

CHAPTER 2

Getting Started

How to Use This Guide

The **MSC.visualNastran Desktop Tutorial Guide** is a tool for learning to use the MSC.visualNastran Desktop products. The exercises in this book provide an overview of the software's major features and functionality.

At the start of each Exercise, exercise objectives and required software applications and support files are listed. Step-by-step instructions are numbered, and key terms such as menu names and items are in **bold** print. Sometimes, supplemental information follows an instruction to inform you of new windows, pop-up menus, changes to the model that result from completion of the instruction.

Chapters in this guide may also include the following:

Notes

NOTE: Notes provide important information regarding special situations or exceptions to any stated rule or instruction.

Tips



Tips provide helpful information, such as an alternate way to perform a task or access a menu item. Tips are indicated by the “page and push-pin” graphic.

Figures

The figures in this **Tutorial Guide** are screenshots from the actual MSC.visualNastran Desktop modeling environment. These screenshots augment the written instructions by showing where to find menu items, where to enter information, or how your exercise results should look.

The Modeling Window

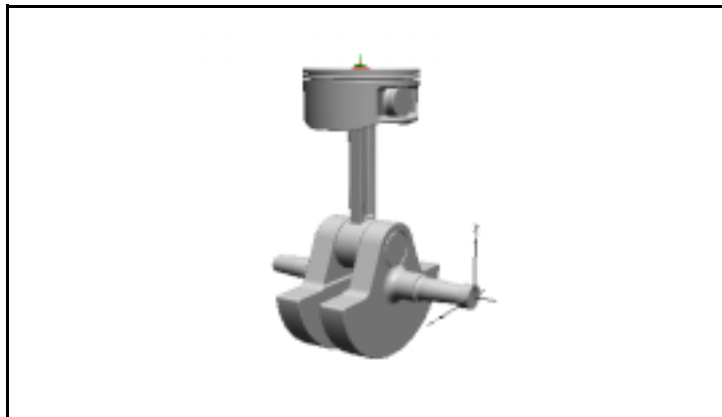
A Model File

To begin to examine the parts of the Modeling Window, first open a file. MSC.visualNastran Desktop files have the suffix **.wm3**. The file you will use in many of the exercises presented in this **Tutorial Guide** is the file **Piston.wm3**.

1. Open the file **Piston.wm3** located in your **Program Files visualNastran Desktop\Tutorials\Chapter 02** directory.

The upper level directory may vary depending on where you installed MSC.visualNastran Desktop. The model of the piston assembly is displayed in the document window, as shown in Figure 2-1.

Figure 2-1
Model of a Piston Assembly



2. Click the **Run** button in the **Tape Player Control** at the bottom of the window.

This base model shows the piston mechanism in motion, driven by the motor attached to the crankshaft. Since this is the first time the simulation is being run, MSC.visualNastran Desktop calculates the dynamics and stores the data. Once the motion history is calculated, the simulation will run faster in subsequent runs.



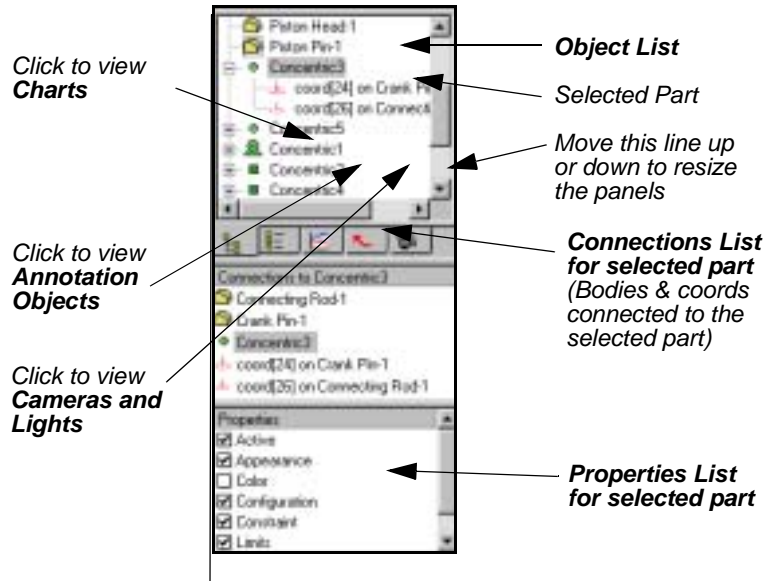
3. Repeat the simulation by clicking the **Stop** button, then the **Reset** button, and then the **Run** button again.

The animation may be faster this time because the history has already been calculated.

Part Relationships

You can see how the parts of the model are connected by selecting them in the **Object Manager** that appears along the left edge of the document window. The **Object Manager** is shown in **Figure 2-2**.

Figure 2-2
The Object Manager



- When you select a **body** (such as **Connecting Rod-1**) in the **Object List** or the **Connections List**, all of the constraints (such as **Concentric3**) and coords (such as **coord[38]**) connected to that body are displayed in the **Connections List**.

- When you select a **constraint** (such as Concentric3) in the **Object List** or the **Connections List**, all of the bodies and coords connected to that constraint are displayed in the **Connections List**.
- When you select a **coord** (such as coord[38]) in the **Object List** or the **Connections List**, all of the bodies and constraints connected to that coord are displayed in the **Connections List**.

NOTE: Objects that have been hidden in the drawing appear with dimmed icons in the **Object List** and **Connections List**. Although they are hidden, they are still active in the simulation, and you can select them in the lists. You can also run the simulation with the parts hidden so that you can better view the inner workings of a moving assembly.

Next, select various objects in the **Object Manager**.

1. Select **Piston Head-1** in the **Object List**.

The constraints and coords connected to the piston head are displayed in the **Connections List**.

2. Select **Concentric6** in the **Connections List**.

The **Connections List** now shows that **Concentric6** connects the piston head, **Piston Head-1**, to the piston pin, **Piston Pin-1**.

The Properties Window


In the **Properties** window, you can define the properties of your model. Open the **Properties** window for **Concentric6**.

1. Double-click **Concentric6** in the **Connections List**.

The **Properties** window displays the properties of **Concentric6**, as shown in **Figure 8-3**.

Figure 2-3
The Properties Window



 You can display the **Properties** window for an **Object** or **Connection** by 1) double-clicking the item's name in the **Object Manager**, 2) double-clicking the object within the model, or 3) right-clicking the object or object name and selecting **Properties** from the pop-up menu.

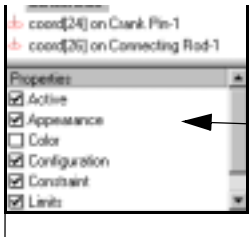
2. Select other objects in the **Object List**.

As you select each object, it is highlighted in the modeling window and its properties are displayed in the **Properties** window.

You can customize the **Properties** window for any object by adding or removing tabbed pages from the window. To add or remove pages, simply check or uncheck the page names in the **Properties List**.

3. In the Object List, right-click **Piston Head-1** and choose **Properties** from the pop-up menu.
4. Click the checkbox for **Surface Rendering** in the **Properties** list of the **Object Manager**.

Figure 2-4
The Properties List



Properties List
for selected part

This enables the **Surface Rendering** page of the **Properties** window.

What's To Come?

In the chapters that follow, you will learn to use features of MSC.visualNastran Desktop in each of its functional categories:

- Motion and Stress analysis: Chapter 6 - Analyzing a Model, Chapter 7 - Building a Model, Chapter 8 - Stress Simulation, Chapter 10 - Belts and Gears, Chapter 11 - Heat Transfer
- Visualization: Chapter 3 - Viewing and Visualization
- Physics-based animation: Chapter 4 - Animating a Model
- CAD Integration: Chapter 5 - Exploring CAD Integration
- Simulink Integration: Chapter 9 - Simulink Integration

As you work through each exercise, please feel free to do further exploration on your own --- What would happen if I redefine the gravitational load? How would adding a new load affect my stress analysis? etc. Such exploration greatly benefits your total learning experience.