



MATERIALS & STRUCTURES

Delivering targeted materials and component testing, analysis and engineering solutions

DESIGN CAPABILITIES

YOU HAVE CHALLENGES

- Testing a component or prototype
- Using non-standard test specimens
- Simulating service conditions
- Needing a new test system on site
- Building prototype equipment

WE HAVE SOLUTIONS

- Collaborating to define goals and requirements for equipment
- Designing and fabricating unique equipment and test fixtures to simulate service and environmental conditions
- Developing in-house custom instrumentation where off-the-shelf equipment does not exist or needs to be modified

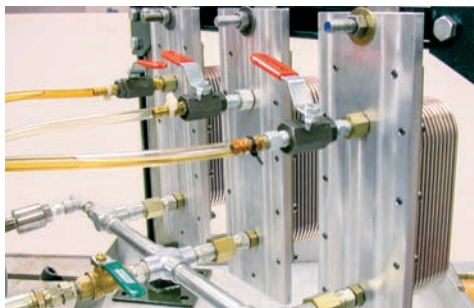
WE HAVE RESOURCES

- Specialists within UDRI and the School of Engineering have expertise in a wide range of scientific fields
- SolidWorks® software to design test equipment/fixtures and create 3-D models of equipment prior to construction
- Software development with LabVIEW® to provide automatic control and data acquisition
- Finite-element analysis of components and structures
- Proven quick response to customer needs



TYPICAL PROJECTS

- Overturning moment of fan ducts
- Submersible variable-height fixtures for supporting jet engine turbine disks for automated ultrasonic inspection
- Flight loading and temperature profile simulation
- Accelerated endurance limit testing of connecting rods, rocker arms and compressor pistons
- Fatigue testing of engine cylinder liners, heads and blocks
- Pressure/strain/fatigue testing and cycling of radiators, oil coolers, fuel filters and engine hoses
- Designed US Trotting Association qualification test for sulkies – sole-source test facility



TESTING & EXPERIMENTAL CAPABILITIES

The Structures and Materials Assessment, Research and Testing Laboratory (SMARTlab) is an integral part of UDRI's comprehensive air/ground/sea vehicle and industrial equipment engineering and test capabilities. We address all technical and management program requirements to ensure our customers' success.

- Digital image correlation for full-field strain and displacement measurement of coupons and components
- Fatigue- and fracture-related testing
- Limit and ultimate load static strength evaluation
- High strain rate material and component characterization
- Verification and validation of designs, models and processes
- Full-scale assembly and system fatigue/performance testing
- Specialty structural testing, including low-velocity and ballistic impact
- Expert modeling and simulation, including aero, thermal, structural and risk analysis, Level III drawing packages
- Development and verification of custom software, instrumentation and test setups
- Comprehensive nondestructive evaluation capabilities and ASNT-qualified personnel
- Full-service machine shop for fixture construction and test article development/repair
- Calibration services following ISO 17025-accredited procedures; see A2LA scope 3790-01.



SMARTlab

Facility Features

- Over 12,000 sq. ft. of floor space
- 24 and 30 ft. floor-to-crane clearance
- 5- and 10-ton overhead cranes
- Fatigue test frequencies from 0.001 to 1000 Hz
- Broad vibration capabilities, including shakers up to 5,000 lb. and modal analysis equipment
- 20 × 20 × 20 ft. deep pit to facilitate testing of tall components
- Multiple T-slot bedplates and reconfigurable floor space to perform custom setups for combined thermal/hydro/mechanical tests
- Over 20 universal test frames ranging from 5 to 550 kip fatigue capacity
- State-of-the-art machine test controllers for multi-axis control and data collection
- Wide variety of instrumentation and data acquisition schemes
- Complete fractographic capabilities for test article teardown analysis
- High-temperature material testing up to 2,500°F