

Knowledge Base

Information

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Plug-in utility to automatically convert NASTRAN CDH/SPOT definitions to Abaqus mesh-independent fasteners

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

QUESTION

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

ANSWER

(The following applies to Versions 6.5 and higher)

An Abaqus/CAE plug-in application for this purpose is attached below. The plug-in creates rigid (MPC) *FASTENER definitions from NASTRAN CDH/SPOT weld definitions. The output from this utility is an Abaqus input file containing the corresponding *FASTENER information; this file must then be included in your regular Abaqus analysis input file.

Installation

To install the plug-in, download and save the attached archive to one of the following directories:

- *abaqus_dir*\cae\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 CDH_SPT_plugin.zip` at the command prompt. Note that the plug-in will not function properly if this procedure is not followed.

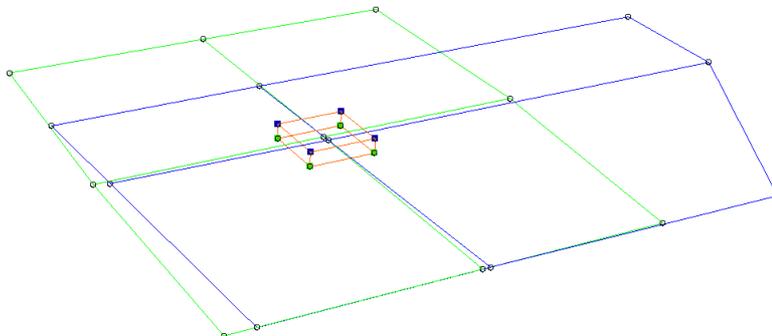
The next time Abaqus/CAE is started, a menu item named **from CDH/SPOT...** will be available in the **Plug-ins** pull down menu from the **Visualization** module. Select **Plug-ins** → **NVH** → **Create Fasteners** → **from CDH/SPOT...** to invoke the plug-in dialog box:



A Nastran Bulk Data File (.bdf) name and an output file name need to be specified. Upon execution of the dialog, an Abaqus input file is created.

Usage

In the CDH/SPOT modeling approach, the weld nugget is approximated as a single hexagonal element. A schematic example is shown in the diagram below, where the solid element is located in between two sets of shell elements (blue on top and green on bottom).



The plug-in determines the centroid of the hexagonal element and uses it as a reference node for creating a rigid BEAM MPC fastener, where it is assumed that only two sheets are being welded. The search radius for the Abaqus *FASTENER definition is set to one-third the height of the hex element and the radius of influence is equal to

$$R_{inf} = \sqrt{\frac{Area}{2\pi}}$$

where *Area* is the area of the bottom face of the hex weld nugget element. Note that:

1. All the CDH spot welds from a model must be in the same .bdf file before the plug-in is used
2. The elset name for the *SURFACE option in the Abaqus fastener input file must be set to the appropriate value. Currently it is hard-coded with the name ALL_SHELL_ISO, which is also provided by the Abaqus **fromnastran**

translator in the translated model.

An example .bdf file is attached for demonstration purposes.

Disclaimer

The attachments to this article are subject to certain usage conditions. Please [click here](#) for details.

Revision History

01 Jun 07	Answer created
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KEYWORDS **Nastran, spot, weld, convert, fastener, plug, plug-in, cwelds, cdh, 3440**

ATTACHMENT

- Answer_3440_Fig2.png
- Answer_3440_Fig1.png
- cdh_welds.bdf
- Answer_3440_Eq1.gif
- CDH_SPT_plug-in.zip

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