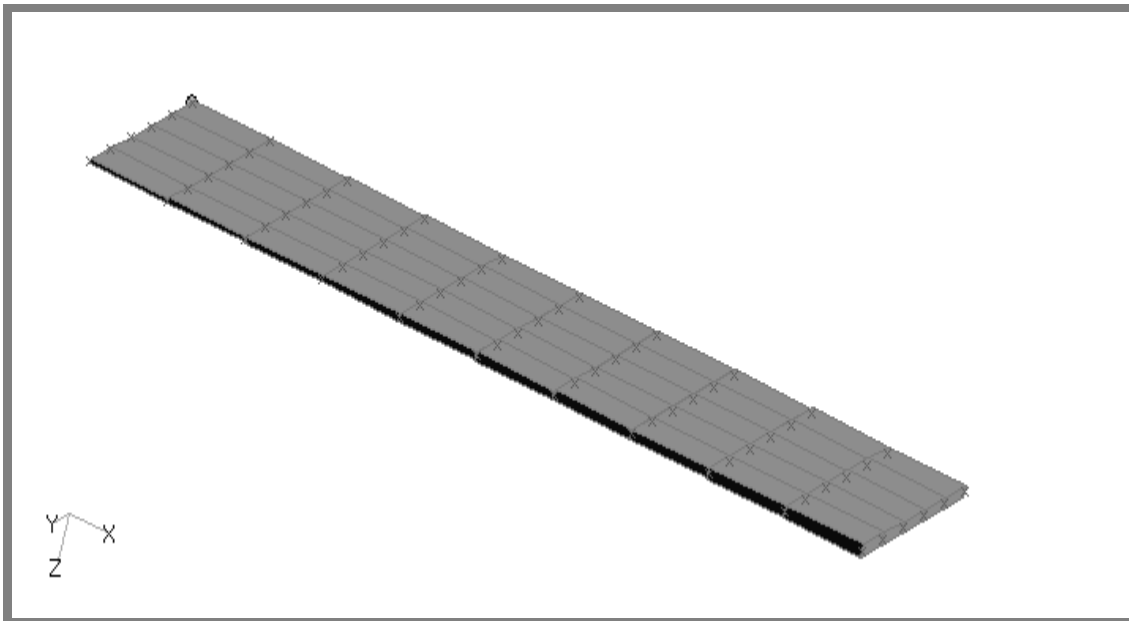


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## WORKSHOP 26b

---

# *Plate w/Varying Thickness- Stepped*



### **Objectives:**

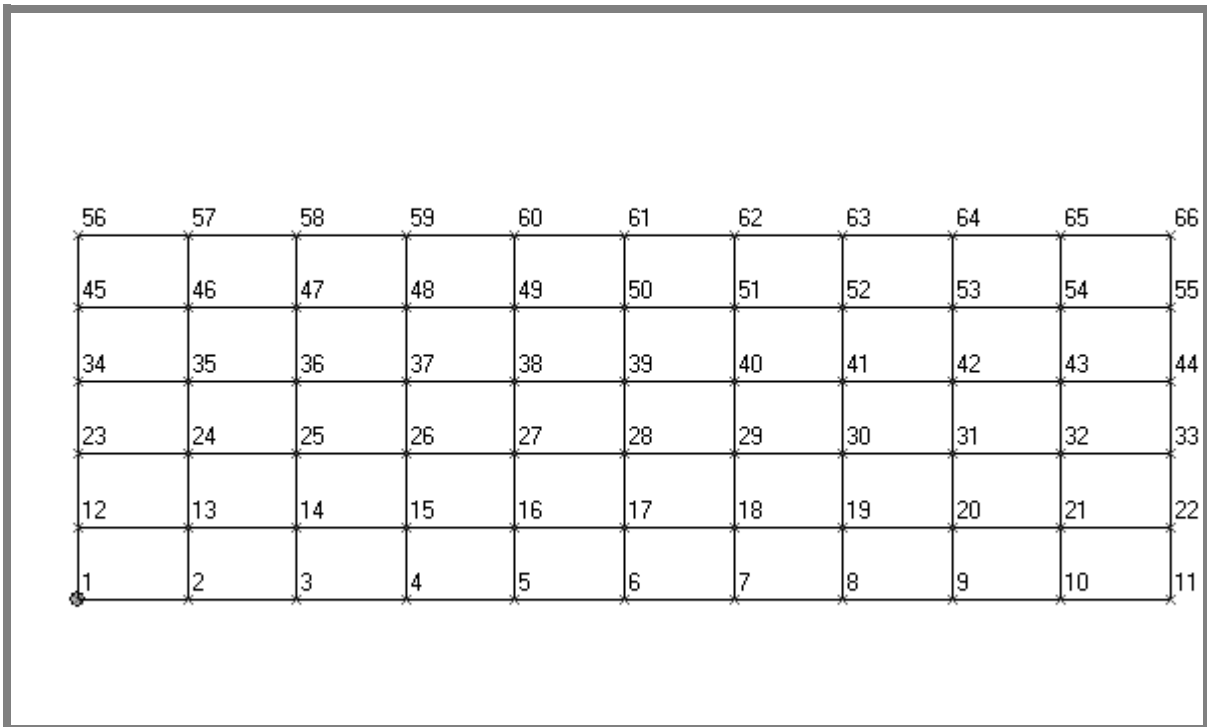
- Open an existing model with tapering thickness.
- Change the thickness option to create a model with changing thickness in steps.



**Model Description:**

In this exercise, we will create a 30 in x 10 in plate with varying thickness. MSC.Nastran for Windows V4.0 will be used to create the varying thickness by inputting a function of  $0.1+0.01x$ , where x is the x-coordinate of the Node ID. This exercise will create a stepped section for a plate.

**Figure 26b.1 - Grid Coordinates and Element Connectivity**



**Table 26b.1 - Material Properties**

<b>Length (a):</b>	<b>30 in</b>
<b>Height (b):</b>	<b>10 in</b>
<b>Youngs Modulus:</b>	<b>10E+06 lb/in<sup>2</sup></b>
<b>Poisson's Ratio:</b>	<b>0.3</b>
<b>Weight Density:</b>	<b>0.1 lb/in<sup>3</sup></b>

---

## Exercise Procedure:

1. Start up MSC.Nastran for Windows V4.0 and begin to create a new model.

Double click on the icon labeled **MSC.Nastran for Windows V4.0**.

On the *Open Model File* form, change to **c:\temp** directory and open the model from the previous exercise.

*Open Model File:*

taper

Open

2. Reapply the equation that will vary the thickness.

**Modify/Update Elements/Adjust Plate...**

Select All

OK

Under *Method* input the following:

**Equation or Constant**

*ID Variable:*

i

*Value:*

**0.1 + 0.01\* XND( ! i )**

Check the **Average for Each Element** box. This will make the thickness increase in steps.

**Average for Each Element**

Under *Update* select the following:

**Thickness**

OK

3. Regenerate the display.

**View/Regenerate**

As you can see, the thickness increases in steps. In the Nastran bulk data file, the PSHELL card creates for stepped behavior.

4. Write the Nastran bulk data file.

**File/Export/Analysis Model...**

**OK**

Change the directory to **c:\temp**.

*File Name:*

**step**

**Write**

**OK**

Save the model.

**File/Save As...**

*File Name:*

**step**

**Save**

5. View the NASTRAN bulk data file.

Minimize NASTRAN for Windows and open Notepad. Change to the **c:\temp** directory and open **taper.dat**. Your file will contain PSHELL cards like shown below which determine the varying thicknesses of the model.

```

PSHELL    1    1    0.1    1        1        0.
PSHELL    2    1    0.1    1        1        0.
PSHELL    3    1    0.13   1        1        0.
PSHELL    4    1    0.16   1        1        0.
PSHELL    5    1    0.19   1        1        0.
PSHELL    6    1    0.22   1        1        0.
PSHELL    7    1    0.25   1        1        0.
    
```

This concludes the exercise.

