

# TEST BUILDER APPLICATION SOFTWARE

## AC-08-0013

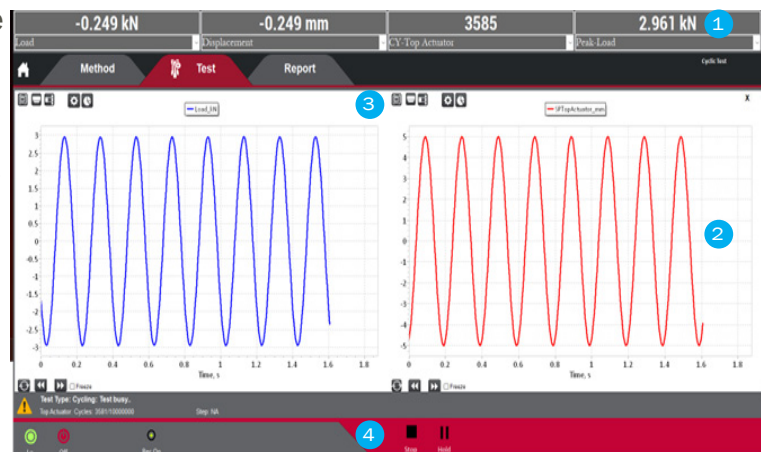


Test Builder Application Software with its most intuitive workflows is designed to suit static, monotonic and user defined fatigue cycling testing. It is designed to help increase testing efficiency and minimize safety hazards. The home screen of the application software has been categorized into 4 major tabs namely the Test, Method, Analysis and the Admin tab to help user identify the relevant section to be accessed when in operation.

The test tab provides the live information of the ongoing test. The live displays are configurable that provide live information to the user about the current status of the test.

Multiple graphs can be displayed in the workspace with the flexibility to choose the parameter in both X and Y axis.

Additionally quick change over of graphical view from Stroke vs. Time to Load Vs. Time / Extensometer Vs. Time is possible at the click of a button distinctly added to the test layout. Distinct and easily accessible test control buttons to set pressure high or low based on the operation required, switch on or off the test data recording based on the need and start and stop the test from the test tab



- 1 Live displays
- 2 Workspace
- 3 Buttons for quick change of graphical parameters
- 4 Distinct control buttons

## TEST BUILDER CAPABILITIES

The Test Builder application software helps to perform the following tests:

### STATIC:

Single step static loading

### CYCLING:

Single step cycle waveform

### MTL:

Multi step waveform generation (ramp, cycle, dwell etc.)  
Monitor change in signals to terminate step

### RANDOM:

Time history, turning points

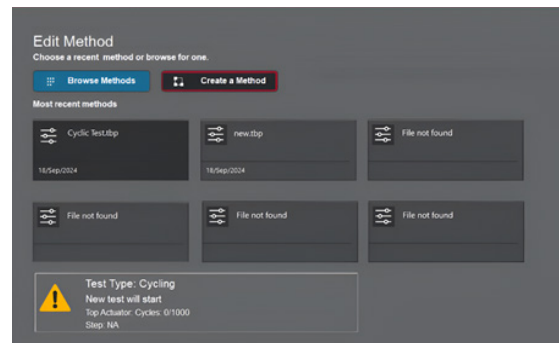
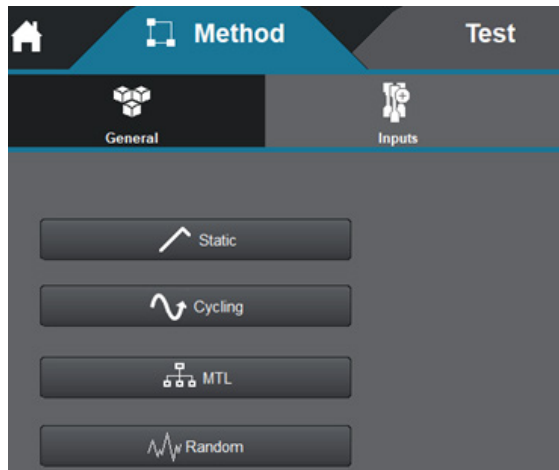
### SPECTRUM LOADING:

With a single spectrum loading, users can vary load levels, frequencies, and turning point patterns based on rainflow counting.

### TEST RECOVERY AND RESUME OPTIONS:

On restarting an aborted test, users can choose to resume from the termination point or restart the aborted block, with previous settings as the session defaults.

You can choose the type of test that needs to be performed from the methods tab. Create your own method or edit an available method from the template available.



The methods tab has further sections relevant to specimen details, test parameters that need to be measured, data log parameters, test control parameters and limit setting panel that get highlighted when in that section. The simple icons and menus used prompt the user to key in the right parameters in the relevant sections.

## A TYPICAL CYCLIC TEST METHOD & RELEVANT SECTIONS



All systems at Instron are built considering safety achievable to the highest level. A dedicated section in the methods tab helps set up the upper and lower safety limits for stoke, load and strain channels to trip, hold or stop the test when in emergency or uncontrolled occurrence of any event.

The screenshot displays the 'Control Channel Limits' software interface. The 'Limit Settings' tab is selected, showing configuration for 'Actuator-1'. The feedback channel is set to 'Load'. The Hi Limit is 50 kN and the Lo Limit is -50 kN. Both have 'Trip' options checked. A graph on the right shows 'HiLimit' (green line at 50), 'Load\_kN' (orange line fluctuating around 0), and 'LoLimit' (green line at -50) over a 2-second period.

Any event occurrence or machine behavior can be logged into the relevant sections of the application software that helps in post analysis.

The screenshot shows a log window with the following entries:

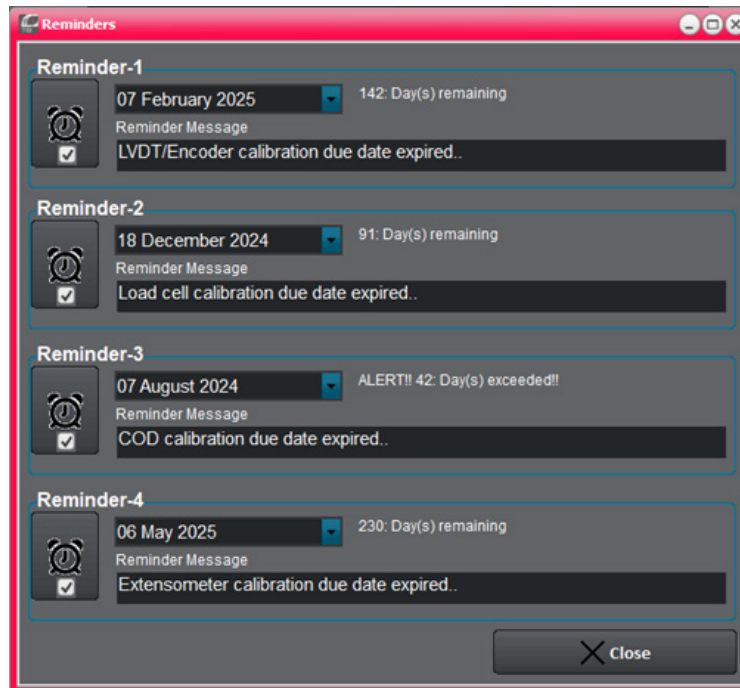
- 18/Sep-03:48:05PM. User Stopped Test...
- 18/Sep-03:48:05PM. User Stopped Test..
- 18/Sep-03:43:10PM. FG: Start Cyc..Actuator 0: Mean=3.500 Amp=1.500 Frq=1.00 Ctrl Mode=1 WF=0 Start Pt=0 Ad Cti
- 18/Sep-03:33:48PM. Power Off!!
- 18/Sep-03:33:48PM. Power status changed to Hi pressure!!
- 18/Sep-03:33:48PM. Power Fault!! Power switched off. Actuator-2
- 18/Sep-03:33:48PM. Power Fault!! Power switched off. Actuator-1
- 18/Sep-03:33:47PM. Application On-line...
- 18/Sep-03:33:46PM. Limit settings done..
- 18/Sep-03:33:46PM. Limits: Actuator-2 Rotary Displacement Lo-Limit=-80.000 Trip=1 Hold=0 Stop=0

A 'Hide' button is visible below the log.

Below the log, there are several lines of limit settings:

- 18/Sep-03:33:46PM. Limits: Actuator-2 Rotary Displacement Lo-Limit=-80.000 Trip=1 Hold=0 Stop=0
- 18/Sep-03:33:46PM. Limits: Actuator-2 Rotary Displacement Lo-Limit=-80.000 Trip=1 Hold=0 Stop=0
- 18/Sep-03:33:46PM. Limits: Actuator-2 Rotary Displacement Lo-Limit=-1.000 Trip=0 Hold=0 Stop=0
- 18/Sep-03:33:46PM. Limits: Actuator-1 Position Lo-Limit=-100.000 Trip=1 Hold=0 Stop=0
- 18/Sep-03:33:46PM. Limits: Actuator-1 Load Lo-Limit=-80.000 Trip=1 Hold=0 Stop=0
- 18/Sep-03:33:46PM. Limits: Actuator-1 COD Lo-Limit=-12.488 Trip=0 Hold=0 Stop=0
- 18/Sep-03:33:43PM. User log-in successful! User name: Ad1 User type=1

The application software has inbuilt functions for sending emails, SMS and provision to set reminders so that the user is never off track of the maintenance and calibration schedules.



The test builder application software also provides Structured HTML help to quickly access required information.

The help page displays the following content:

**Fig 9.20 MTL - Cyclic Test Inputs**

- Above Fig 9.20 shows the cyclic test method input parameters.
- Control Channel:** It refers to the actuator or any other device to be controlled. If the station has only one control channel, selection is not required, and control channel selection will not be visible to the user.
- Control Mode:** User can select the control mode channel, to perform the test. Three different control channels are available such as stroke, load and COD/Extensometer control. Test will be conducted based on the selection. Selected control mode will be switched, when the test is start.
- Amplitude:** Enter the amplitude of the cycle. Refer Figure 9.21  

$$\text{Amplitude} = 0.5 * (\text{Maximum} - \text{Minimum})$$

**Fig 9.27 MTL – Amplitude and Mean**

- Mean:** Enter the mean value of the cycle.  

$$\text{Mean} = 0.5 * (\text{Maximum} + \text{Minimum})$$
- Frequency:** Enter the cycle frequency. It is the number of cycles per second in the wave.

**Fig 9.28 MTL - Frequency**

- Phase:** This parameter will visible only when more than one control channel is assigned in the station. User can specify

# APPLICATIONS

UTM-High cycle fatigue, customized tests

Multi Channel: Axial-Torsion, Biaxial etc.

Works up to 128 Channels

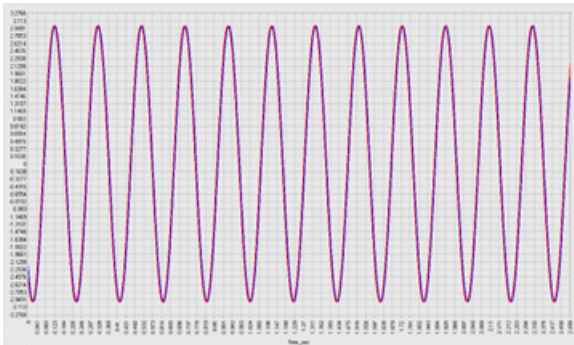
Multi-channel aircraft structural static and fatigue testing.

Low Force Systems

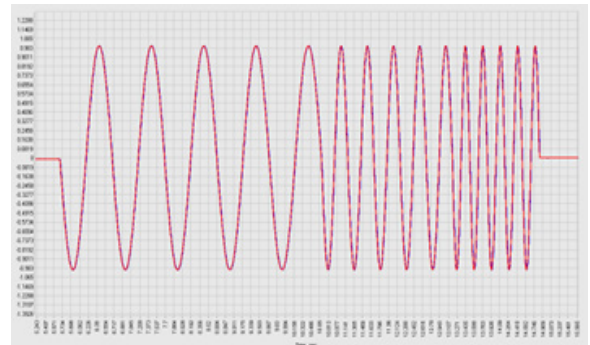
Metals, composites, plastics, structures, components, etc.

## AN OVERVIEW OF TYPICAL WAVEFORMS GENERATED

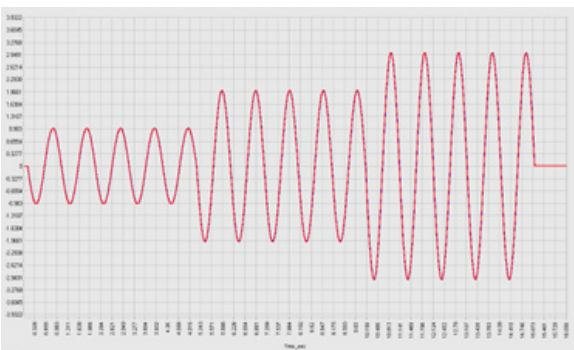
### CYCLIC



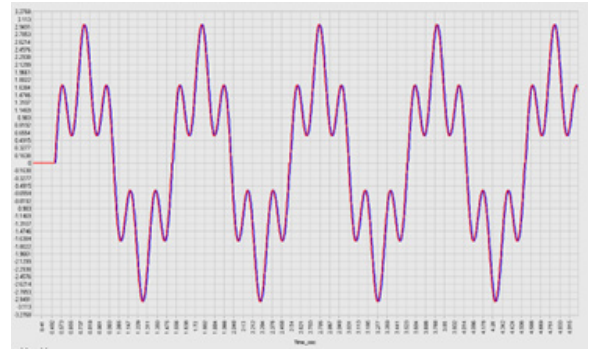
### FREQUENCY SWEEP



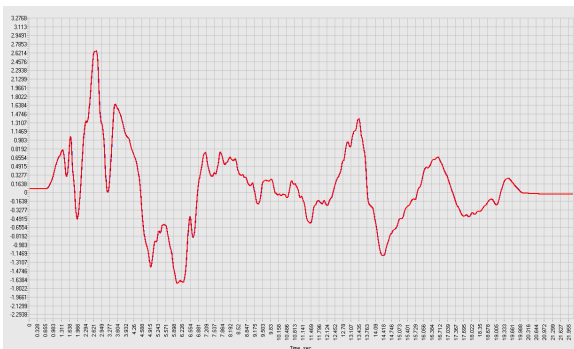
### MULTI-STEP



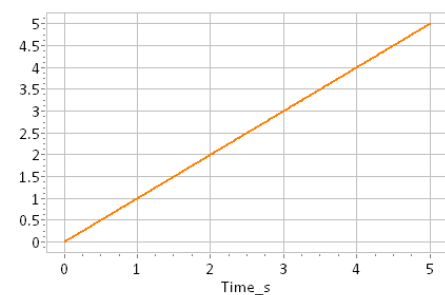
### SINE-ON-SINE



### SPECTRUM



### STATIC



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