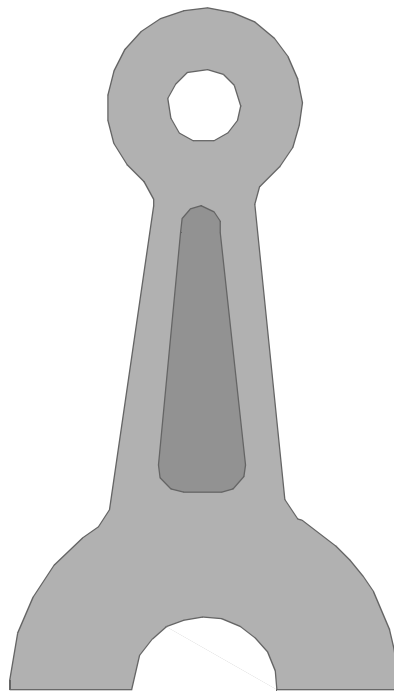# LESSON 3

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.

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.

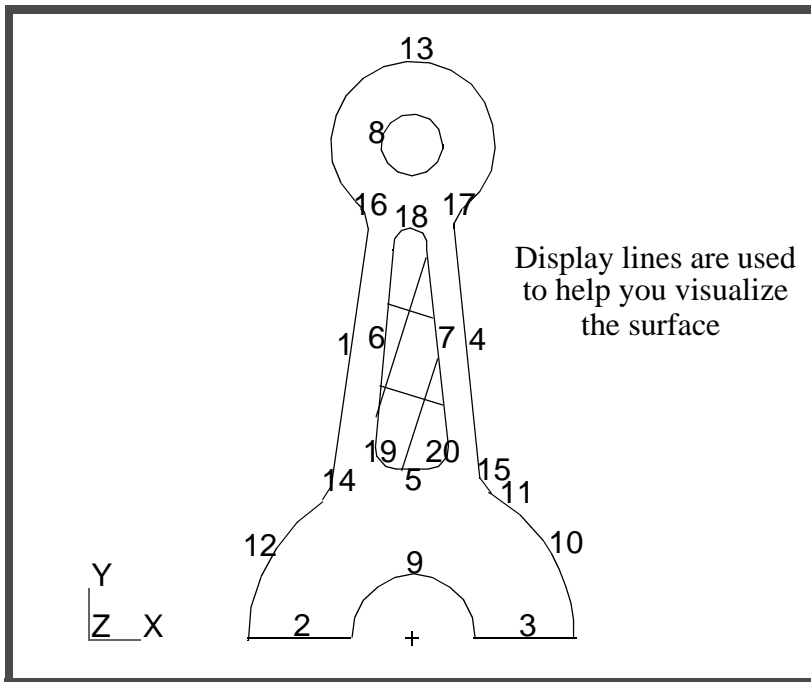The *Label Control Panel* will appear and you will select the **Curve** icon.

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

from the toolbar.

Your viewport should appear as follows:

Display lines are used to help you visualize the surface

3.   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.
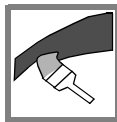
Auto Chain...
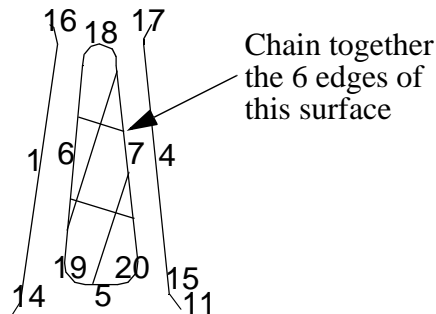
Select a Start Curve | **Curve 9**

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.

Chain together the 6 edges of this 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.
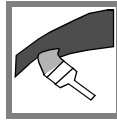
Geometry Model of a Connecting Rod

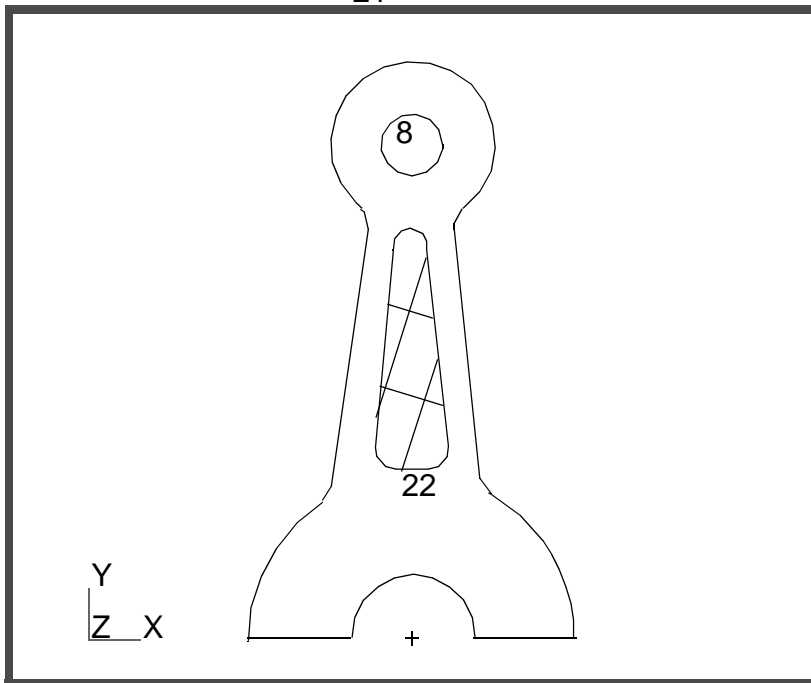Click and drag a rectangle surrounding the magenta surface.

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**

| *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:
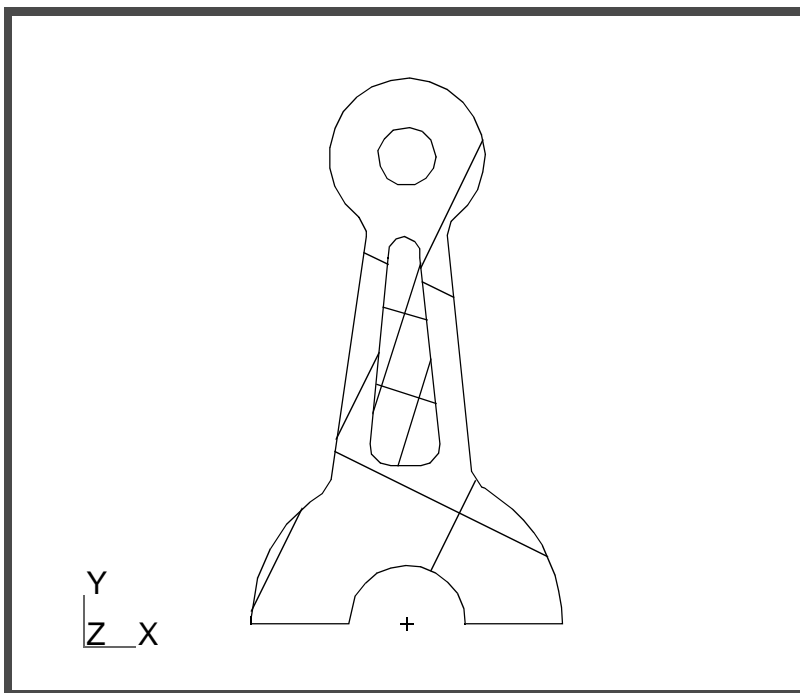
To complete this exercise, close the database.

File/Quit