Introducing Testing Plan in EDM Modal

by Jeff Zhao, Ph.D. - Senior Product Manager

With Modal Analysis software, all DOFs on the mesh of a structure under test needs be measured. The common practice is using the Input channel setting, with one incremental value to move on to the next batch of measurement points till all DOFs are measured. With the newly released EDM 9.1 Modal software, the new Testing Plan will solve this issue by providing users the complete picture of the testing DOF layout. Also discussed in this note are the details of the Testing Plan feature.

Testing Plan is a very powerful tool which provides users with the ability to customize and control the flow of the testing process. The testing plan also provides information about the acquisition status. The user can also change or modify the parameter for each individual measurement entry as discussed in more detail below.

A quick glance of the testing plan provides a lot of information about the setup of the modal test. For example, the above screenshot shows that the test is carried out with a roving response method. Hence, the DOF of each measurement entry is incremented by 6 in the response column while the DOFs of the Excitation column are fixed on a couple of particular measurement points. There are 8 measurement entries in the testing plan which reflects that the geometry model of the test structure created has 45 mesh points.

Testing Plan Status and Setup

The Skip column in the test plan shows whether the user has decided to skip the measurement for any DOFs on the geometry model. If the user decides to skip the measurement for a point, this column will display “YES” and the status of the corresponding entry will also be changed from “Queued” to “Skipped” as shown in the screenshot below.

The Status of each measurement entry can be Queued, Skipped, or Measured. When the testing plan is initialized, all entries have the status of Queued. Users can purposely choose to skip certain entries, which as a result will be not measured. When an entry is run, its status will be Measured.

For the measured entry, the time and frequency signals are saved for each measurement entry as shown in the bottom right corner under the “Save files” tab. This is particularly helpful when multiple runs are executed for a single measurement entry. Since all the files associated with that measurement point is stored here, it is easy for the user to distinguish the different runs and signals.
Testing Plan Menu Entries
Right mouse clicking the measurement entry area provides a list of options for the user to choose from.

Select this measurement entry
The user can choose this option to select any measurement entry to perform an operation. Another way to select any measurement entry is by clicking on the check box in the first column of any measurement entry.

Run this measurement entry
Users can run any measurement entry. This gives the user the flexibility to carry out the test in any order they want. On some complicated structures, it might be difficult to impact a few locations and the user might want to save those for the last. This is a common example of when this feature is helpful.

Reset Entry
Clears data for the measurement entry and resets it.

Set to skip
If the user decides to skip the entry for a measurement location, they can use this feature.

Re-calculate all following entries
To reset all the measurement entries in the testing plan.

Edit entry
When the user wants to change the measurement point location or the direction of measurement for a specific entry, they can use this option.

Testing Plan Samples for Hammer Impact Test and Modal Shaker Test
With different testing types, the Testing Plan feature could be different based on the test nature. Whether it is a roving excitation or roving response test types, the Testing Plan will lay out the measurement entries to cover all the measurement DOFs on the structure under test.

The following is a testing plan for the Roving Hammer Impact test.
As it illustrates, the excitation is roving from DOF +1Z to the +45Z, while the response is fixed to the +5Z DOF. This is a very common setup with impact hammer.

A testing plan is discussed below where a modal test is carried out using two modal shakers.

![Testing plan with 2 excitation and 6 response sensors](image)

It is common to fix the modal shaker(s) on fixed DOF(s) and rove the sensors through all the measurement points to obtain a complete FRF data set. The testing plan above indicates that the modal shakers are fixed on +12Z and +29Z DOF while 6 sensors are roved through 45 measurement points on the test structure. The testing plan automatically accommodates and adjusts for the roving sensors according to the response DOFs.