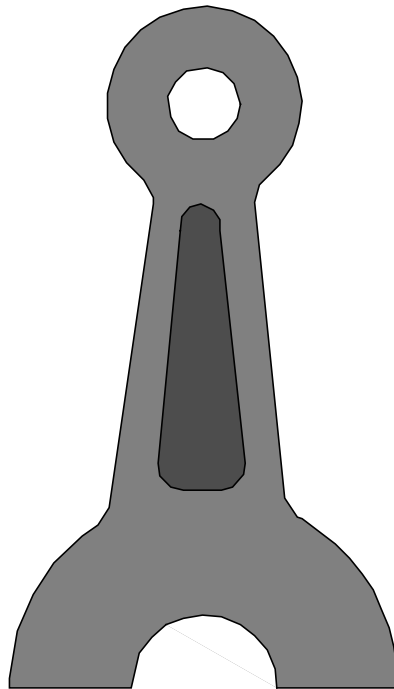


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## LESSON 3

# *Geometry Model of a Connecting Rod*



### **Objectives:**

- Import geometry from an IGES file.
- Create geometry in MSC/PATRAN (Phase I).



**Model Description:**

In this exercise you will create a geometry model of a connecting rod. It will consist of surface entities. First you will import an IGES file. The file contains a surface and curves. The curves will be used to define a trimmed surface in MSC/PATRAN.

**Suggested Exercise Steps:**

- Create a new database and name it **con\_rod.db**. The approximate maximum dimension for this model is 3 units. Use MSC/NASTRAN as the analysis code.
- Import the IGES file named **con\_rod.igs**. Turn off all entity labels except curves.
- Chain together the outer curves in the model to create a continuous loop.
- Create a second single curve by chaining together the edges of the interior surface
- Create a trimmed surface using the chained curves you have created and the circular “hole” at the top of the connecting rod.

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## Exercise Procedure:

1. Create a new database and name it **con\_rod.db**. The approximate maximum dimension for this model is 3 units. Use MSC/NASTRAN as the analysis code.

### File/New Database...

*New Database Name*

con\_rod

OK

### New Model Preference

*Tolerance*

◆ Based on Model

*Maximum Model Dimension*

3

*Analysis Code:*

MSC/NASTRAN

*Analysis Type*

Structural

OK

2. Import the IGES file **con\_rod.igs**. Turn off all entity labels except curves.

### File/Import

*Object:*

Model

*Source:*

IGES

*IGES Files*

con\_rod.igs

Apply

Due to the nature of the contents of the IGES file, MSC/PATRAN will query as to what it should do when it finds duplicate curves. Click on **No For All** when prompted *Do you wish to create a Duplicate Curve?*

The response **No** would continue to prompt you for each duplicate curve found. **No For All** suppresses any further prompts on this topic and tells MSC/PATRAN not to create any duplicate curves.

The *IGES Import Summary* will appear when MSC/PATRAN has completed the importation procedure. Review this information, then click on the **OK** button to close the form.

After importing the file, turn on curve label by selecting the **Label Control** icon from the toolbar.



The *Label Control Panel* will appear and you will select the **Curve** icon.

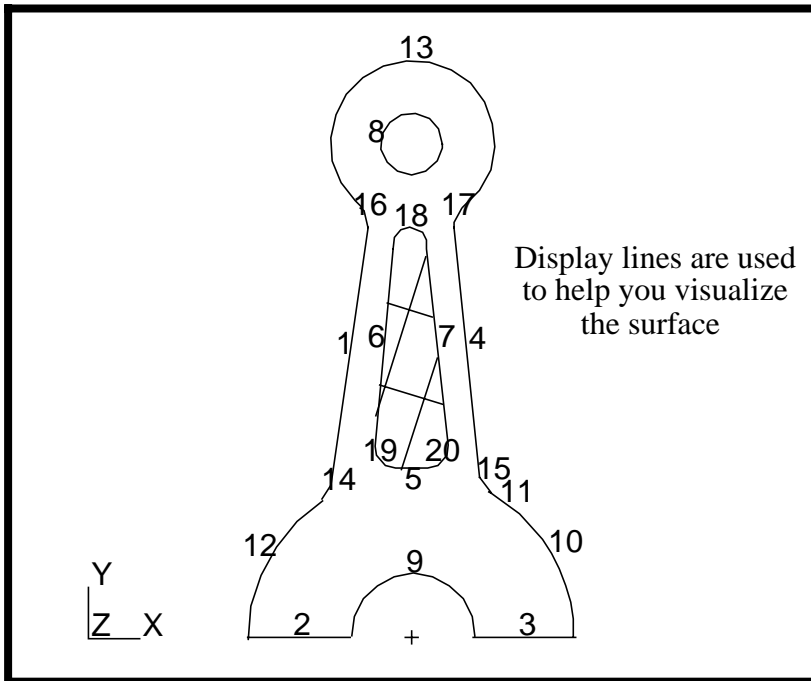


Also, turn on *display lines* by selecting this icon



from the toolbar.

Your viewport should appear as follows:



- Chain together the outer curves in the model to create a continuous loop.

◆ **Geometry**

Action:

**Create**

*Object:*

**Curve**

*Method:*

**Chain**

We will use **Auto Chain** to create the inner and outer boundaries of the trimmed surface. The *Auto Chain* form is activated by pressing on the corresponding button.

**Auto Chain...**

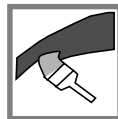
*Select a Start Curve*

**Curve 9**

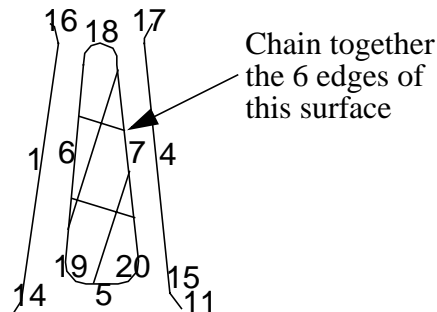
**Apply**

Respond **Yes** when prompted for deletion of the original curves.

Click on the repaint icon in the *Main Form*.



4. Create a second single curve by chaining together the edges of the interior surface.



*Action:*

**Create**

*Object:*

**Curve**

*Method:*

**Chain**

*Curve List*

Change the *Select Menu* icon to indicate that you will be selecting edges as opposed to curves.

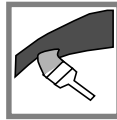


Click and drag a rectangle surrounding the magenta surface.

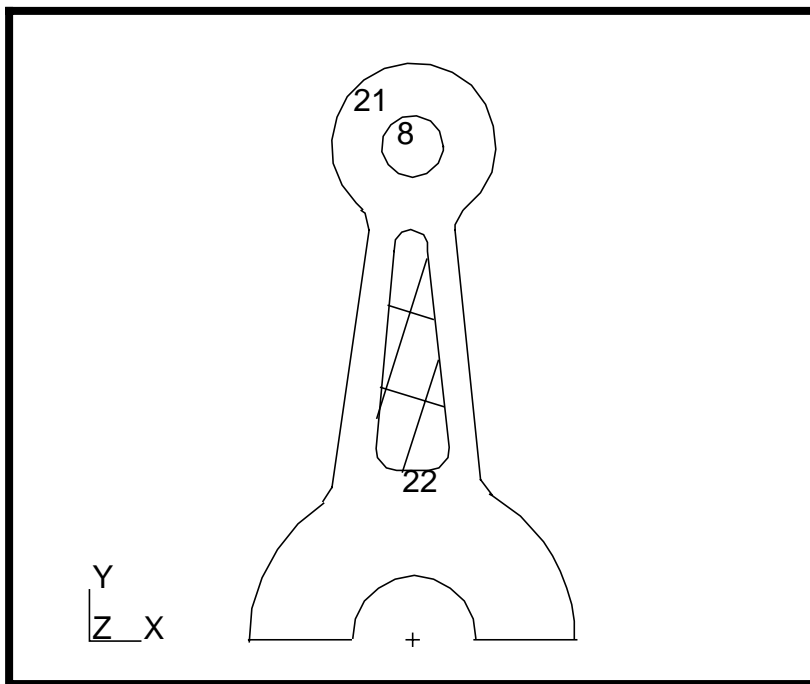
**Apply**

Respond **Yes** when prompted for deletion of the original curves.

Click on the repaint icon.



Your model should appear as follows:



5. Create a trimmed surface using the chained curves you have created and the circular “hole” at the top of the connecting rod.

*Action:*

**Create**

*Object:*

**Surface**

*Method:*

**Trimmed**

*Option:*

**Planar**

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*Outer Loop List*

**Curve 21**

*Inner Loop List*

**Curve 8 22**

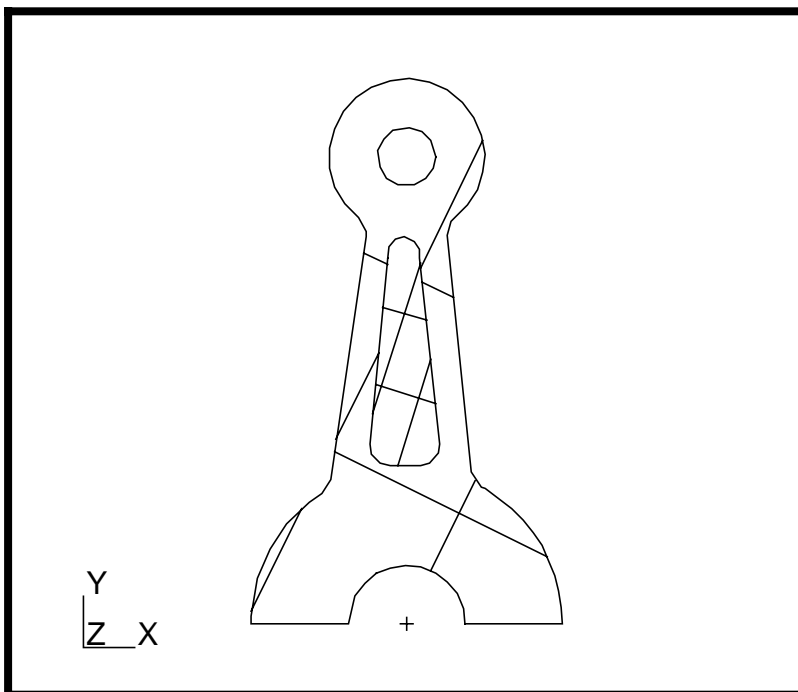
Use multiple picking (Shift + left mouse button) to add Curve 22 to the list. Shift click on the centroid of **Curve 22**. If the desired entity was not picked, use cycle picking: keep the cursor over the centroid of Curve 22 and use Shift-Right Mouse Button until the databox indicates Curve 22.

**Apply**

Notice on the above form that there are two toggle switches for deleting loops: one for the outer loop, and one for the inner loop. Therefore MSC/PATRAN will prompt you twice asking *Do you wish to delete the original curves?*

Answer **Yes** both times.

Your model will appear as follows:



To complete this exercise, close the database.

**File/Quit**