Knowledge Base

Plug-in utility to automatically convert NASTRAN CWELD definitions to Abaqus fastener definitions

Portfolio / Domain: SIMULIA Abaqus Unified FEA / SIMULIA Abaqus Unified FEA
Product: n/a

QUESTION

I have a NASTRAN model that contains CWELD spotweld definitions. I would like to convert these to fasteners in an Abaqus model. Is there an automated way to complete this task?

ANSWER

An Abaqus/CAE plug-in for this task is attached below.

Installation

To install the plug-in, download and save the attached archive to one of the following directories:
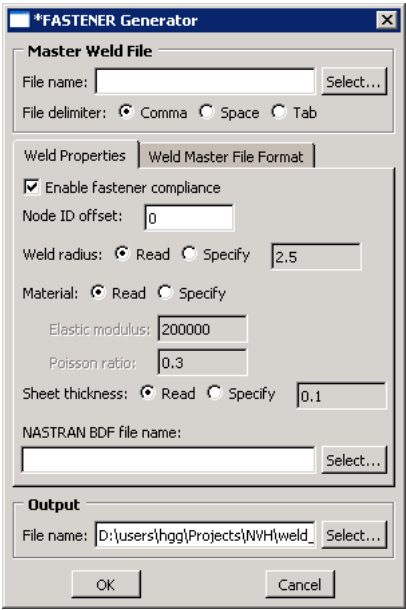
- *abaqus_dir*\abaqus_plugins where *abaqus_dir* is the Abaqus parent directory
- *home_dir*\abaqus_plugins where *home_dir* is your home directory
- *current_dir*\abaqus_plugins where *current_dir* is the current directory

Note that if the abaqus_plugins directory does not exist in the desired path, it must be created. The *plugin_dir* directory can also be used, where *plugin_dir* is a directory specified in the abaqus_v6.env file by the environment variable **plugin_central_dir**. You can store plug-ins in a central location that can be accessed by all users at your site if the directory to which **plugin_central_dir** refers is mounted on a file system that all users can access. For example,

        plugin_central_dir = r'\\fileServer\sharedDirectory'

On Windows platforms, right click on the archive file and select **WinZip → Extract to here**. On Linux platforms, type **unzip CWELD_plug-in_1_2_2.zip** at the command prompt. Note that the plug-in will not function properly if this procedure is not followed.

The next time Abaqus/CAE is started, a menu item named **from CWELD...** will be available in the **Plug-ins** pull down menu from the **Visualization** module. Select **Plug-ins → NVH → Create Fasteners → from CWELD...** to invoke the plug-in dialog box:

Usage

The *FASTENER generator plug-in creates either compliant or rigid fastener definitions from a weld master file (.wmf). The weld master file is an ASCII formatted file that may be comma (default setting for the plug-in), tab, or space delimited, and contains information regarding spot welds in a structure. The output from this utility is an Abaqus input file containing the corresponding *FASTENER information; this file is then included in an Abaqus analysis.

There are two ways of creating spot welds based on a given weld master file:

1. Reading the corresponding NASTRAN bulk data .bdf file directly

   A Nastran bulk data file may be specified to define weld radii, material properties or shell thicknesses.

2. Explicitly specifying the weld material properties and the thicknesses of the shells being joined.

Please refer to the attached plug-in documentation for detailed technical descriptions, including installation directions and a discussion of how the stiffness values of compliant welds are defined.

An example weld master file is attached for demonstration purposes. To use the example .wmf file, first launch the plug-in. From the GUI, read the Test_wmf.wmf file, enable fastener compliance, specify weld radius (say 2.5), material properties and sheet thickness, and write out an input file for the spot welds. This file will contain Abaqus node, fastener, and connector definitions. A file of this type can then be included in your Abaqus model via the *INCLUDE keyword.

For additional information see:

- 'Mesh-independent fasteners'
  - Section 34.3.4 of the Abaqus 6.12 Analysis User's Guide
  - Section 35.3.4 of the Abaqus 6.13 Analysis User's Guide

Revision History

18 Oct 2004	Release of Version 1.1
26 Sep 2007	Release of Version 1.2-1. Package syntax added.
06 May 2008	Release of Version 1.2-2. Fixed command syntax error.

Disclaimer

The attachments on this article are subject to certain usage conditions. Please click here for details.

| KEYWORDS | weld, spotweld, spot weld, fastener, nastran, bdf, 2194 |

| ATTACHMENT | CWELD_plug-in_1_2_2.zip   Test_wmf.wmf   Fastener_plugin_documentation.doc |
| | Answer_2194_Fig1.png |

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