TESTING EQUIPMENT

SPECIFICATIONS

STRESS ENGINEERING SERVICES INC.

an employee-owned company

6 Million Pound Test Frame

Specifications:

- Max Tension Capacity = 6,000,000 lbs
- Max Compression Capacity = 4,700,000 lbs
- Max Bending Capacity = 1,000,000 ft-lbs
- Max Stroke = 72 inches
- Max Sample Length = 44 feet

Applications:

- Single or Multiple Casing Connection Testing to 30" Pipe
- ISO 13679 Test Procedures & Special Oil Company Procedures
- Drilling Equipment Proof Testing of Hooks, Blocks and Swivels
- Load Testing of Riser Connections
- Load Cell Calibration
- Load Testing of Downhole Tools

4 Million Pound Test Frame

Specifications:

- Max Tension Capacity = 4,000,000 lbs
- Max Compression Capacity = 3,000,000 lbs
- Max Bending Capacity = 500,000 ft-lbs
- Max Stroke = 36 inches
- Max Sample Length = 27 feet

Applications:

- Single or Multiple Casing Connection Testing to 30" Pipe
- ISO 13679 Test Procedures & Special Oil Company Procedures
- Drilling Equipment Proof Testing of Hooks, Blocks and Swivels
- Load Testing of Riser Connections
- Load Cell Calibration
- Load Testing of Downhole Tools

3.5 Million Pound Test Frame

Specifications:

- Max Tension Capacity = 3,500,000 lbs
- Max Compression Capacity = 3,500,000 lbs
- Max Bending Capacity = 400,000 ft-lbs
- Max Stroke = 36 inches
- Bending to = 40° / 100 ft-lbs
- Max Sample Length = 30 feet
- Gas Pressure to 45 ksi
- Induction Heating to HPHT Conditions
- Combined Loading in Tension or Compression with Bending and Pressure
- Frame Calibration Traceable to the NIST
- Horizontal Orientation with Anti-Buckling

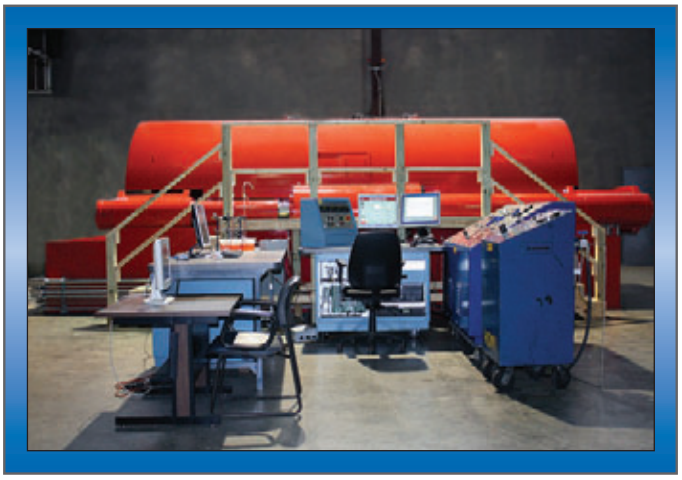
Applications:

- Tubular Products
- Hoisting Equipment
- Marine Equipment

3.3 Million Pound Test Frame

Specifications:

- Max Tension Capacity = 3,300,000 lbs
- Max Compression Capacity = 2,800,000 lbs
- Max Bending Capacity = 400,000 ft-lbs
- Max Stroke = 36 inches
- Max Sample Length = 11 feet



Applications:

- ISO 13679 Test Procedures & Special Oil Company Procedures
- Load Testing of Riser Connections
- Load Cell Calibration
- Load Testing of Downhole Tools

3 Million Pound Vertical Test Frame

Specifications:

- Maximum Load Capacity with 60” Travel

  Tension = 3,000,000 lbs

  Compression = 2,250,000 lbs
- Data Acquisition System with up to 384 Channels
- Frame Calibration Traceable to the NIST

Applications:

- Tubular Products
- Marine Equipment
- Hoisting Equipment
- Downhole Equipment
- Compression / Flattening
- Load Cell Calibration
- Ring Collapse Tests

2.5 Million Pound Test Frame (A)

Specifications:

- Max Tension Capacity = 2,500,000 lbs
- Max Compression Capacity = 1,250,000 lbs
- Max Bending Capacity = 200,000 ft-lbs
- Max Stroke = 12 inches
- Max Sample Length = 8.5 feet

Applications:

- Combined Load Testing of OCTG Casing Connectors to 11-7/8” Pipe
- ISO 13679 Test Procedures & Special Oil Company Procedures
- Load and Failure Test of Large Diameter Studs and Bolts
- Proof Testing of Drilling Equipment
- Load Testing of Downhole Tools

2.5 Million Pound Test Frame (B)

Specifications:

- Max Tension Capacity = 2,500,000 lbs
- Max Compression Capacity = 2,500,000 lbs
- Max Stroke = 24 inches
- Bending to = 40° / 100 ft-lbs
- Max Sample Length = 15 feet
- N_2 Pressure to 45 ksi
- H_20 Pressure to 60 ksi
- Induction Heating to HPHT Conditions
- Combined Loading in Tension or Compression with Bending and Pressure
- Frame Calibration Traceable to the NIST
- Horizontal Orientation with Anti-Buckling

Applications:

- Tubular Products
- Hoisting Equipment
- Marine Equipment

2 Million Pound Vertical Test Frame

Specifications:

- Maximum Load Capacity with 60” Travel

  Tension = 2,000,000 lbs

  Compression = 1,500,000 lbs
- Data Acquisition System with up to 384 Channels
- Frame Calibration Traceable to the NIST

Applications:

- Tubular Products
- Marine Equipment
- Hoisting Equipment
- Downhole Equipment
- Compression / Flattening
- Load Cell Calibration
- Ring Collapse Tests

2 Million Pound Test Frame

Specifications:

- Max Tension Capacity = 2,000,000 lbs
- Max Compression Capacity = 2,000,000 lbs
- Max Bending Capacity = 120,000 ft-lbs
- Max Stroke = 60 inches
- Max Sample Length = 50 feet

Applications:

- Single or Multiple OTCG Casing Connection Testing to 14" Pipe
- Fatigue Testing of Composite Pipe and Mooring Ropes
- Proof Testing of Drilling Equipment and Umbilical Testing
- Functional Testing of Chain Jacks
- Proof and Failure Testing of Hoses

1.1 Million Pound Test Frame

Specifications:

- Max Tension Capacity = 1,100,000 lbs
- Max Compression Capacity = 1,100,000 lbs
- Max Bending Capacity = 200,000 ft-lbs
- Max Stroke = 30 inches
- Max Sample Length = 45 feet

Applications:

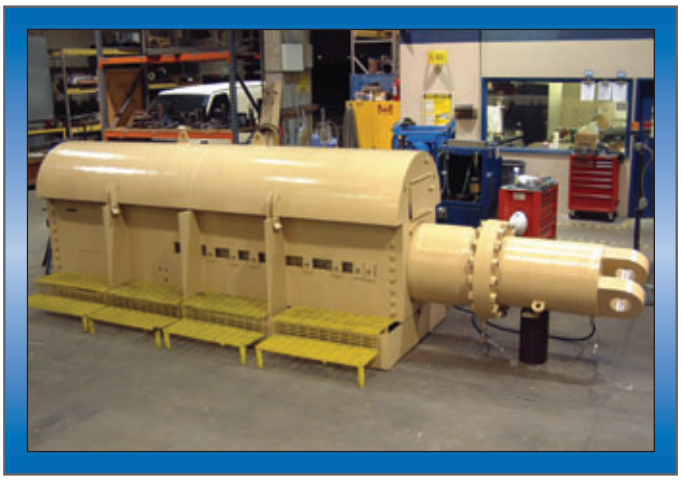
Static and Fatigue Testing of:

- Tubular Samples
- Metallic Tension and Compression
- Large Scale Fracture Mechanics
- High Speed Fatigue Testing up to 1,000,000 lbs
- Components

1 Million Pound Test Frame (A)

Specifications:

- Max Tension Capacity = 1,000,000 lbs
- Max Compression Capacity = 1,000,000 lbs
- Max Bending Capacity = 120,000 ft-lbs
- Max Stroke = 24 inches
- Max Sample Length = 10 feet



Applications:

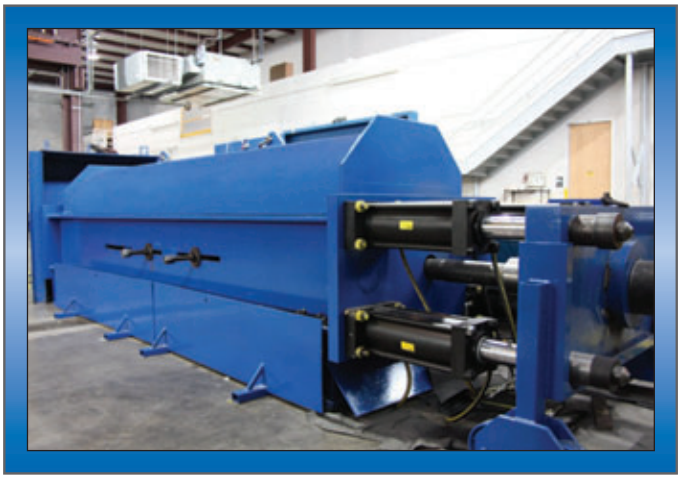
- Proof Testing of Drilling Equipment
- Load Cell Calibration
- Combined Load Testing of OCTG Casing Connectors to 11-7/8” Pipe
- ISO 13679 Test Procedures & Special Oil Company Procedures
- Load and Failure Test of Studs and Bolts

1 Million Pound Test Frame (B)

Specifications:

- Max Tension Capacity = 750,000 lbs
- Max Compression Capacity = 500,000 lbs
- Max Bending Capacity = 120,000 ft-lbs
- Max Sample Length = 45 feet
- Max Stroke = 18 inches is typical*

* Can be expanded using alternate cyclinders up to 60”



Applications:

- Tubular Products
- Pipeline Connectors
- Tubing & Casing Threaded Connections
- Drill Pipe Threaded Connectors
- Composite Materials
- Downhole Tools

90 ft-kip Makeup / Breakout Station

Specifications:

- Computerized Torque vs. Turns Control System
- Torque vs. Turns Data Recorded and Plotted
- Hydraulic Tongs to Fit Pipe Sizes from 4.5” to 14”
- Torque Capacity to 90,000 ft-lbs
- 5 Ton Jib Crane
- 10 Ton Bridge Crane
- Two Floor Holes - 36” diameter x 15 ft deep

Applications:

- ISO 13679 Test Procedures & Special Oil Company Procedures
- Torque Application Used to Assemble Oil Field Tools
- Torque to Failure Test Including Pipe Threads
- Makeup or Breakout of OCTG Threaded Tubing and Casing Pipe Samples to Specified Torque or Turn Values

30 ft-kip Makeup / Breakout Station

Specifications:

- Computerized Torque vs. Turns Control System
- Torque Capacity to 30,000 ft-lbs
- Torque vs. Turns Data Recorded and Plotted
- Hydraulic Tongs to Fit Pipe Sizes from 2.375” to 7.625” (back-ups to 8.625”)
- Regular, Non-directional and Non-marking Dies (where available)
- 4 Ton Bridge Crane and 4 Ton Jib Crane
- Floor hole 10” diameter x 15 ft deep with support chuck

Applications:

- Make & Break per ISO 13679 Connection Qualification Test Requirements
- Assembly of Downhole Oil Field Tools Where High Torque is Required
- Make Up of Special Connectors, Sucker Rods and Drill String Components
- Makeup or Breakout of OCTG Threaded Tubing and Casing Pipe Samples to Specified Torque or Turn Values

28 ft-kip Makeup / Breakout Station

Specifications:

- Computerized Torque vs. Turns Control System
- Torque vs. Turns Data Recorded and Plotted
- Hydraulic Tongs to Fit Pipe Sizes from 4.375” to 13.375”
- Torque Capacity to 90,000 ft-lbs
- 5 Ton Jib Crane
- 10 Ton Bridge Crane
- Two Floor Holes - 36” diameter x 15 ft deep

Applications:

- ISO 13679 Test Procedures & Special Oil Company Procedures
- Torque Application Used to Assemble Oil Field Tools
- Torque to Failure Test Including Pipe Threads and Sucker Rods
- Makeup or Breakout of OCTG Threaded Tubing and Casing Pipe Samples to Specified Torque or Turn Values

Materials Testing Frames

500 Thousand Pound Test Frame

- Max Tension/Compression Capacity = 500,000 lbs
- Max Stroke = 6 inches
- Max Sample Length = 8 feet

110 Thousand Pound Test Frame

- Max Tension/Compression Capacity = 110,000 lbs
- Max Stroke = 6 inches
- Max Sample Length = 8 feet

55 Thousand Pound Test Frame

- Max Tension/Compression Capacity = 55,000 lbs
- Max Stroke = 6 inches
- Max Sample Length = 8 feet

22 Thousand Pound Test Frame

- Max Tension/Compression Capacity = 22,000 lbs
- Max Stroke = 6 inches
- Max Sample Length = 2 feet

Pressure Vessels and Chambers

Pressure Chamber Specifications:

Vessel	Max Pressure (psi)	Max Inside Diameter (in)	Max Sample Length (ft)
1	30,000 *	4.5	15.5
2	30,000 *	5	15.5
3	30,000 *	10	14
4	30,000 *	10	10
5	20,000	6	1.5
6	20,000	5.75	21
7	20,000	4	12
8	20,000	4	3
9	15,000	11	6.5
10	15,000	5.75	24
11	6,000	14	4
12	5,900	42	22
13	4,750	26	11
14	3,700	22	20

* Heated

Slip-On Pressure Chamber Specifications:

Working Pressure	up to 20,000 psi
Minimum Sample Diameter	2.375 inches O.D.
Maximum Sample Diameter	16 inches O.D.
Sample Lengths	up to 6 feet

Applications:

- Large Diameter Pipe Collapse Samples
- Umbilical Cables, Connectors and Wires
- Subsea Control Pods
- Pressure Testing of Subsea Valves, Actuators, Chokes, Pigging Components, Wellheads, etc.

Resonant Bending Fatigue Testing

Specifications:

- Seven machines for 3” to 24“ diameter samples; one machine for 20” to 36“ diameter samples; eight machines for 0.59” to 3“ diameter samples
- Currently have tested from 0.59” to 36” diameter pipes
- Stress ranges from very low to very high possible (typically 5 to 50 ksi range [35 to 350 MPa])
- Cyclic rates typically about 2.5 million cycles per day
- 24 hour / 7 day operation with automatic shutdowns if sample leaks, strain limit is exceeded, or pressure is lost
- Alternating fatigue stresses monitored continuously throughout test
- Post mortem dimensional and metallurgical evaluations to determine misalignment at crack and crack geometry

Applications:

- Qualification of pipe girth welds to project specified fatigue curves
- Verification of fatigue life of connectors and pipe girth welds

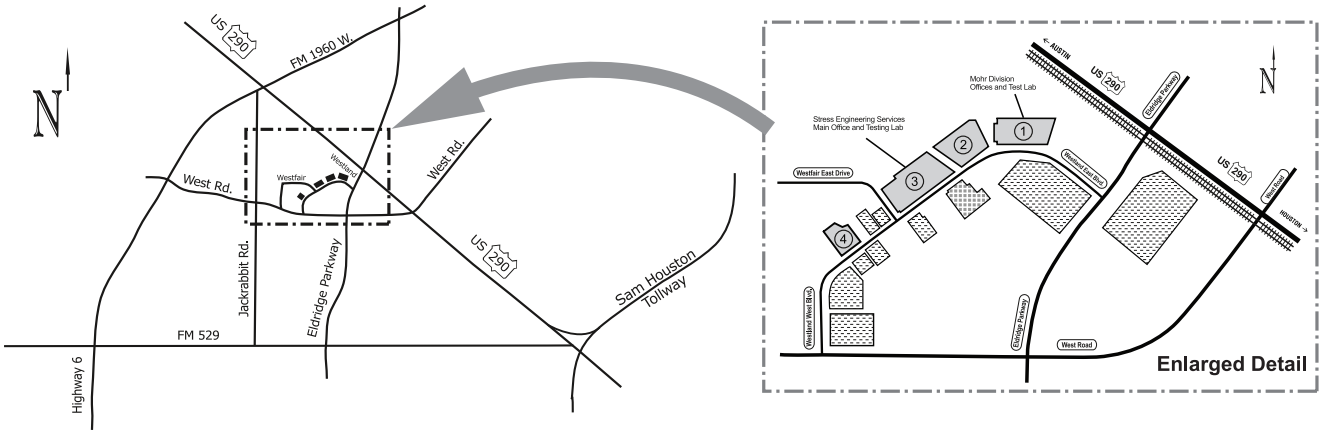
Drill String Friction and Casing / Riser Wear Testing

Specifications:

- Casing = 7 in. to 11.875 in. (plus coupons of larger casing / riser sizes)
- Lateral Load = 10,000 ft-lbs
- Rotary Speed = 155 RPM
- Tool Joint Material = Steel / Hard Metal / Composites
- Tool Joint Size = 3.75 in. (lenth) / 4.5 in. to 7 in. (diameter)
- Drilling Fluid = Water or Synthetic Based Mud / Brine
- Test Duration = 8 Hours or Until 100% Worn
- Reciprocation Rate = 22 ft./hr. (approx.)

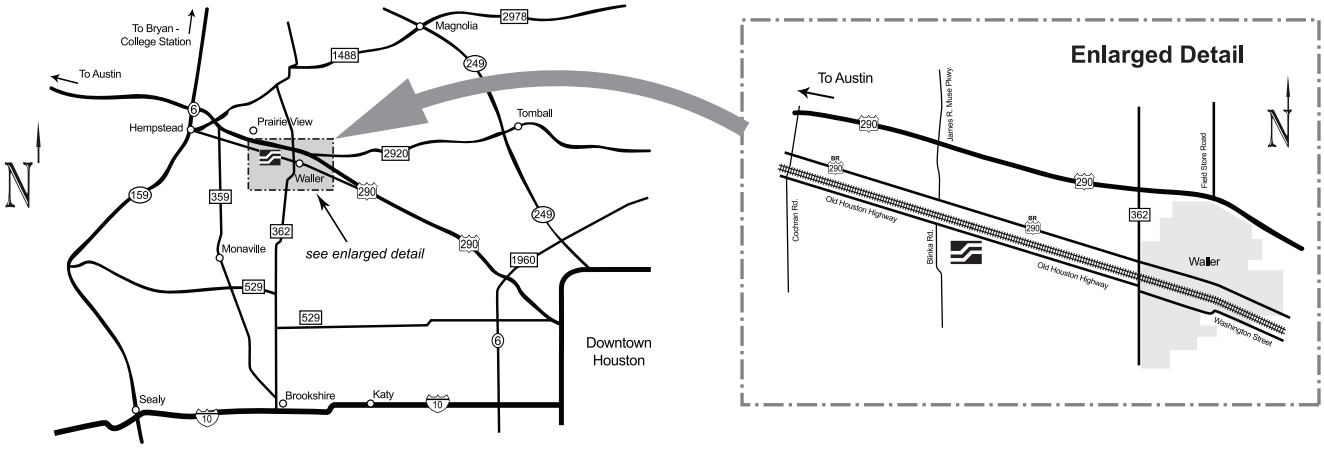
Applications:

- Tool Joint Hard Metals
- Casing / Riser Materials
- Tubular Composites
- Riser Coatings
- Rotary Torque Studies
- Axial Drag Studies
- Casing Wear Issues
- Fluid Lubricity Studies



Houston Testing Facility #1
13800 Westfair East Dr.
Houston, Texas 77041
281.955.2900

Houston Testing Facility #2
13602 Westland East Blvd.
Houston, Texas 77041
281.469.2177



Waller Testing Facility
42403 Old Houston Highway
Waller, Texas 77484
281.671.2550

STRESS ENGINEERING SERVICES INC.

www.stress.com

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