

LOADCASES

What is a loadcase?

A loadcase is a group of files that is associated with a part or assembly and contains the full description of an analysis, including the materials used, all assigned loads, temperatures, restraints and interactions, as well as the calculated FEA results. All of this information can be saved in a named loadcase that can be recalled and displayed later.

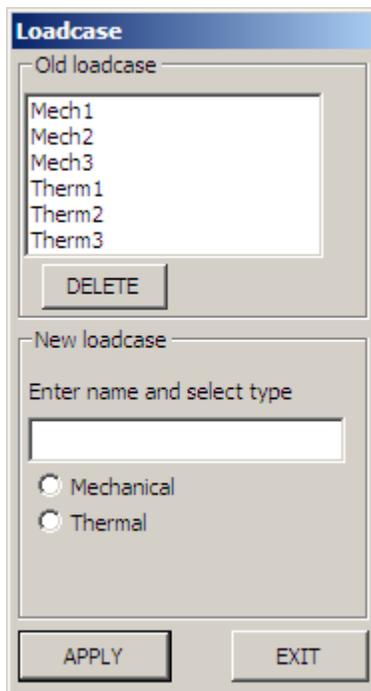
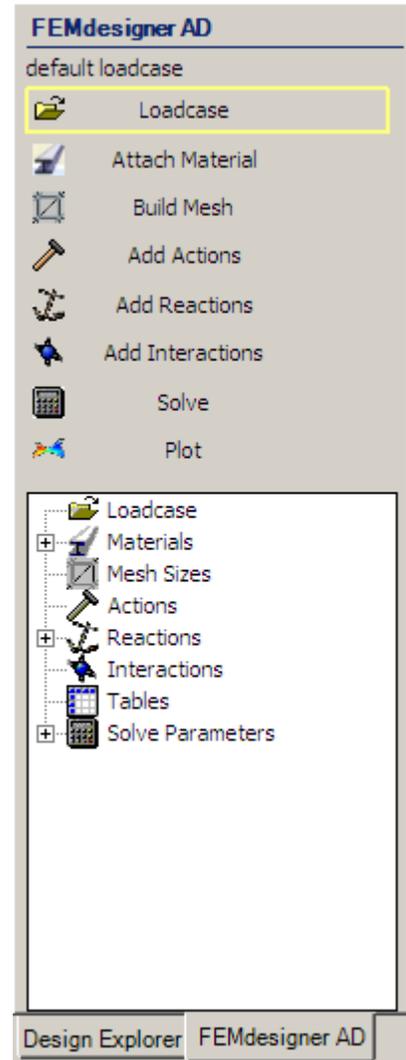
Named Loadcases

An unlimited number of named loadcases can be created and saved for any given part or assembly. This means that every analysis scenario and its results can be stored as a named loadcase for review and display later*, which is very helpful for design review and presentation.

* Because the PLOT function uses the mesh currently stored in the file fem.meb (please see **Loadcase Files** below for more information), all loadcases must use the same mesh in order for saved loadcase results to be displayed accurately. It is best to use the default mesh parameters when creating meshes to insure all loadcases are using the same mesh. If mesh refinement is necessary, the same mesh refinements must be used for all loadcases in order to recall and correctly display results without recalculation.

Loadcase Types

There are two types of loadcases in FEMdesigner AD: **mechanical** and **thermal**. The default loadcase type is mechanical. Mechanical loadcases contain analysis scenarios and results for elastic and plastic stress, buckling, natural frequencies, and forced vibrations, where thermal loadcases describe steady state and transient heat transfer analyses where the results are given as temperatures.



Loadcase Dialog Box

Selecting 'Loadcase' from the FEMdesigner AD explorer menu (yellow rectangle above right) will display the Loadcase dialog box, shown at left. With this dialog box the user can:

- Create named loadcases
- Delete loadcases
- Activate saved loadcases
- Refresh the active loadcase name displayed

In this example, the user has created and saved several mechanical loadcases named Mech1, Mech2, etc., and several thermal loadcases named Therm1, Therm2, etc.

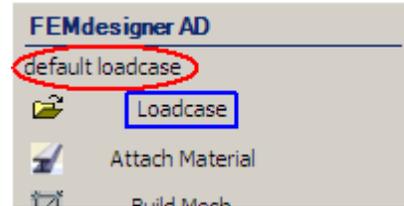
To **create a named loadcase**, enter the loadcase name in the data entry box provided in the lower half of the dialog box, select Mechanical or Thermal for loadcase type, and click APPLY. The named loadcase is now displayed in the Old Loadcase section above, and is made the currently active loadcase.

To **delete an existing loadcase**, select the loadcase name targeted for deletion, and click DELETE.

To **activate a saved loadcase**, select the loadcase name to be activated and click APPLY.

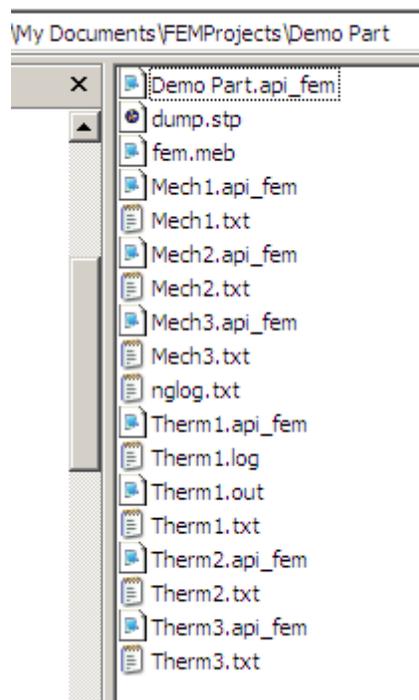
Active Loadcase

The active loadcase name is displayed in the FEA explorer at the top left, circled here in red. Initially, this area will display 'default loadcase' as shown. To insure the currently active loadcase name is being displayed, refresh the display by opening the Loadcase dialog (click 'Loadcase' shown in the blue rectangle) and when the Loadcase dialog box appears, click EXIT.



Loadcase Files

Loadcase files are stored as a group in a subdirectory of the FEMProjects directory, with a default location of C:\...\My Documents\FEMProjects\. A subdirectory is created with the same name as the Alibre Design part or assembly file name, and contains all the FEMdesigner AD loadcase files for that part or assembly.



The default name for the files that make up a loadcase is the name of the part or assembly file – in the Windows explorer listing of the loadcase files at left, the part name is “Demo Part” and the directory as well as the default loadcase have that name. For named loadcases, the loadcase files are given the loadcase name. Shown at left are the files from the previous example of saved loadcases named Mech1, Mech2,...Therm1 ,Therm2, etc. Within a single loadcase, files will share the loadcase name, but will have different file extensions depending on the file type. Individual files that are created for each loadcase:

<loadcasename>.api_fem – a binary file that contains information for the Alibre Design API

<loadcasename>.out – a binary output file that contains the calculated solution for the loadcase

<loadcasename>.log – a plain text log file that records the status of each step of the analysis

<loadcasename>.txt – a plain text file that contains analysis parameters

Here, *<loadcasename>* is the name of the saved loadcase. As mentioned above, the default *<loadcasename>* is the same as the Alibre Design part or assembly name.

There are also files in the loadcase directory that are not named for a specific loadcase, but are shared by all loadcases in that directory:

fem.meb – the binary mesh file, replaced each time a mesh is created from the part/assembly

dump.stp – the STEP file created by Alibre Design that is used as the geometry input to the mesher

nglog.txt – the mesher log file, replaced each time the mesher is run for the part/assembly