Industry users - AMTTF Services

AMTTF
ADVANCED MACHINE TOOL TESTING FACILITY

ADVANCED MACHINE TOOL TESTING FACILITY

CMTI Campus, Tumkur Road, Bangalore-560022 ; Tel : 080 23370108 ; E-mail : director@amttf.in

AMTTF is a single window agency with dedicated facilities for Machine Tool Calibration Inspection and Testing, established as a Joint project by Govt. of India, IMTMA and CMTI

AMTTF
ADVANCED MACHINE TOOL TESTING FACILITY

Ministry of Commerce & Industry
Government of India

Indian Machine Tool
Manufacturers' Association (IMTMA)

Central Manufacturing
Technology Institute

Advanced Engineering Test Facilities

AMTTF
ADVANCED MACHINE TOOL TESTING FACILITY
www.amttf.in

AMTTF is a joint project of the Indian Machine Tool Industry and the Dept of Industrial Policy and Promotion (DIPP) of the Govt of India and CMTI. This is a dedicated facility equipped with the latest equipment and facilities to test industrial machinery, parts and subsystems to establish their performance and reliability against international standards. The facility will help industries to test, trouble shoot and upgrade their products to higher level of performance.

RESIDUAL STRESS & RETAINED AUSTENITE MEASUREMENT AND ANALYSIS

Residual Stress is measured using X-ray diffraction principle by measuring distance between crystallographic planes (d-spacings) as a strain. When the material is in tension, the d-spacing increases and, when under compression the d-spacing decreases. The d-spacings are calculated using Bragg's Law: $\lambda = 2d\sin\theta$, and the Stresses is determined from the measured d-spacings.

Estimated analysis time for measurement and analysis is 15 min. to 1 hr. per measurement, depending on the diffracted X-ray intensity and technique used.

EMI/EMC MEASUREMENT FOR CERTIFICATION (EMISSION & IMMUNITY)

The Equipment Performance is evaluated with reference to the relevant parts of BS EN 50370-1:2005 and BS EN 50370-2:2003 standards, and the evaluation is done for conducted Emission and radiation and Immunity. Conducted Emission Test is carried out by monitoring the RF signal emitted by the equipment through conducted line is captured and sent to the EMI test receiver. EMI Test receiver analyzes the signal and compares Quasi-peak and Average values of the signals with the limits specified in the standard. The Instruments include LISN, EMI test receiver and EMI Filter.

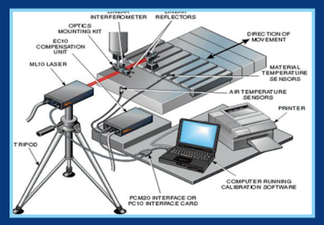
Radiated Emission Test is carried out by monitoring the radiated emissions using Bi-Log antenna kept at a height of 1 meter on all the possible locations around the equipment. The antenna captures the emitted EMI and EMI Test receiver analyzes the signal and compares the Quasi-peak of the signals with the limits specified in the standard. Immunity Test is carried out by monitoring the Electro Static Immunity Discharge at identified locations on the equipment using EDS Simulator Gun.

DYNAMIC ANALYSIS OF MACHINES & MACHINE SUB-ASSEMBLIES

Dynamic characteristics are measured and analyzed for Modal shapes and Deflection shapes. Modal Analysis is the deformation of a structure, primarily concerned with resonance frequencies (or natural frequencies) of a structure. Operating Deflection Shape (ODS) is the deformation of a structure at specific frequencies and response of the structure to both resonant and forced vibration, and is carried out during idle running and machining at specific rotational speed.

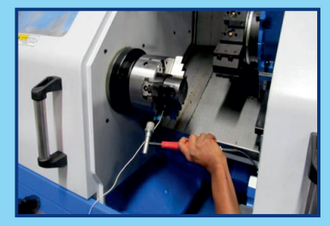
Dynamic measurement and analysis is a Diagnostic tool to evaluate dynamic performance of structure by measuring the dynamic response and vibrations. The Dynamic response of a structure includes: Natural frequencies, Damping, Stiffness factors, Mode shapes and Displacement shapes.

CALIBRATION AND DYNAMIC ANALYSIS OF MACHINES



Machine Calibration is carried out by by direct measurement of individual axes of the machine, using LASER Measurement System. Machine Calibration involve measurements and analysis of measured results in accordance with relevant parts of ISO-230 standard for, Linear positioning accuracy and repeatability of axis, Angular errors like pitch and yaw of an axis, Straightness error of an axis, Angular positioning and Repeatability of axis, Dynamic characteristics of linear axis like response and uniformity of movement

VIBRATION & FREQUENCY ANALYSIS



Frequency response function spectra at different conditions are conducted by giving an impulse excitation with an instrumented hammer and vibration response was captured with an accelerometer probe.

Damping factors at dominant frequencies are identified and evaluated. Coast down plot of vibrations are measured to identify the resonance frequencies of the rotating shaft within its operating speed range (zero to maximum speed) in clockwise and counter clockwise directions.

THERMAL CHAMBER – CONTROLLED TEMPERATURE AND HUMIDITY

Temperature humidity chamber is established to evaluate the environmental limits for every product of machine, machine elements, machine tools, machine sub-systems, telecommunications, aerospace, automotive and electronics industries.

AMTTF has established calibrated Temperature & Humidity Chambers with working volume of 2.5x2.5x3.0mand capable of controlling 10 to 60^{0}C and 40-90% humidity.

TEST BED FOR DYNAMIC TESTING OF MACHINES

The Testbed is established at AMTTF for conducting Full power, Chatter, Vibration and study of Dynamic characteristic of machines, under clamped/Grouted conditions of the machine under test. Total Test bed surface consists of 24 beds (0.5x2.0m area), one of its kind established at AMTTF is designed with a mono-block concrete structure on a steel frame with levelling arrangement, facilitating the total top surface area of testbed with in flatness. All the 24 Testbeds are designed and manufactured with T-slots, facilitating the machine/test item grouted to the foundation, isolated from external vibrations. The testbed area is capable of accommodating mounting one or more machines and tested simultaneously.

Flatness of Testbed top surface: 0.2mm | Floor area: 4mx13m | Load Capacity: 200tons
Input power supply capacity of 200A.

INSTRUMENT CALIBRATION FACILITY

Calibration facility is established with necessary equipments for inspection and calibration of dimensional measuring instruments (Height gauge, Displacement sensors like dial gauges, LVDT, Slip gauges etc.), Contour and Surface roughness measuring equipment, Height Gauge for dimensional measurement.

- Dynamic Testing for Mode shapes
- Static Rigidity Analysis – Load cell & LVDT
- Vibration and Noise analysis of rotating elements
- EMC / EMI Measurements
- Test beds for Machine Testing up to 200Tons weight
- Surface & Contour measurement
- Residual Stress Measurements and analysis
- Thermal chamber with Variable Environmental conditions
- (3x3x3m volume, ambient variations: 10 to 60^{0}C, Humidity: 40-90%)
- Thermal behaviour of Spindle and Linear axes
- Laser system and ball bar for machine calibration
- Performance evaluation test rigs
- Spindle assembly as per ISO standard
- Guideway Cover - (2g, 120m/min)
- Electrohydraulic exciter - Machine Dynamic analysis
- Latest international standards on machine testing

FACILITIES AVAILABLE AT AMTTF