checkSTRESS-to-PIPESTRESS Conversion

This section describes in detail, the methodology followed for transferring the Piping System from checkSTRESS to PIPESTRESS.

Note:

Analysis module of CAEPIPE is built into checkSTRESS. Hence, the word Element and Data Types described in this manual refers to CAEPIPE Element and Data Types.

1.0 Limitations

1. For To-be-Designed hangers, 'VSUP' card is created, but is commented. The user has to fill the values for 'FO' (hot load) and 'LO' field.
2. 'VSUP' card for user hanger is created and commented if cold load for user hanger is specified in the CAEPIPE mod file. The user has to fill the 'FO' (hot load) field manually.
3. Non-linear load cases for limit stops and rod hangers are not created. The user has to create them manually.
4. Slip joint is not transferred.
5. Jacketed pipe and jacketed bend are not transferred.
6. Spider is not transferred.
7. Guide is not transferred.
8. 'Connected to' node information, if present (as in the case of 'To be designed Hanger', 'User Hanger', 'Rod Hanger ','Skewed Restraint', 'Limit Stop' etc. in CAEPIPE), is ignored by the interface.
9. Pump, Compressor and Turbine data are not transferred at this time.

2.0 Reference

See Chapter 5 titled "Reference" in CAEPIPE-to-PIPESTRESS User's Manual (CPTOPS.pdf) for further details.

3.0 Verification and Validation

checkSTRESS Nuke (hereinafter called checkSTRESS) has 3 built-in modules as described below.

Module 1 reads and converts the 3D Plant Design software data into checkSTRESS format. Since the 3D Plant Design software can be customized by any client and since this front-end Module 1 of checkSTRESS can also be customized by the client, the validation of Module 1 has to be carried out by each client.

Module 2 is the main engine of checkSTRESS, the source code of which is identical to that of CAEPIPE. Using the "Edit Layout" command of checkSTRESS, one can build a stress model (.mod file) from scratch (that is, independent of any 3D Plant Design software, like done by stand-alone CAEPIPE). That checkSTRESS model can then be analyzed by the analysis processor of checkSTRESS (which is identical to that of CAEPIPE). checkSTRESS post-processor displays only those results that are relevant to the 3D Piping Designers. This post-processor of checkSTRESS is a subset of the post-processor of CAEPIPE.

Module 3 converts the checkSTRESS model (.mod file) into the free format input (.fre file) for DST's PIPESTRESS. The source code of this module is identical to that of CAEPIPE to PIPESTRESS Translator (CPTOPS).

To verify and validate the translation, a number of models were created using CAEPIPE with different analysis options and complexity. Using CPTOPS (as stated under Module 3 above), each CAEPIPE model was then transferred to PIPESTRESS Input file". Analysis was then performed using PIPESTRESS and the results thus obtained were compared against CAEPIPE results (i.e., Support Load Summary for Anchors and Frequencies).

Verification models developed are presented in Section titled "6.0 Verification and Validation of Translator" in CAEPIPE-to-PIPESTRESS User's Manual (CPTOPS.pdf) with increasing complexity, starting from a four-node piping system to piping system with many more elements and data types.

Refer to CAEPIPE-to-PIPESTRESS User's Manual (CPTOPS.pdf) for further details.