Altair

HyperWorks

Altair HVVH Tutorials 2019

HVVH-5000: FE Model Tab

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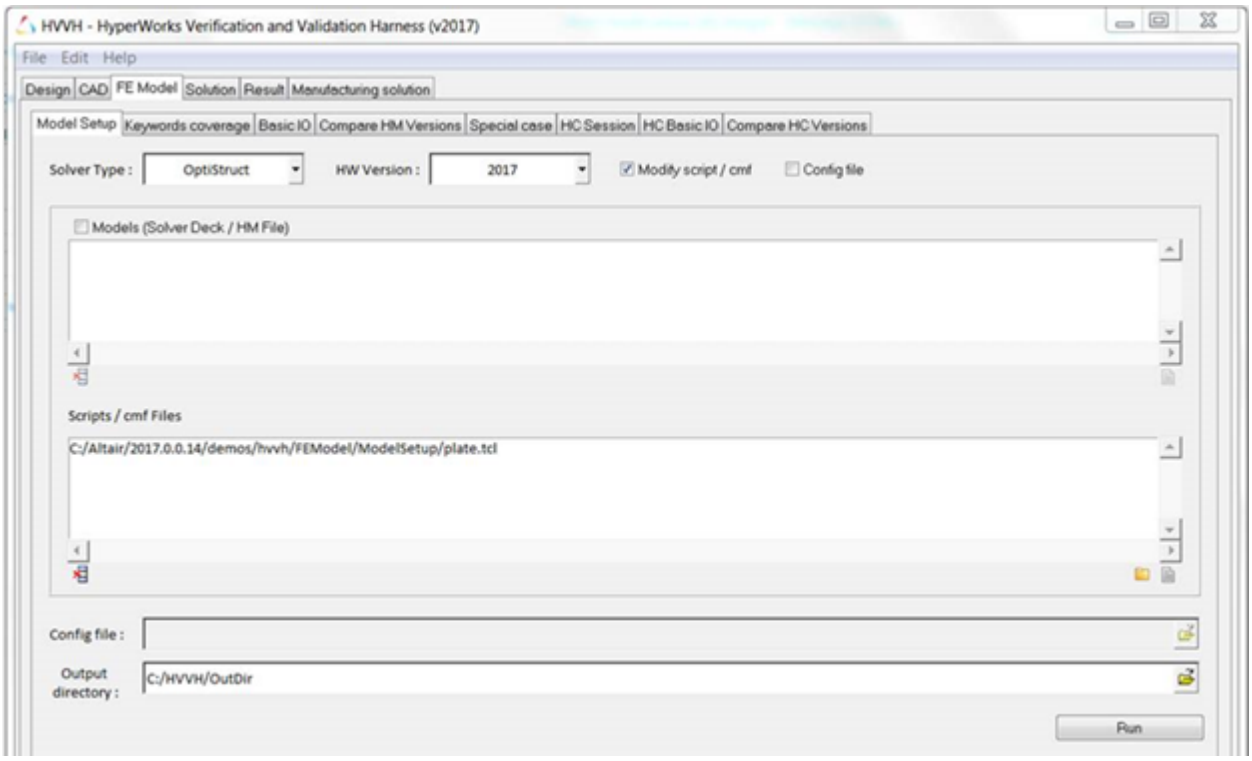
In this tutorial, you will learn how to:

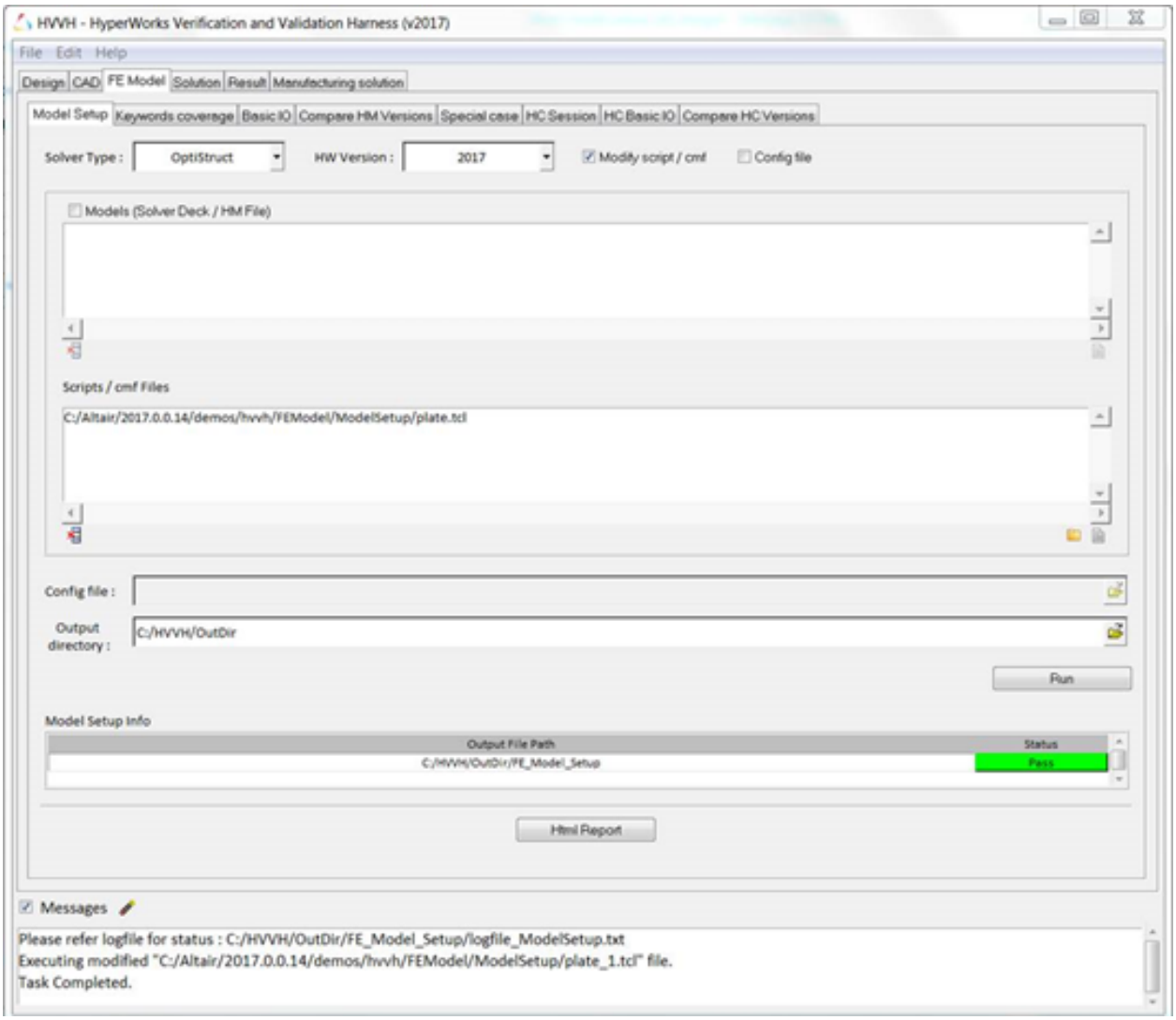
- Perform model setup in Altair HyperMesh and identify any problems during the interactive Altair HyperMesh operation.

Step 1: FE-Model setup, first use case.

1. From **FE Model** tab, select the ***Model Setup*** tab.



2. For **Solver Type**, select ***OptiStruct***.
3. For **HW Version**, select ***2017***.
4. Activate the ***Modify script/cmf*** check box.
5. Do not select the **Config file** or **Models** option.
6. Under **Scripts/cmf files**, use the file browser icon, , or the add file icon, , to select and open the `Plate.tcl` file, located in `..\tutorials\hvvh\FEModel\ModelSetup`.
7. For the ***Output directory*** field, use the open file icon, , to select an output directory.
8. Click ***Run***.



The model file with the script is imported and a set of operations in Altair HyperMesh are executed. The status is displayed under **Model Setup info.**

9. If the selected Tcl file is executed correctly and there are no problems with the Altair HyperMesh operations, the status shows **Pass**.
10. In the **Messages** window, the run details are displayed along with the log file location.
11. Click ***HTML Report*** to open an HTML report, which contains details of the script executed Altair HyperMesh.

Step 2: FE-Model setup, second use case.

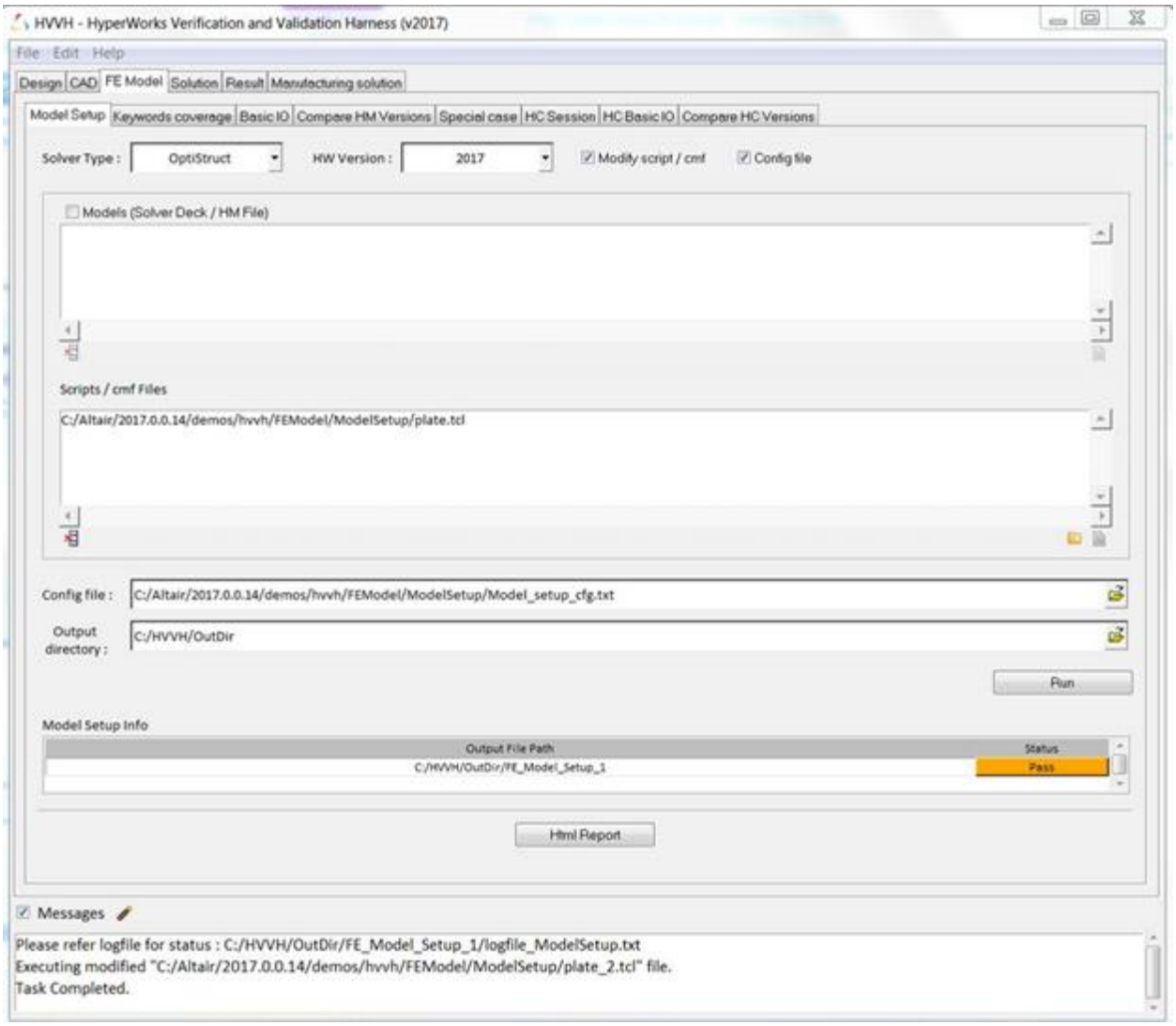
1. From **FE Model** tab, select the ***Model Setup*** tab.
2. For **Solver Type**, select ***OptiStruct***.
3. For **HW Version**, select ***2017***.
4. Activate the ***Modify script/cmf*** and ***Config file*** check boxes.
5. Do not select the **Models** option.

6. Under **Scripts/cmf files**, use the file browser icon,  , or the add file icon,  , to select and open the `Plate.tcl` file, located in `..\tutorials\hvvh\FEModel\ModelSetup`.

7. For **Config file**, use the file browser icon,  , to open the `Model_setup_cfg.txt` file, located in `..\tutorials\hvvh\FEModel\ModelSetup`.

8. For the ***Output directory*** field, use the open file icon,  , to select an output directory.

9. Click ***Run***.



The model file with the script is imported and a set of operations in Altair HyperMesh are executed. The status is displayed under **Model Setup Info.**

When you select the config file, the operation is interactive and Altair HyperMesh starts, allowing you to see the model's interactive operations.

10. If the selected Tcl file is executed correctly and there are no problems with the Altair HyperMesh operations, the status displays **Pass**. If there are additional lines at the end of the `command.tcl` file that are generated compared to the original script, it is highlighted in orange as a warning.
11. In the **Messages** window, the run details are displayed along with the log file location.
12. Click ***HTML Report*** to open an HTML report, which contains details of the script executed Altair HyperMesh.

Step 3: FE-Model setup, third use case (comparison across Altair HyperMesh versions).

1. From **FE Model** tab, select the ***Model Setup*** tab.
2. For **Solver Type**, select ***OptiStruct***.
3. For **Curr Version**, select ***2017.3*** and for **Ref version** select ***2017.0***.
4. Activate the ***Modify script/cmf***, ***Config file*** and ***Ref Version*** check boxes.
5. Do not select the **Models** option.
6. Under **Scripts/cmf files**, use the file browser icon or the add file icon,  , to select and open the `Plate.tcl` file, located in:
   `..\tutorials\hvvh\FEModel\ModelSetup`
7. For **Config file**, use the file browser icon to open the `Model_setup_cfg.txt` file, located in
   `..\tutorials\hvvh\FEModel\ModelSetup`
8. For the ***Output directory*** field, use the open file icon to select an output directory.
9. Click ***Run***.

   The model file with the script is imported and a set of operations are executed in **Current HM version** and **Reference HM version**. The status is displayed under **Model Setup Info.**

   When you select the config file, the operation is interactive and Altair HyperMesh starts, allowing you to see the model's interactive operations
10. If the selected Tcl file is executed correctly and there are no problems with the Altair HyperMesh operations, the status displays **Pass**. If there are additional lines at the end of the `command.tcl` file that are generated compared to the original script, it is highlighted in orange as a warning.
11. In the **Messages** window, the run details are displayed along with the log file location.
12. Click ***HTML Report*** to open an HTML report, which contains details of the script executed Altair HyperMesh.

Step 4: FE-Model - model setup (Process Manager template in work flow).

1. From **FE Model** tab, select the ***Model Setup*** tab.
2. For **Solver Type**, select ***OptiStruct***.
3. For **HW Version**, select ***2017***.
4. Activate the ***Modify script/cmf*** and ***Config file*** check boxes.

5. Do not select the **Models** option.
6. Under **Scripts/cmf files**, use the file browser icon or the add file icon,  , to select and open the `Launch.tcl` file, located in:

   `..\tutorials\hvvh\FEModel\ModelSetup\pmt`

   Note Edit the process template path in `Launch.tcl`.

   For **Config file**, use the file browser icon to open the `Model_setup_cfg.txt` file, located in

   `..\tutorials\hvvh\FEModel\ModelSetup\pmt\ModelSetup.txt`
7. For the ***Output directory*** field, use the open file icon,  , to select an output directory.
8. Click ***Run***.

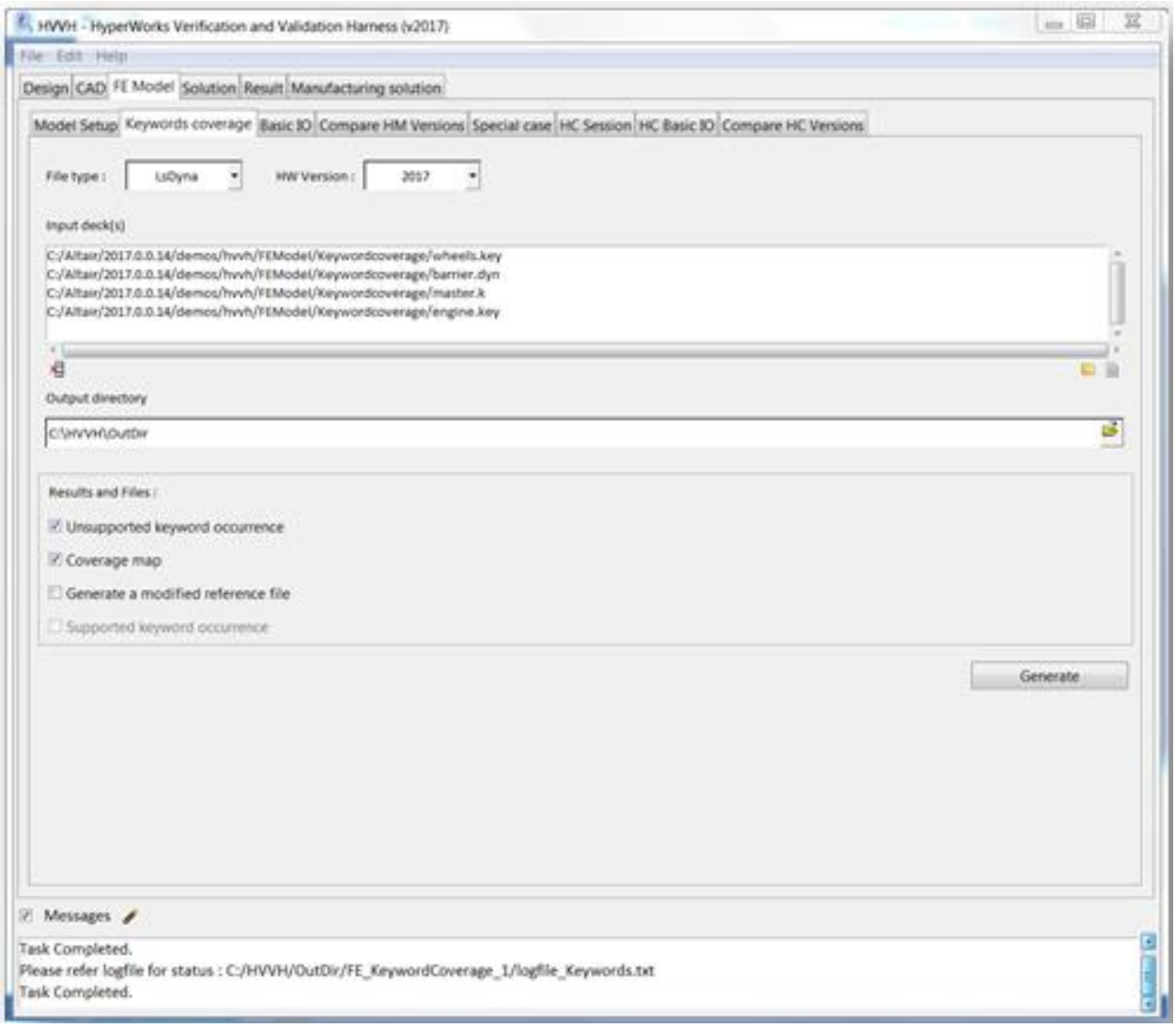
   The PMT will be loaded in selected HyperMesh version. Now, you can execute the process template. The status is displayed under the **Model Setup Info**.

   Note The Config file option should always be ON to execute the Process Manager template, with quit = 1 in `ModelSetup1.txt`. The default of quit = 0 or no entry will continue without waiting for user input.
9. If the selected Tcl file is executed correctly and there are no problems with the Altair HyperMesh operations, the status displays **Pass**. If there are additional lines at the end of the `command.tcl` file that are generated compared to the original script, it is highlighted in orange as a warning.

Step 5: Generate keyword coverage summary.

Extract the details of supported, unsupported, and partially supported keywords from the solver analysis decks

1. From **FE Model** tab, select the ***Keywords coverage*** tab.



2. For **File Type**, select ***LsDyna***.
3. For **HW Version**, select ***2017***.
4. Under **Input deck(s)**, use the file browser icon, , or the add file icon, , to select and open the following files:

   `..\tutorials\hvvh\FEModel\Keywordcoverage\barrier.dyn`

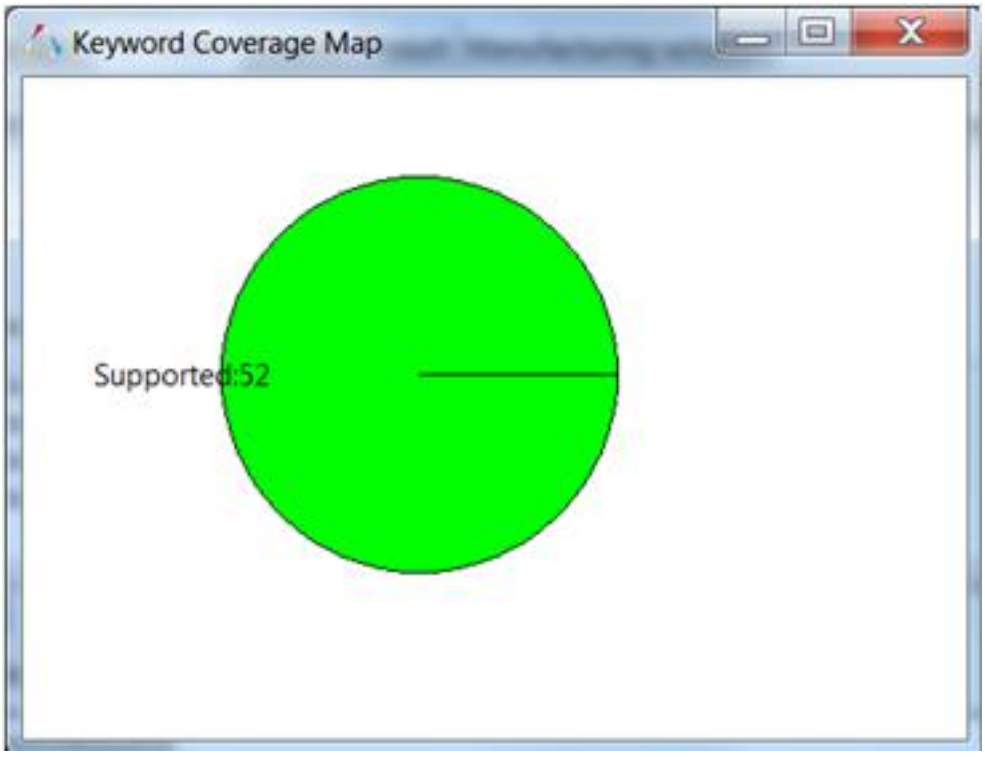
   `..\tutorials\hvvh\FEModel\Keywordcoverage\engine.key`

   `..\tutorials\hvvh\FEModel\Keywordcoverage\master.k`

   `..\tutorials\hvvh\FEModel\Keywordcoverage\wheels.key`
5. For the ***Output directory*** field, use the open file icon, , to select an output directory.
6. Click ***Generate***.

   From the imported solver decks, supported, unsupported, and partially supported keywords are generated.

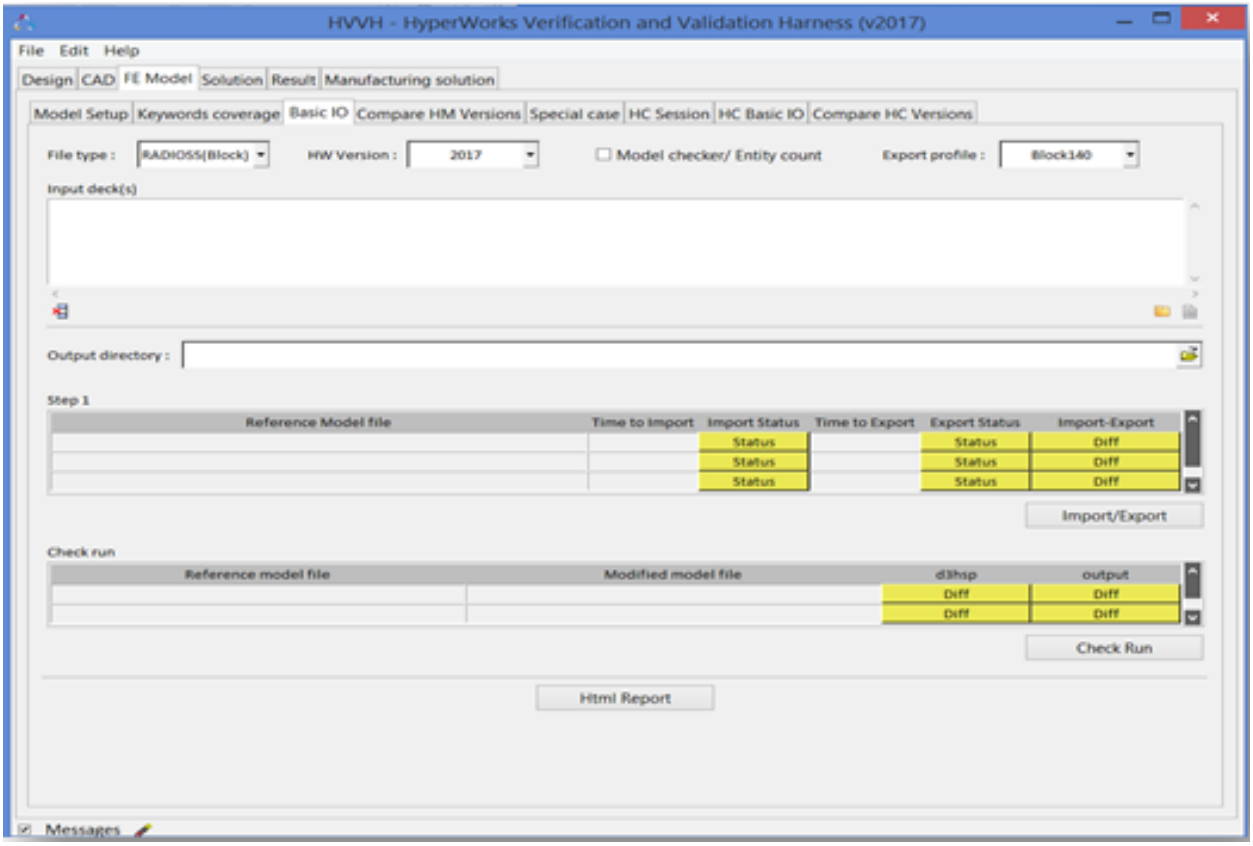
7. In the **Messages** window, the run details are displayed along with the log file location.
8. Click the pie chart to view details regarding the published files, as well as to see details in a document of supported, unsupported, and partially supported keywords based on the analysis decks. All individual and combined files are listed in the document.



Step 6: Basic import and export.

Identify any loss of data during solver import and export.

1. From **FE Model** tab, select the ***Basic IO*** tab.



2. For **File Type**, select ***OptiStruct***.
3. For **HW Version**, select ***2017***.
4. Activate the ***Model Checker/Entity count*** option.
5. Use the default **Export profile**.
6. Under **Input deck(s)**, use the file browser icon, , or the add file icon, , to select and open the following files:

   `..\tutorials\hvvh\FEModel\BasicIO\buckling1.fem`

   `..\tutorials\hvvh\FEModel\BasicIO\car1.fem`
7. For the ***Output directory*** field, use the open file icon, , to select an output directory.
8. Click ***Import/Export***.

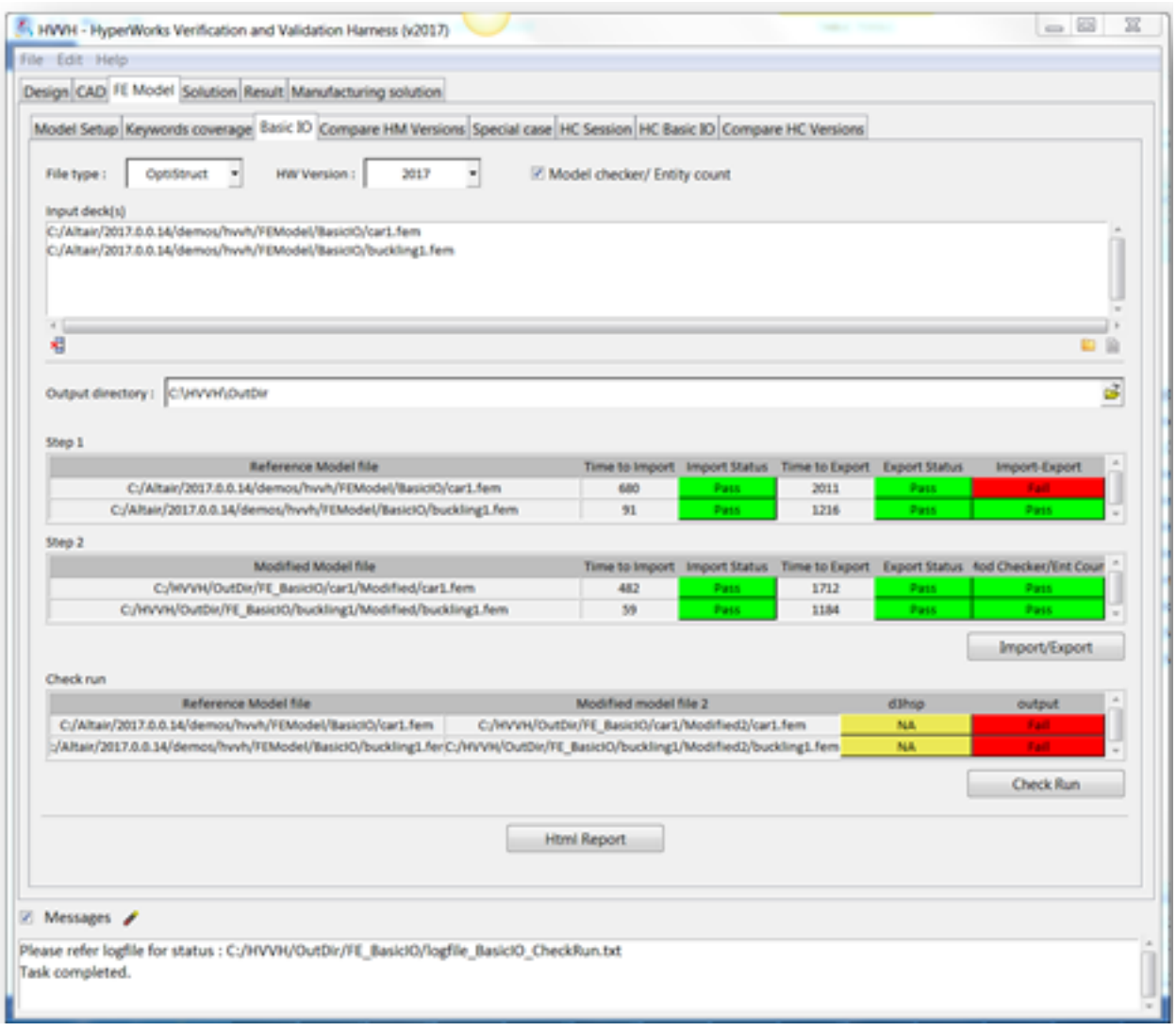
   Under **Step 1**, the import and export time and status (pass or fail) of the reference model file (selected above) are displayed.

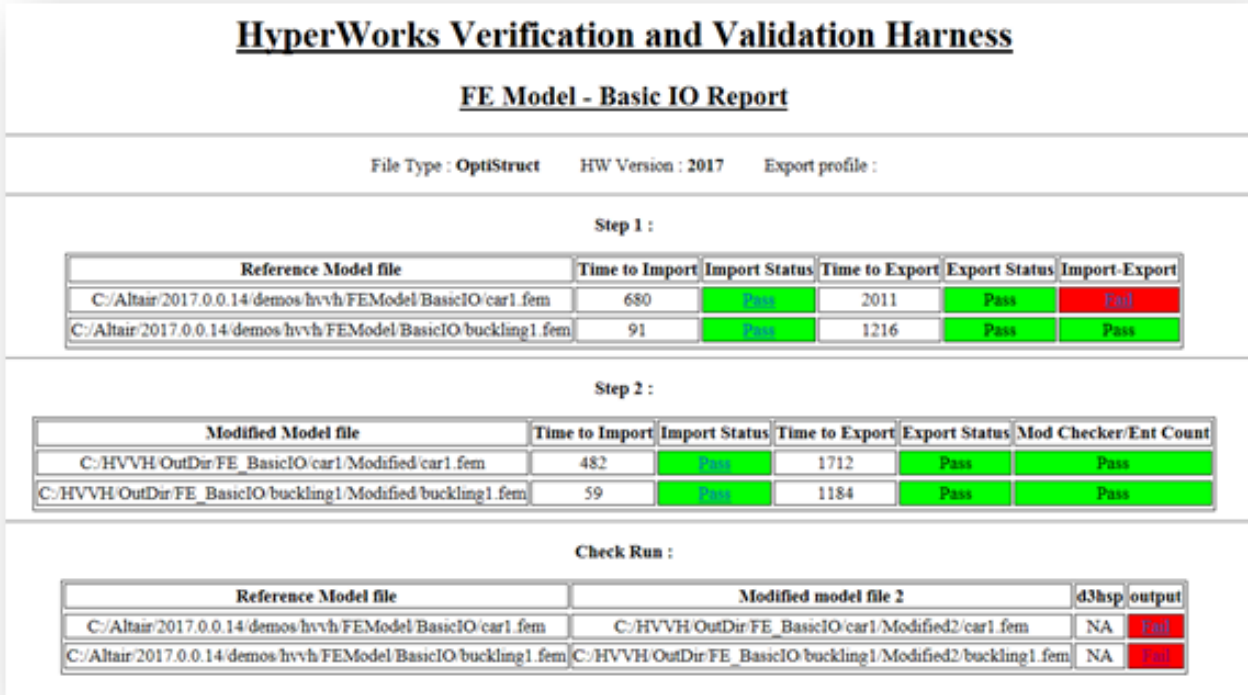
   The last column gives information on the ASCII difference between the imported file and Altair HyperMesh exported file. If there are no differences, it is displayed as **Pass**, otherwise, it's shown as **Fail**.

   Step 2 displays the import and export time and status (pass or fail) of the exported model file that is re-imported back into Altair HyperMesh (along with the import and export status and time).

The last column displays information on the ASCII difference between the model checker summary of the file in steps 1 and 2. Any loss of data is identified.

9. Click ***Check run***.
10. The original model and the Altair HyperMesh exported models are run with the Altair Radioss solver. The OUT file blocks are compared as shown in the status.
11. In the **Messages** window, the run details are displayed along with the log file location.
12. Click ***HTML Report*** to open an HTML report.





HyperWorks Verification and Validation Harness

FE Model - Basic IO Report

File Type : **OptiStruct** HW Version : **2017** Export profile :

Step 1 :

Reference Model file	Time to Import	Import Status	Time to Export	Export Status	Import-Export
C:/Altair/2017.0.0.14/demos/hvvh/FEModel/BasicIO/car1.fem	680	Pass	2011	Pass	Fail
C:/Altair/2017.0.0.14/demos/hvvh/FEModel/BasicIO/buckling1.fem	91	Pass	1216	Pass	Pass

Step 2 :

Modified Model file	Time to Import	Import Status	Time to Export	Export Status	Mod Checker/Ent Count
C:/HVVH/OutDir/FE_BasicIO/car1/Modified/car1.fem	482	Pass	1712	Pass	Pass
C:/HVVH/OutDir/FE_BasicIO/buckling1/Modified/buckling1.fem	59	Pass	1184	Pass	Pass

Check Run :

Reference Model file	Modified model file 2	d3hsp	output
C:/Altair/2017.0.0.14/demos/hvvh/FEModel/BasicIO/car1.fem	C:/HVVH/OutDir/FE_BasicIO/car1/Modified2/car1.fem	NA	Fail
C:/Altair/2017.0.0.14/demos/hvvh/FEModel/BasicIO/buckling1.fem	C:/HVVH/OutDir/FE_BasicIO/buckling1/Modified2/buckling1.fem	NA	Fail

Step 7: Compare Altair HyperMesh versions.

Compare the analysis decks exported using different versions of Altair HyperMesh.

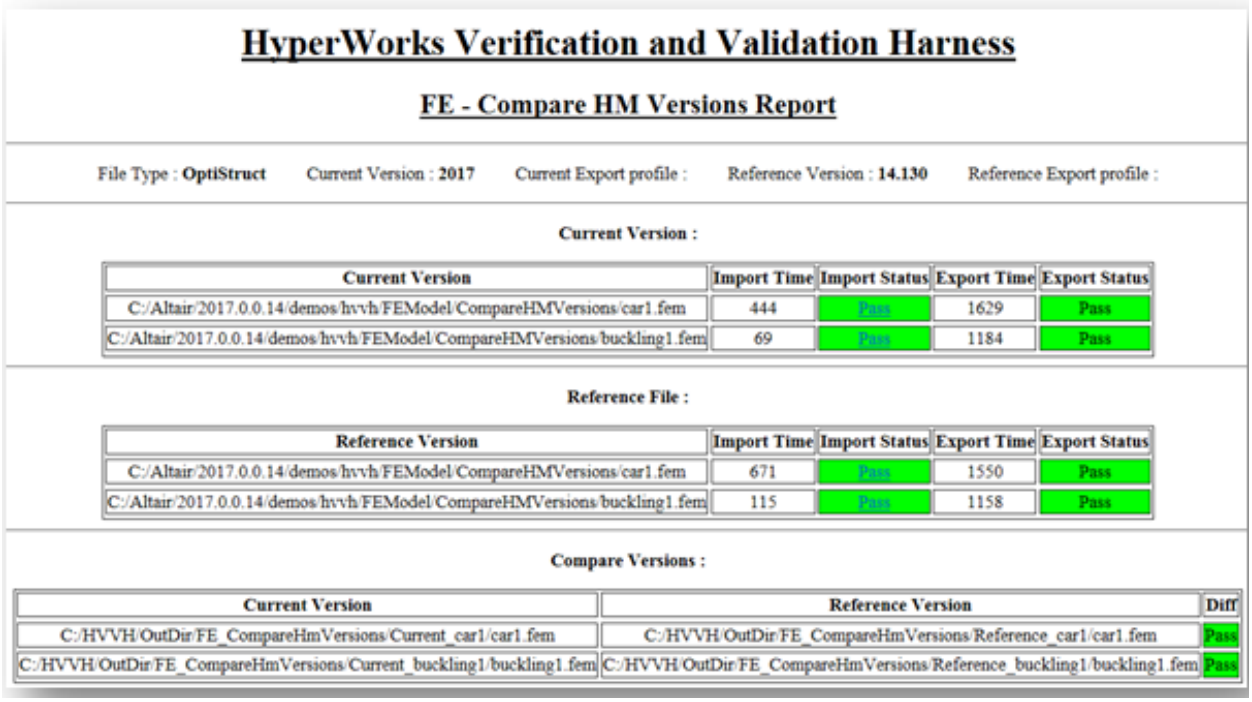
1. From **FE Model** tab, select the ***Compare HM Versions*** tab.
2. For **File Type**, select ***OptiStruct***.
3. For **Current Version**, select ***2017***.
4. For **Reference version**, select ***14.0.0.130*** (should also be installed).
5. Under **Input deck(s)**, use the file browser icon, , or the add file icon, , to select and open the following files:

   ```
   ..\tutorials\hvvh\FEModel\CompareHMVersions\buckling1.fem
   ..\tutorials\hvvh\FEModel\CompareHMVersions\car1.fem
   ```

6. For the ***Output directory*** field, use the open file icon, , to select an output directory.
7. Click ***Import/Export***.
8. The first table details the import and export time and status (pass or fail) of the model file selected in the current version.

   The second table details the import and export time and status (pass or fail) of the model file selected in the reference version.

   The last column displays information on the ASCII difference between the exported files in the current and reference versions of Altair HyperMesh. If there are no differences, it is displayed as **Pass**, otherwise, it's shown as **Fail**.
9. In the **Messages** window, the run details are displayed along with the log file location.
10. Click ***HTML Report*** to open an HTML report.



HyperWorks Verification and Validation Harness

FE - Compare HM Versions Report

File Type : **OptiStruct** Current Version : **2017** Current Export profile : Reference Version : **14.130** Reference Export profile :

Current Version :

Current Version	Import Time	Import Status	Export Time	Export Status
C:/Altair/2017.0.0.14/demos/hvvh/FEModel/CompareHMVersions/car1.fem	444	Pass	1629	Pass
C:/Altair/2017.0.0.14/demos/hvvh/FEModel/CompareHMVersions/buckling1.fem	69	Pass	1184	Pass

Reference File :

Reference Version	Import Time	Import Status	Export Time	Export Status
C:/Altair/2017.0.0.14/demos/hvvh/FEModel/CompareHMVersions/car1.fem	671	Pass	1550	Pass
C:/Altair/2017.0.0.14/demos/hvvh/FEModel/CompareHMVersions/buckling1.fem	115	Pass	1158	Pass

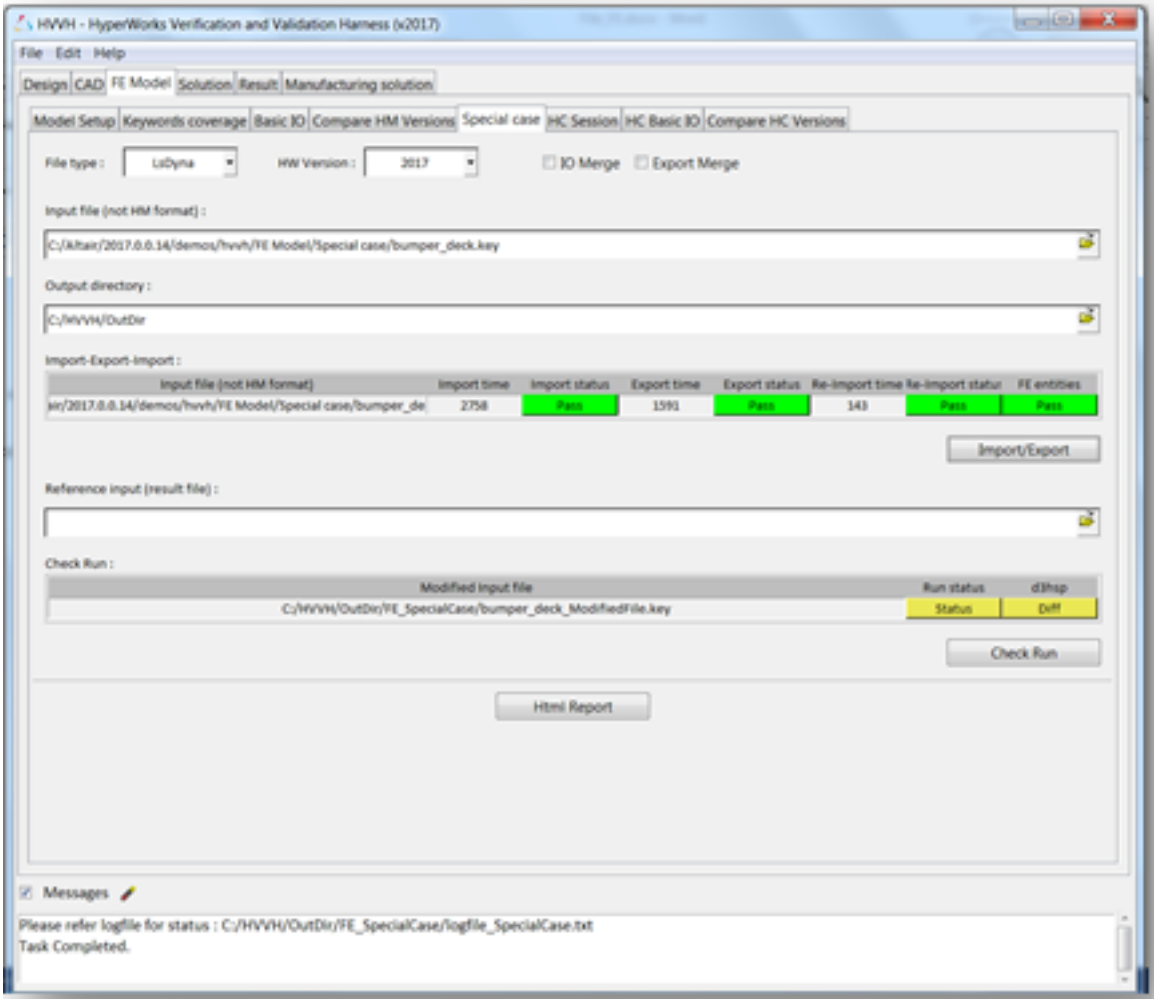
Compare Versions :

Current Version	Reference Version	Diff
C:/HVVH/OutDir/FE_CompareHmVersions/Current_car1/car1.fem	C:/HVVH/OutDir/FE_CompareHmVersions/Reference_car1/car1.fem	Pass
C:/HVVH/OutDir/FE_CompareHmVersions/Current_buckling1/buckling1.fem	C:/HVVH/OutDir/FE_CompareHmVersions/Reference_buckling1/buckling1.fem	Pass

Step 8: Special case: compare Altair HyperMesh exported decks based on FE entities.

Compare the data of solver deck in a non-Altair HyperMesh format after import and export with different options for any loss of data.

1. From **FE Model** tab, select the ***Special case*** tab.



2. For **File Type**, select ***LsDyna***.
3. For **HW Version**, select ***2017***.
4. Do not select the **IO Merge** and **Export Merge** options.
5. Under **Input deck(s)**, use the file browser icon, , or the add file icon, , to select and open the following file:

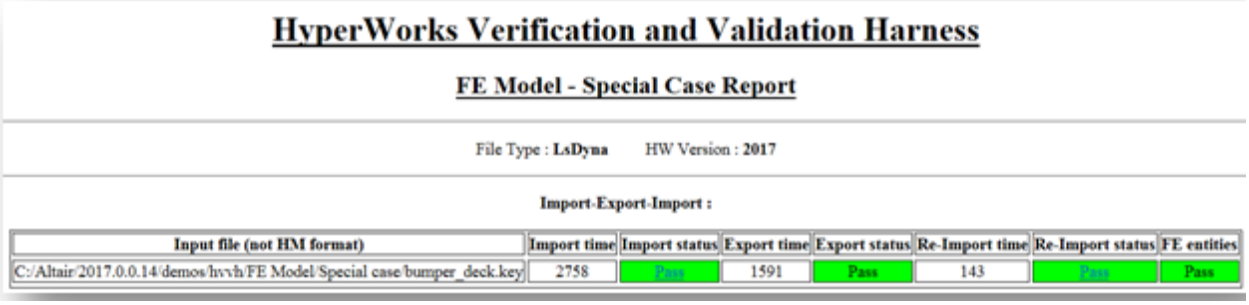
   `..\FE Model\Special case\bumper_deck.key`.
6. For the ***Output directory*** field, use the open file icon, , to select an output directory.
7. Click ***Import/Export***.

   The first table details the import and export times and status (pass or fail) of the model file in the HyperMesh version selected.

   The file is re-imported and the status is displayed under **Re-import status**.

   FE entities are compared with the original solver deck. Any changes in data shows any loss of data, otherwise it is shown to pass.
8. In the **Messages** window, the run details are displayed along with the log file location.

9. Click ***HTML Report*** to open an HTML report.



HyperWorks Verification and Validation Harness

FE Model - Special Case Report

File Type : **LsDyna** HW Version : **2017**

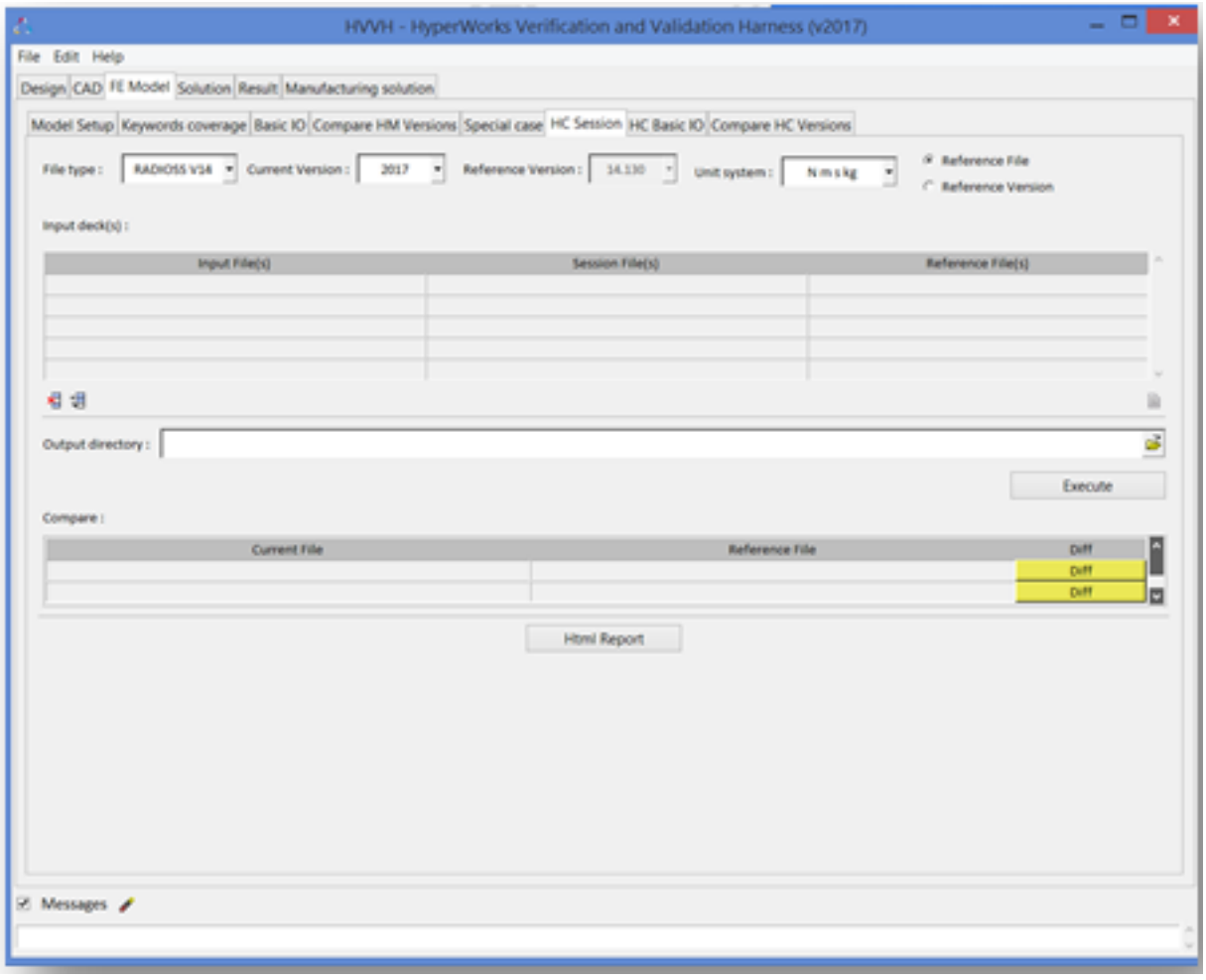
Import-Export-Import :

Input file (not HM format)	Import time	Import status	Export time	Export status	Re-Import time	Re-Import status	FE entities
C:/Altair/2017.0.0.14/demos/hvvh/FE Model/Special case/bumper_deck.key	2758	Pass	1591	Pass	143	Pass	Pass

Step 9: Check interactive operations in Altair HyperCrash and compare the exported files.

Use the session recording option in Altair HyperCrash to check interactive operations.

1. From **FE Model** tab, select the ***HC Session*** tab.

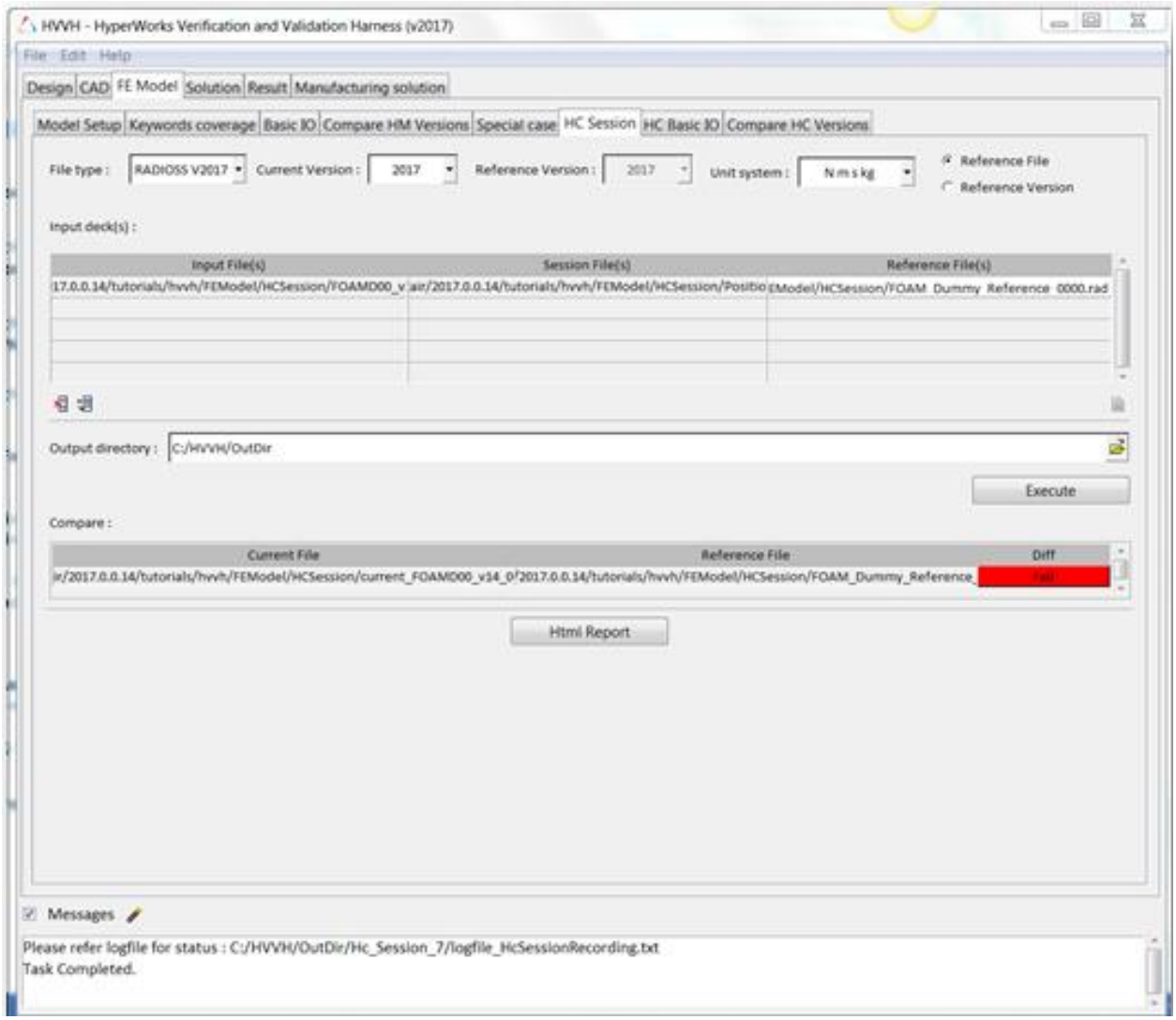


2. For **File Type**, select ***RADIOSS v2017***.
3. For **Current Version**, select ***2017***.
4. Activate the ***Reference file*** option.

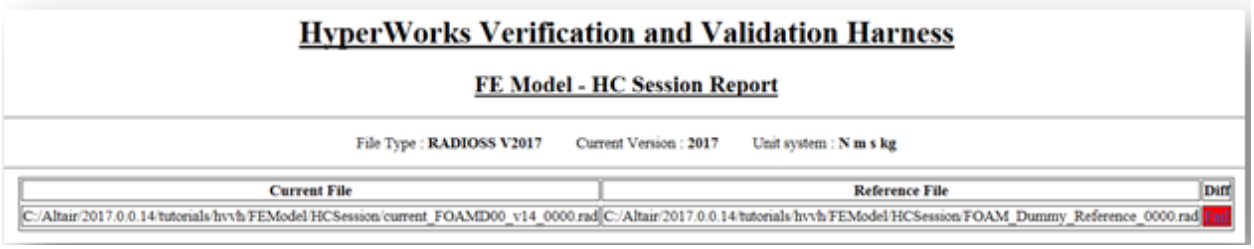
5. Under **Input File**, use the add file icon,  , to select and open the following file:
   `...\tutorials\hvvh\FEModel\HCSession\FOAMD00_v14_0000.rad file`
6. Under **Session File**, use the add file icon,  , to select and open the following file:
   `...\tutorials\hvvh\FEModel\HCSession\Position.xml`
7. Under **Reference File**, use the add file icon,  , to select and open the following file:
   `...\tutorials\hvvh\FEModel\HCSession\FOAM_Dummy_Reference_0000.rad`
8. For the ***Output directory*** field, use the open file icon,  , to select an output directory.
9. Click ***Execute***.

   The input file is imported in Altair HyperCrash. Using the session file, a set of interactive operations are executed inside Altair HyperCrash and the file is exported.

   In the **Compare** table, the **Diff** column displays information on the ASCII difference between this exported file and the current and reference files selected above. If there are no differences, it is shown as **Pass**, otherwise, **Fail**.



10. In the **Messages** window, the run details are displayed along with the log file location.
11. Click ***HTML Report*** to open an HTML report.



HyperWorks Verification and Validation Harness

FE Model - HC Session Report

File Type : **RADIOSS V2017** Current Version : **2017** Unit system : **N m s kg**

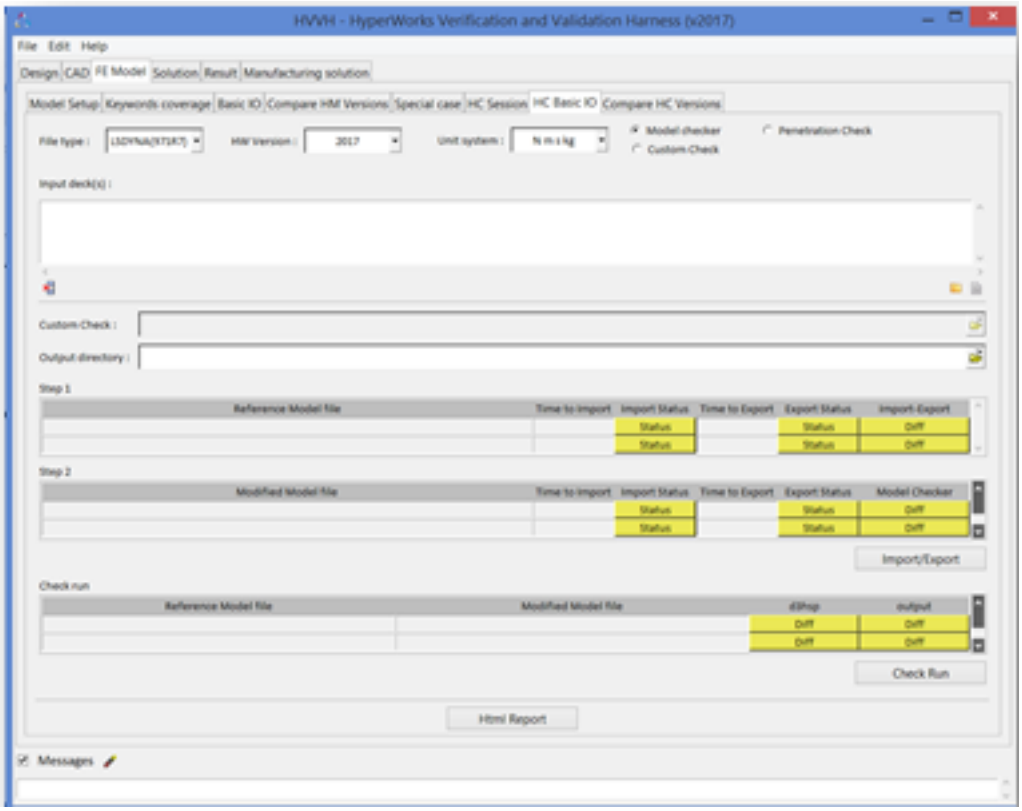
Current File	Reference File	Diff
C:/Altair/2017.0.0.14/tutorials/hvvh/FEModel/HCSession/current_FOAMD00_v14_0000.rad	C:/Altair/2017.0.0.14/tutorials/hvvh/FEModel/HCSession/FOAM_Dummy_Reference_0000.rad	Fail

The difference between the exported files are not major.

Step 10: Altair HyperCrash basic import and export.

Identify any loss of data during Altair HyperCrash basic import and export.

1. From **FE Model** tab, select the ***HC Basic IO*** tab.



2. For **File type**, select ***RADIOSS v2017***.
3. For **HW Version**, select ***2017***.
4. For **Unit system**, select ***kN-mm-ms-kg***.
5. Activate the ***Model checker*** option.
6. Under **Input deck(s)**, use the file browser icon, , or the add file icon, , to select and open the following file:

   `..\tutorials\hvvh\FEModel\HCBasic IO\model01_0000.rad`
7. For the ***Output directory*** field, use the open file icon, , to select an output directory.
8. Click ***Import/Export***.

   Under **Step 1**, the import and export time and status details (**pass or fail**) of the reference model file (selected above) are displayed.

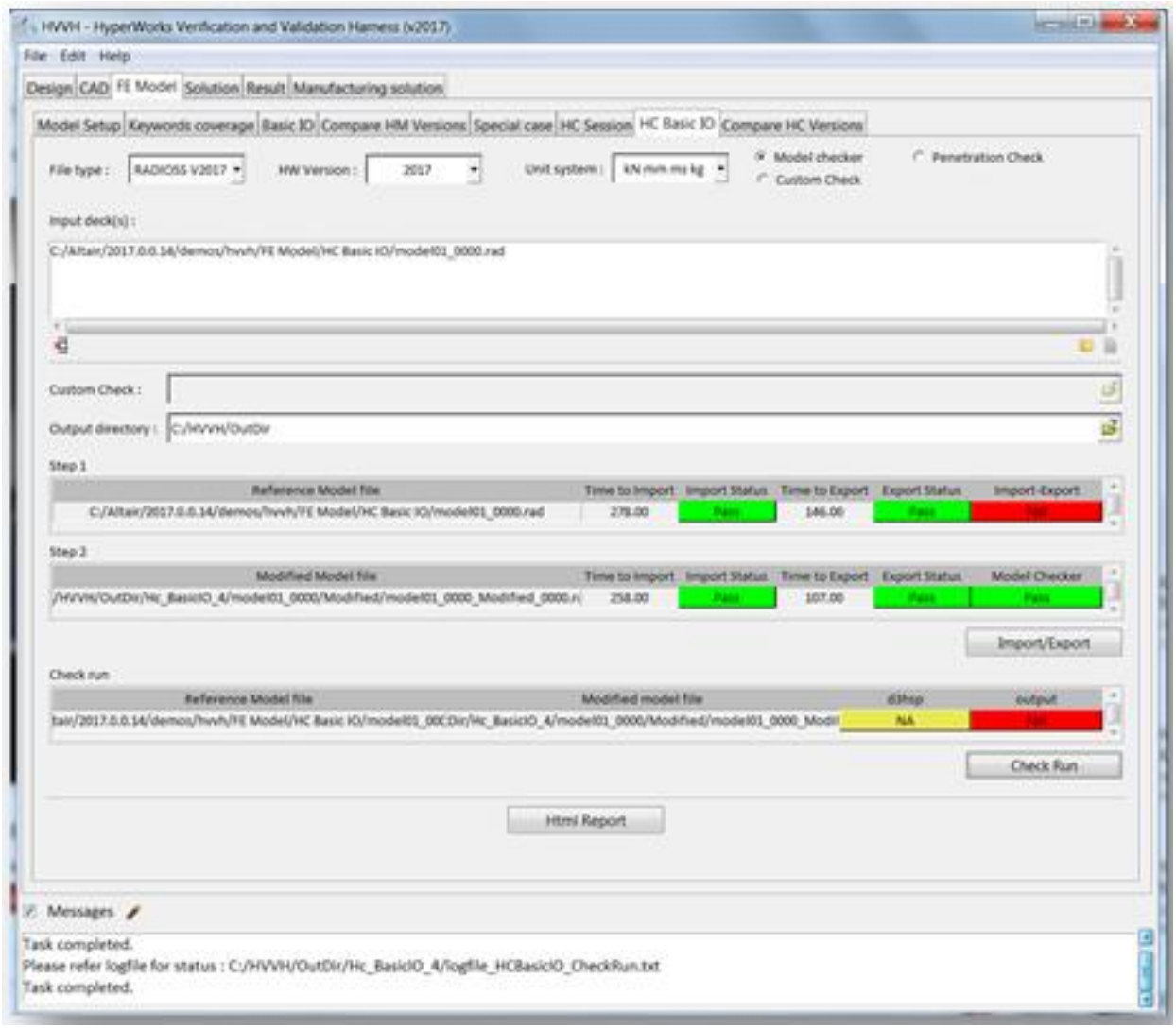
   The last column displays information on the ASCII difference between the imported file and Altair HyperCrash exported file. If there are no differences, it is displayed as **Pass**, otherwise, it's show as **Fail**.

   Step 2 displays the import and export time and status (pass or fail) of the exported model file that is re-imported back into Altair HyperCrash (along with the import and export status and time).

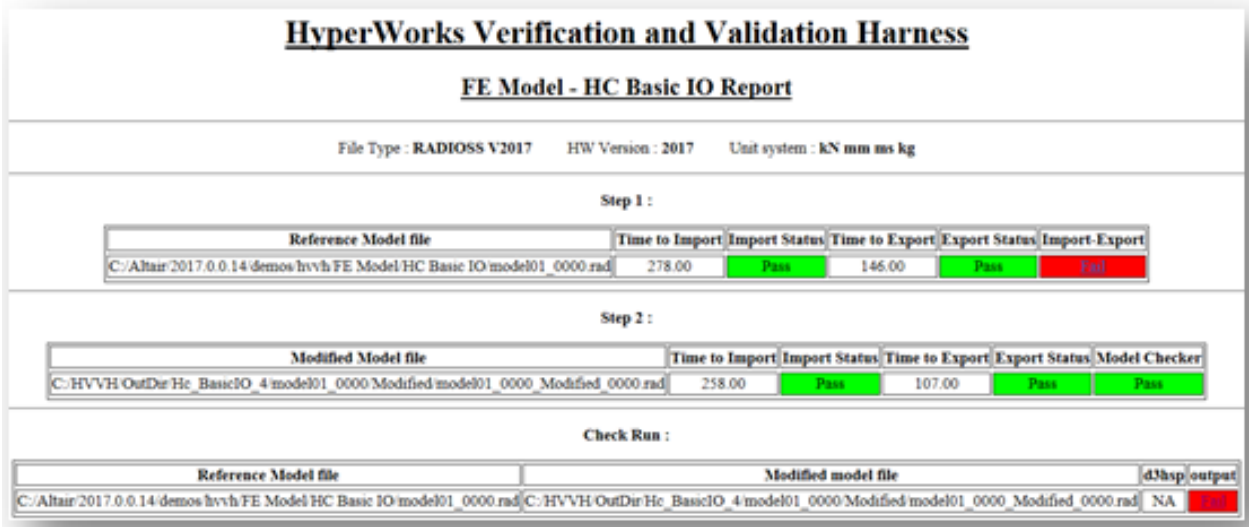
   The last column displays information on the ASCII difference between the model checker summary file in steps 1 and 2. Any loss of data is identified
9. Click ***Check run***.

The original model and the Altair HyperCrash exported models are run with the Altair Radioss solver. The Altair Radioss starter OUT file blocks are compared as shown in the status.

10. In the **Messages** window, the run details are displayed along with the log file location.



11. Click ***HTML Report*** to open an HTML report.



HyperWorks Verification and Validation Harness

FE Model - HC Basic IO Report

File Type : **RADIOSS V2017** HW Version : **2017** Unit system : **kN mm ms kg**

Step 1 :

Reference Model file	Time to Import	Import Status	Time to Export	Export Status	Import-Export
C:/Altair/2017.0.0.14/demos/hvvh/FE Model/HC Basic IO/model01_0000.rad	278.00	Pass	146.00	Pass	Fail

Step 2 :

Modified Model file	Time to Import	Import Status	Time to Export	Export Status	Model Checker
C:/HVVH/OutDir/Hc_BasicIO_4/model01_0000/Modified/model01_0000_Modified_0000.rad	258.00	Pass	107.00	Pass	Pass

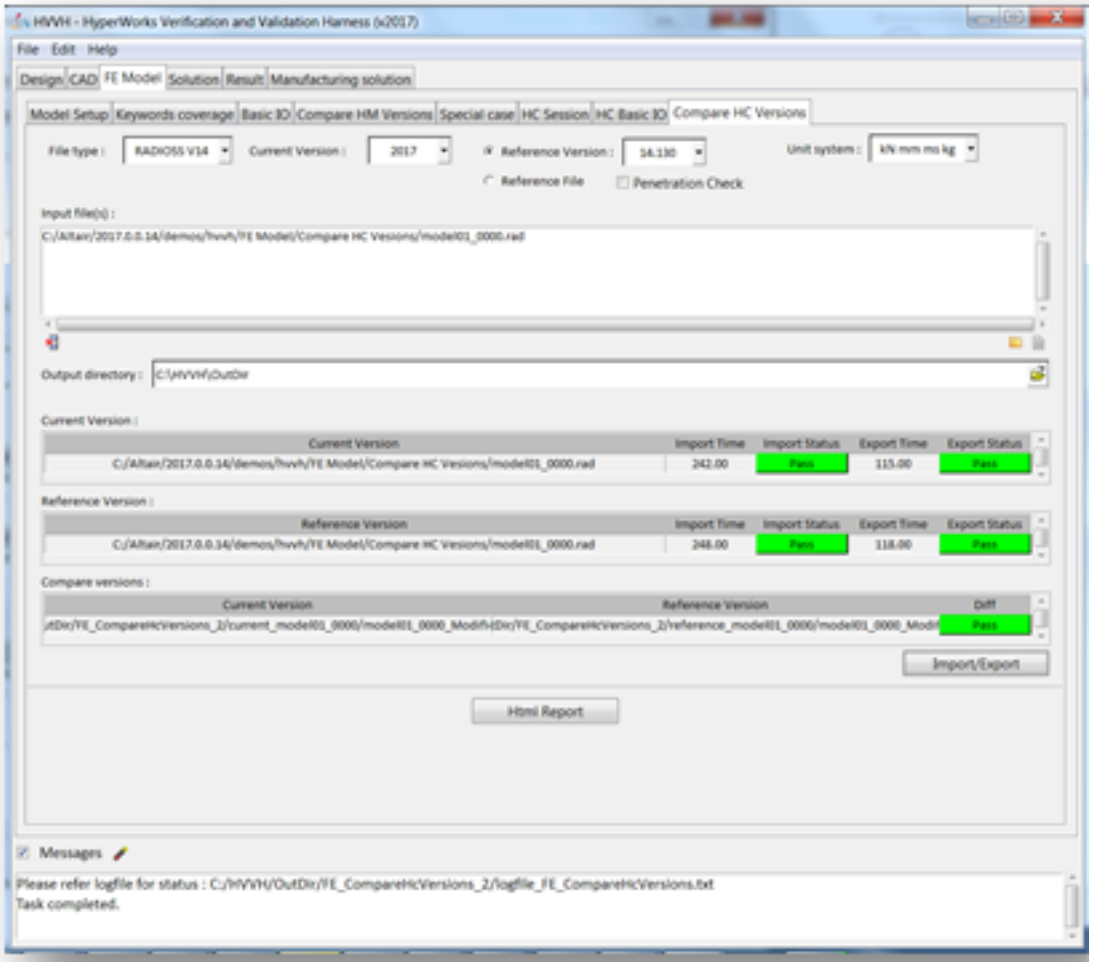
Check Run :

Reference Model file	Modified model file	d3hsp	output
C:/Altair/2017.0.0.14/demos/hvvh/FE Model/HC Basic IO/model01_0000.rad	C:/HVVH/OutDir/Hc_BasicIO_4/model01_0000/Modified/model01_0000_Modified_0000.rad	NA	Fail

Step 11: Compare Altair HyperCrash versions.

Compare the analysis decks exported in different versions of Altair HyperCrash.

1. From **FE Model** tab, select the ***Compare HC versions*** tab.



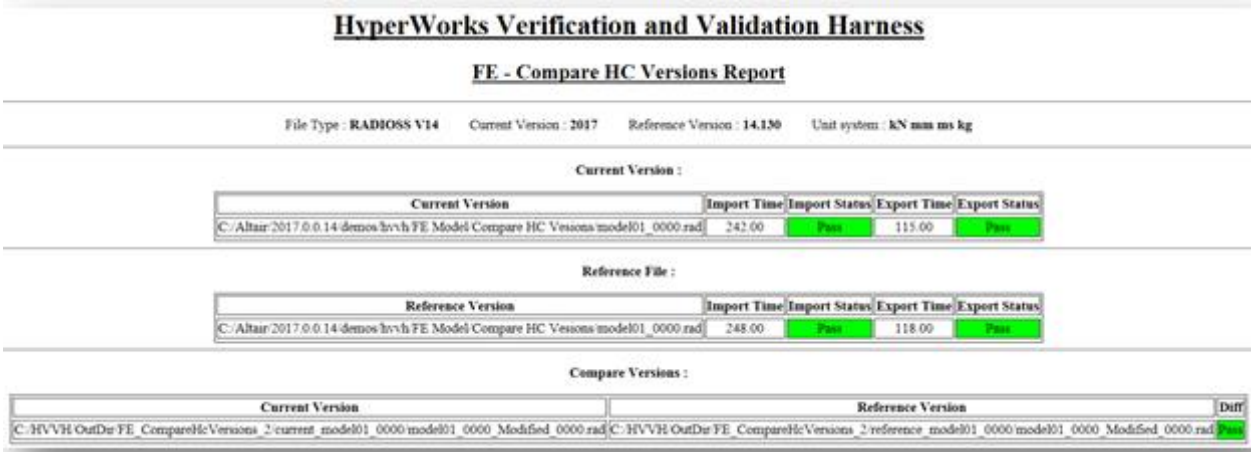
2. For **File type**, select ***RADIOSS v14***.
3. For **Current Version**, select ***2017***.
4. For **Reference Version**, select ***14.0.0.130***.
5. For **Select Unit System**, select ***kN-mm-ms-kg***.
6. Under **Input deck(s)**, use the file browser icon,  , or the add file icon,  , to select and open the following file:

   `..\tutorials\hvvh\FEModel\CompareHCVersions\model01_0000.rad`
7. For the ***Output directory*** field, use the open file icon,  , to select an output directory.
8. Click ***Import/Export***.

   The first table details the import and export time and status (pass or fail) of the model file selected in the current version.

   The second table details the import and export time and status (pass or fail) of the model file selected in the reference version.

   The last column displays information on the ASCII difference between the exported files in the current and reference versions of Altair HyperCrash. If there are no differences, it is displayed as **Pass**, otherwise, it's shown as **Fail**.
9. In the **Messages** window, the run details are displayed along with the log file location.
10. Click ***HTML Report*** to open an HTML report.



HyperWorks Verification and Validation Harness

FE - Compare HC Versions Report

File Type : **RADIOSS V14** Current Version : **2017** Reference Version : **14.130** Unit system : **kN mm ms kg**

Current Version :

Current Version	Import Time	Import Status	Export Time	Export Status
C:/Altair/2017.0.0.14/demos/hvvh/FE Model/Compare HC Versions/model01_0000.rad	242.00	Pass	115.00	Pass

Reference File :

Reference Version	Import Time	Import Status	Export Time	Export Status
C:/Altair/2017.0.0.14/demos/hvvh/FE Model/Compare HC Versions/model01_0000.rad	248.00	Pass	118.00	Pass

Compare Versions :

Current Version	Reference Version	Diff
C:/HVVH/OutDir/FE_CompareHcVersions_2/current_model01_0000/model01_0000_Modified_0000.rad	C:/HVVH/OutDir/FE_CompareHcVersions_2/reference_model01_0000/model01_0000_Modified_0000.rad	Pass