

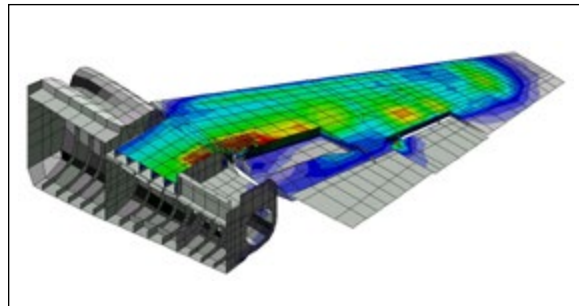


# Structural Engineering

Southwest Research Institute® (SwRI®) structural engineering specialists design, analyze, fabricate, and test structural systems and components. SwRI's experienced engineering and technical staff apply state-of-the-art technologies to a broad spectrum of industries including aerospace, marine, offshore, petrochemical, building, highway, and transportation. Applications in these industries are linked by the common requirement that the structures must be highly reliable, since failures often have severe economic consequences and may involve loss of human life.

## Capabilities

- Structural design and redesign to improve performance and lifetime
- Structural analysis
- Test planning, buildup, and instrumentation
- Test execution and data interpretation
- Field testing and service environment evaluation
- System fabrication and assembly
- Welding
- Compliance testing and engineering stress screening
- Product reliability evaluation and testing
- Damage tolerance analysis (DTA)
- Fitness-for-service (FFS) analysis
- Fatigue and fracture analysis
- Probabilistic risk analysis
- State-of-the-art structural analysis computational tools including NASTRAN®, ANSYS®, and StressCheck®
- State-of-the-art fracture mechanics and fatigue crack growth software including NASGRO® and AFGROW

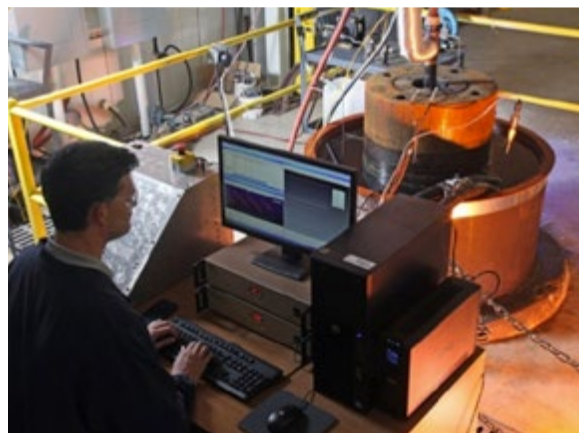


Finite element model stress analysis of an aircraft wing

0015790

## Experience

- Structural analysis of aircraft, marine, offshore, and other systems
- Test planning, test buildup, instrumentation, test execution, and data collection and analysis of complex structures under static, fatigue, and other harsh loading environments
- Testing of high-strength steel, aluminum, acrylic, and composite hulls and housing for the U.S. Navy and numerous commercial submersible/diving system companies
- Structural enhancements and life extension of aircraft, marine, and other mechanical systems
- Physical environment testing of systems, subsystems, and components for manufacturing robustness and industry qualification/acceptance
- Full-scale aircraft static and fatigue testing

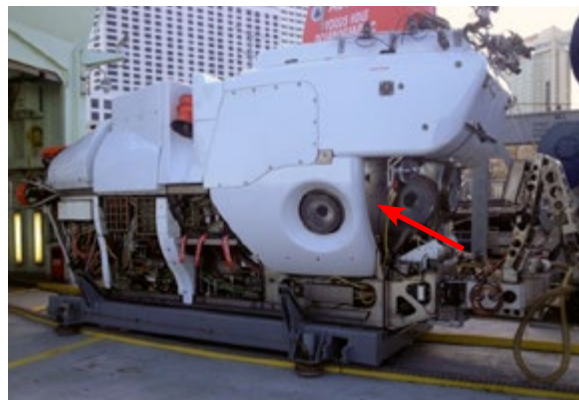


High pressure-high temperature (HPHT) testing

0015198\_0079

## Facilities

- Underwater engineering laboratories with hydrostatic test chambers to simulate temperatures and ocean depths greater than 30,000 ft
- High bays with overhead bridge cranes for fabricating and welding pressure vessels, submersibles, load frames, and other structures
- 17,000+ sq ft Mechanical Fabrication Center (MFC) with a wide variety of lathes, milling machines, sheet metal tools, welders, grinders, drill presses, and saws for machining and tooling; a CAD/CAM programming control room and a large inspection room to perform quality assurance measurement control



Pressure hull for the Alvin research submarine

0021851



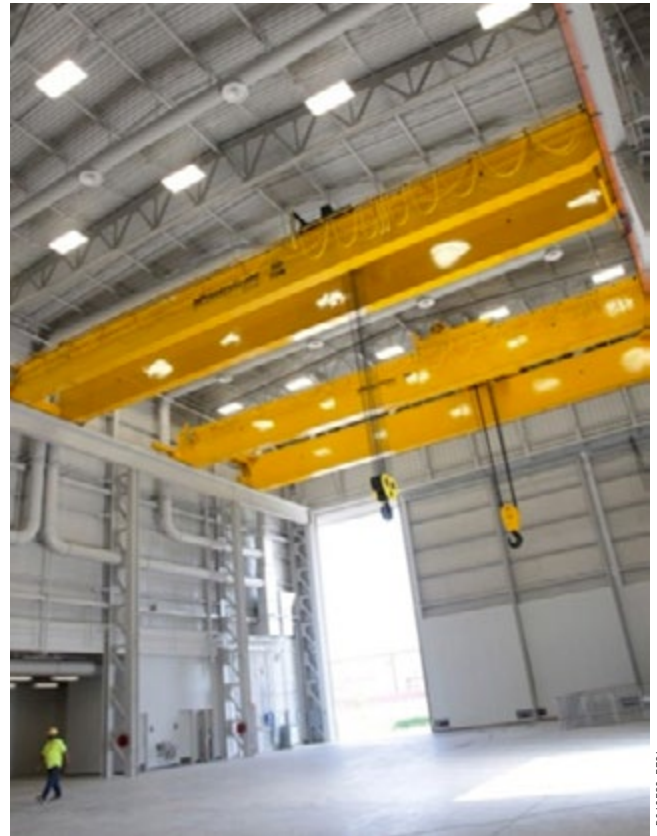
DE138651

Environmental Testing Laboratory with exposure chambers and electro-magnetic and servo-hydraulic shaker tables to simulate a wide variety of transportation, storage, and operating environments including earthquake/seismic



DO15789

Spacious laboratories for full-scale static and fatigue tests of large structures and components; shown at left is a fatigue test of a business-class aircraft wing



DO15089\_5721

56-ft-high Heavy Article Testing (HAT) Facility with more than 14,350 sq ft of working space, three bridge cranes (25-ton, 50-ton, and 100-ton), and a 20x20x20-ft floor pit that allows below-ground access to test articles



DO21862

Dynamic Impact Test Facility with 600-ft x 100-ft concrete runway, large pendulum, large buried and surface-mounted reaction masses, and 30-ft drop tower to simulate various types of dynamic impact, drop and crash events

**We welcome your inquiries.**  
**For additional information, please contact:**

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Southwest Research Institute is an independent, nonprofit, applied engineering and physical sciences research and development organization using multidisciplinary approaches to problem solving. The Institute occupies 1,200 acres in San Antonio, Texas, and provides more than 2 million square feet of laboratories, test facilities, workshops, and offices for nearly 3,000 employees who perform contract work for industry and government clients.

Find us on



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Designed & printed by SwRI MPS 18 0616 253123 bl

