INSTRON®

The difference is measurable®

Stiffness Based Tuning | Less setup, more testing

Do you ever find your testing machine more complicated than your test?

Do less experienced users lack the confidence to set up and run new tests?

Do you ever doubt the accuracy of your test data as a result of poor tuning?

What is tuning?

Tuning is the vital process undertaken before a fatigue test to allow the system to properly control the machine, and for your test to run successfully. It traditionally involves loading the test specimen with a number of sudden step changes and automatically or manually iterating the control gains until the performance meets the test requirements. This process is time consuming and daunting for less experienced users.

Why do I need to tune?

Fatigue systems are high performance machines that can run in load or strain control at high frequencies. Unlike a traditional position controlled electromechanical system, this requires sophisticated control techniques to provide smooth and controlled motion. Ultimately, this means the system needs to be tuned before each new test so that the performance and control is optimized for that specimen material and geometry, and your data is accurate and repeatable. Failure to tune can result in system instability and unreliable data.

What is different about Stiffness Based Tuning?

Stiffness Based Tuning only requires a simple ramp within the specimen's elastic limit to measure the specimen stiffness. Using our patented algorithms, this stiffness is then used to calculate the optimum control gains in a matter of seconds. This means no lengthy tuning process, reduced complexity and no specimen damage before the test begins!

Key Benefits of Stiffness Based Tuning

QUICKER PROCESS

Over 75% time saving compared to traditional square-wave based auto-tuning. Innovative patented algorithms tune all control channels using a single specimen measurement.

MORE ACCESSIBLE

Simple and robust tuning process builds user confidence and reduces errors. Experienced operators are free to support more challenging applications.

NO PRE-CYCLING

More representative fatigue life because no cycles are applied to the specimen before the test. No use of square-wave cycling means no impact damage to vulnerable specimens, such as composites.

IMPROVED ACCURACY

Perfectly tuned systems produce better waveforms, improving your test accuracy and repeatability. Amplitude control monitors and maintains your waveform peaks so you don't have to.

Stiffness Based Tuning Procedure

Tuning can be carried out in the control mode best suited to your specimen, irrespective of your test control channel. For example, load control is ideal for stiff specimens and displacement control for compliant specimens. Position, load and strain channels are tuned at once, and all are optimized and available for testing immediately. No need to remember to apply specimen preloads, no need to tune each channel in succession and no need to guess what level of displacement or strain your delicate specimen can withstand.

Select any control mode for tuning → Specified ramp is applied to specimen, measuring stiffness → All channels are optimized and ready for testing

15 seconds

Now available on servohydraulic systems for the first time!

Stiffness Based Tuning is now available on all Instron systems fitted with the powerful 8800MT controller. Following the success of Stiffness Based Tuning on ElectroPuls™ systems since their launch in 2006, it is now fully compatible with Instron® Servohydraulic testing systems. Utilizing the computational power of the 8800MT controller, the tuning algorithms provide unparalleled performance for all specimens in any control mode, and these are constantly being further developed and improved.

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