can easily position the geometry for the threaded cylindrical boss and opposing clamp pad on the finished part.)

Now, switch back to the Isometric View. (View 7.)





Delete the horizontal line that you used for trimming.



Click on the CYLINDER Icon. A Dialog Box appears.

Select the Two Positions Option. Type 0.625 for the Radius and hit the ENTER Key.

Click on the two profile midpoints at the left end of the swept solid and the two profile midpoints at the right end of the swept solid.





Your screen should look like this:

Click on the EXTRUDE FACE Icon. Type 0.125 for the Length.

Select the right circular face of the left cylinder and then the left circular face of the same cylinder.





Click on the BOOLEAN UNION Icon.

Select the swept solid and the two cylinders and hit the ENTER Key.

Now, click on the SOCKET SCREW Icon.

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A Dialog Box appears. Select the 1-8 UNC Screw C (Length of 2.5 inches.) Make sure the Solid Option is checked. Click on the Fast Setup Button at the top of the box and remove the check from the Create as a Fastener Object Option. Hit the ENTER Key.



Now, click on the CONSTRUCTION PLANE Icon and type 5 for the Plane.

Using the CtrMid Option, click on the right circular edge of the left cylindrical boss on the part. Your screen should look like this:





Click on the BOOLEAN DIFFERENCE Icon. Click on the main solid and then on the screw that you just placed.

This will create the internal threads in the boss.

The last major task is to trim off the cylinder at the right end of the swept geometry.

Switch to View 1. (The Top View.)





Click on the CONSTRUCTION PLANE Icon and select the CP=DV Option.

Click on the CREATE RECTANGLE BY WIDTH HEIGHT Icon. Use the Mid Ctr Anchor Option.

Type 0.5 for the Width and 2 for the Height.





Using the CtrMid Option, click on the left circular edge of the cylindrical boss at the right end of the swept geometry.

Now, click on the CUT Icon.

A Dialog Box appears. Select the Forward and Back Option and Through All for both directions. Hit the ENTER Key.

Select the solid. Then, select the rectangle and hit the ENTER Key.

This trims off the cylindrical boss to final size.







Your clamp frame should now look like this:

You can add the cosmetic blends on your own.