LESSON 12

Verification of a Stiffened Plate Model
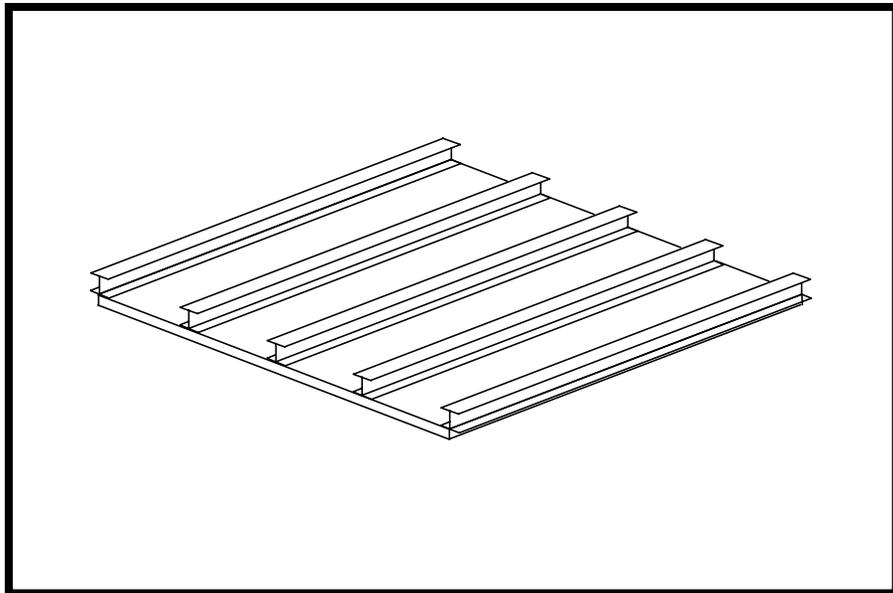
Objectives:

■ Become familiar with MSC/NASTRAN error and warning messages arising from common modeling mistakes.

■ Import an Analysis Model into MSC/PATRAN via the MSC/NASTRAN Input File.

■ Use MSC/PATRAN to verify the validity of an existing MSC/NASTRAN model.

Model Description:

The model used for this exercise is identical to the model used for Lesson 8.
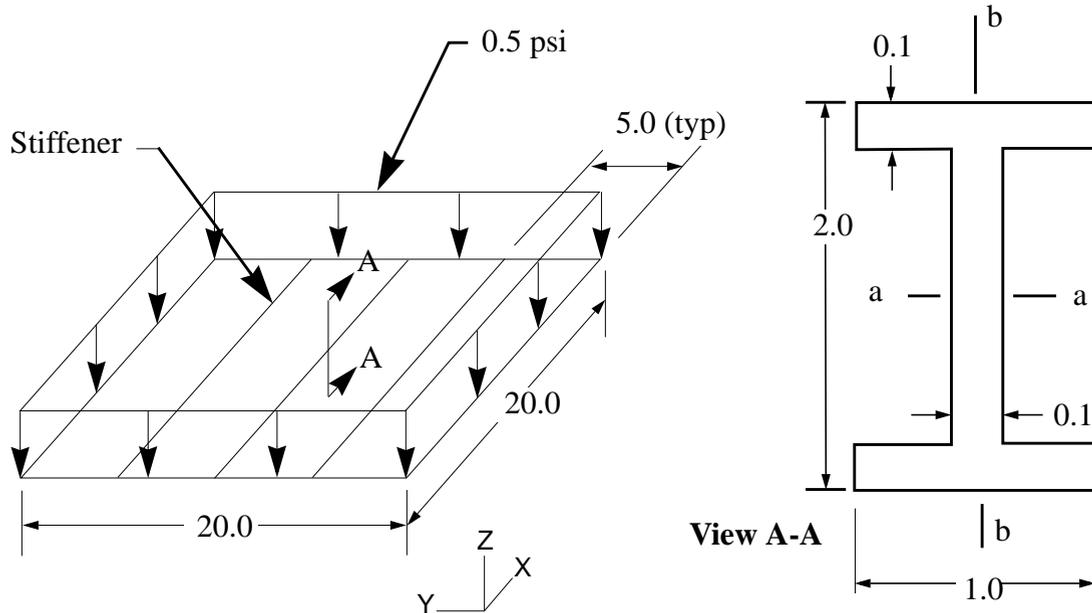
Elastic Modulus:	**10.3E6 psi**
Poisson Ratio:	**0.3**
Density:	**0.101 lbs/in^3**
Plate Thickness:	**0.1 in**
Bar cross sectional area:	**0.38 in^2**
I$_{aa}$:	**0.2293 in^4**
I$_{bb}$:	**0.0168 in^4**
J:	**0.0013 in^4**

Exercise Procedure:

Imagine being hired by a major structural engineering firm. On your first day, your manager gives you a legacy MSC/NASTRAN input file and all of one hour to submit the model for analysis and prepare a strength report which your manager plans to support his bid for a major contract. Sounds easy enough, right? Think again!

It is enough of a challenge for you to generate a valid finite element model on your own, but to inherit a model of which you nothing about from someone you wouldn't know from Adam?? Well, it does happen....

And it is going to happen here... fortunately for you we are informing you that the model for this exercise is "broken". We took the solution MSC/NASTRAN input file from Lesson 8 and DELIBERATELY embedded common modeling errors encountered in industry. Your job is find out what these errors are and resolve them.

1. The MSC/NASTRAN input file you will be starting with is **lesson12_work.bdf**.

2. Submit this file to the MSC/NASTRAN solver for analysis. To do this, find an available xterm window and at the prompt enter:

nastran lesson12_work.bdf scr=yes

Monitor the run using the UNIX **ps** command.

3. When the run is completed, edit the **lesson12_work.f06** file and search for the words **WARNING** and **FATAL**.

Although **WARNING** messages are, for the most part, informative and will not interrupt an analysis, it is a good idea to review these messages just in case they may be an indication of a more serious problem.

FATAL messages, on the other hand, indicates a definite problem with your system, input file format and/or the integrity of your model and will halt the analysis once encountered. These should be addressed as soon as possible.

4. The MSC/NASTRAN solver will find all of the errors we embedded in the "broken" input file for this exercise. The **CAVEAT** is that it **may not find ALL of them during the same run**!

If undesirable WARNING and/or FATAL messages appear in the lesson12_work.f06:

4a. Make a copy of the lesson12_work.bdf input file.

4b.   Edit this copy to resolve any critical issues.

4c.   Submit the revised input file to the solver.

4d.   Continue this process until your <jobname>.f06 contains no more WARNING and/or FATAL messages.

5.   Congratulations! You have successfully revised the "broken" model to the point where the solver does not issue undesirable WARNING and/or FATAL messages. HOWEVER, this **does not mean** that your model is acceptable.

6.   Invoke MSC/PATRAN and create a new database called **lesson12.db**.

File/New...

New Database Name: | **lesson12** |

OK

In the New Model Preference form set the following:

Tolerance: ◆**Default**

Analysis Code: | **MSC/NASTRAN** |

Analysis Type: | **Structural** |

OK

7.   Import your model via the <jobname>.bdf which spawned your most current <jobname>.f06 into MSC/PATRAN.

◆ **Analysis**

Action: | **Read Input File** |

Object: | **Model Data** |

*Method***:** | **Translate** |

Select Input File...

Filter

Selected Input File: *select the desired* **.bdf** *file*

OK

Apply

8. Also, import the corresponding <jobname>.op2 file.

◆ **Analysis**

Action: | Read Output2 |

Object: | Result Entities |

Method: | Translate |

Select Results File...

Filter

Selected Results File: *select the desired .op2 file*

OK

Apply

When translation is completed and the Heartbeat turns green, bring up the **Results** form.

◆ **Results**

Action: | Create |

Object: | Quick Plot |

Choose the desired result case in the **Select Result Cases** list and select the result(s) in the **Select Fringe Result** list and/or in the **Select Deformation Result** list. And hit **Apply** to view the result(s) in the viewport.

9. Use the MSC/PATRAN model verification and post-processing features to assess whether or not the model & results make sense (relative to the model & results for Lesson 8). If they do make sense, great job!. If not, you have a little more work to do before giving the results to you manager.

10. If there are still problems with your model, resolve these problems in MSC/PATRAN. Once completed, generate a new input file using the the same preparation procedures used in Lesson 8.

11. Submit this new input file, check the <jobname>.f06 file, & post-process in MSC/PATRAN. Your results and those from Exercise 8 should be identical.

NOTE: In a real-life situation, you would have verified the original input file in a pre-processor such as MSC/PATRAN before submitting the input file to the solver. Had we used MSC/PATRAN **first** for this Lesson, we may have been spared a few iterations. But in the event that a pre/post-processor is not available at your site, the iteration process you underwent prior to verifying model & results in MSC/PATRAN is realistic.

Provided below is a log where you can document the problems you encounter during this Exercise.

Item	WARNING/ FATAL Message Number	Message	What Caused This Message?