

1522 – Experimental Mechanics & Non-Destructive Testing Diagnostics

SAND2007-5356P

Mission: *To accurately characterize the structural response of systems to pressure, temperature/humidity, load, and acceleration environments. Provide design expertise for fixturing and development of experimental configurations. Develop and apply state of the art radiographic and acoustic diagnostics.*

Fixture Design



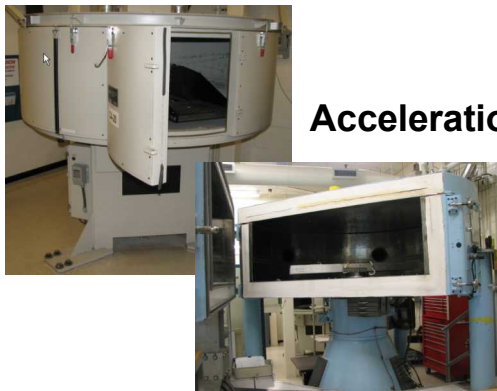
Production Testing



Structural Mechanics



Acceleration



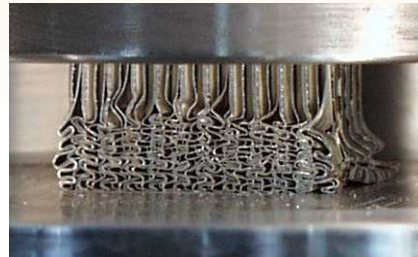
Non-Destructive Testing



Climatic



1522: Structural Mechanics Lab (860)



• Overview of Capabilities

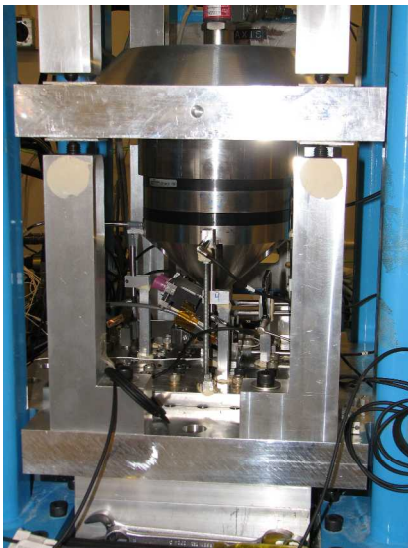
- Force up to 600,000 lbs
- Field test up to 120,000 lbs
- Pressure up to 20,000 psi
- Vacuum down to .1 psia
- Displacement / Strain measurement

• Accomplishments

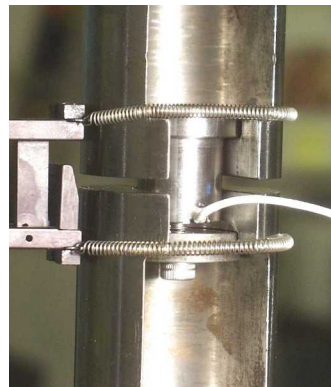
- 3 degree of freedom static test
- Combined thermal and pressure tests

• Future Activities

- Combine vacuum and pressure tests
- Improved multiaxis load and displacement control
- Utilization of Digital Image Correlation for full field displacement and strain measurements



QuickTime™ and a
Photo™ JPEG decompressor
are needed to see this picture.



Point of Contact: Nathan Roberts
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Personnel: 1 Engineer, 3 Technologists

1522: Climatic Lab (860)



• Overview of Capabilities

- **Altitude / Temperature Chamber**
 - -100°F to 350°F, ambient to 160,000 ft
- **Thermal Shock Chamber**
 - -100°F to 350°F
- **Oven**
 - Ambient to 1292°F
- **Salt Fog/Humidity Chamber**
 - Corrosion Testing
- **5 Temp/Humidity Chambers, 1 walk-in**
 - -100°F to 350°F, 10% to 95% relative humidity
 - -85°F to 200°F, 10% to 95% relative humidity (walk-in)
- **3 Temperature Chambers**
 - -100°F to 350°F
- **Data Acquisition**
 - Data Loggers and Circular Chart Recorder

• Accomplishments

- Development, Qualification, and Acceptance of multiple system components
- Portable data acquisition system upgrade
- Temp/humidity chamber controller conversion upgrade

• Future Activities

- Walk-in chamber controller upgrade
- Support equipment upgrade

1522: Centrifuge Lab (860)



- **Overview of Capabilities**

- **Space Electronics**

- 400g
 - 50 lb. payload
 - 33" max radius
 - 16 Data/Power Connections via slirings
 - RF Data Connection
 - Accelerometer and RPM data availability

- **Goerz**

- 100g
 - Fast rise time
 - 50 lb. payload
 - 27" max radius
 - 34 data/power connections via slirings
 - Accelerometer and RPM data availability

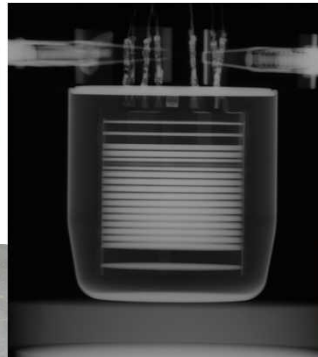
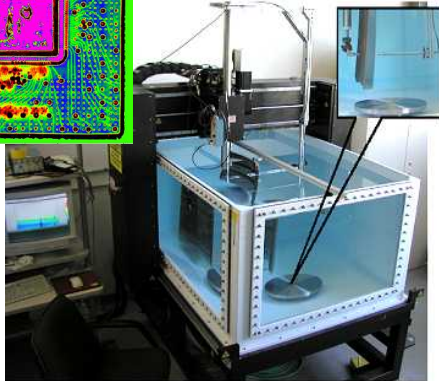
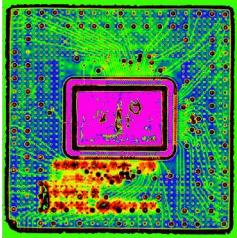
- **Accomplishments**

- Development, Qualification, and Acceptance of multiple system components
 - Power installed for portable temp chamber

- **Future Activities**

- Goerz controller software/computer upgrade
 - Investigate active thermal conditioning
 - Investigate replacement for higher g level
 - Vibrafuge capability added to Goerz

1522: Non Destructive Test Lab (860/6539)



• Overview of Capabilities

- Film Radiography
- Digital Radiography
- High Energy X-ray
- Flash and High Speed X-ray
- Computed Tomography
- Ultrasonics
- Eddy Current, Dye Penetrant, Visual Inspection, Optical Measurement

• Accomplishments

- Flaw Detection
- Micro Computed Tomography
- Material Characterization

• Future Activities

- High Energy CT
- High Temp Material Characterization
- Nonlinear Acoustics

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Personnel: 2 Engineers, 2 Technologists