Trenchless Technology Center

Louisiana Tech University

RESEARCH FACILITIES AND EQUIPMENT

OVERVIEW

Last Update: February 2015

NATIONAL TRENCHLESS TECHNOLOGY RESEARCH FACILITY

National Trenchless Technology Research Facility Overview

High bay research space (85ft x 40ft x 22ft high) with strong floor and overhead crane

Strong floor -- 3 ft thick, w anchor points for 320,000 lb tensile load

Soil box, large and small -- Large-scale soil structure interaction test chamber (20ft x 20ft x 11ft high) with strong floor base. Small soil test chamber (12ft x 6ft x 4ft high) with air pressure cover to simulate soil depths to 30 ft.

Two servo-controlled hydraulic rams (550,000 lb and 150,000 lb)

Test control and data acquisition equipment

Materials and sample preparation room

Extruder for cementitious samples

Liner inversion chamber

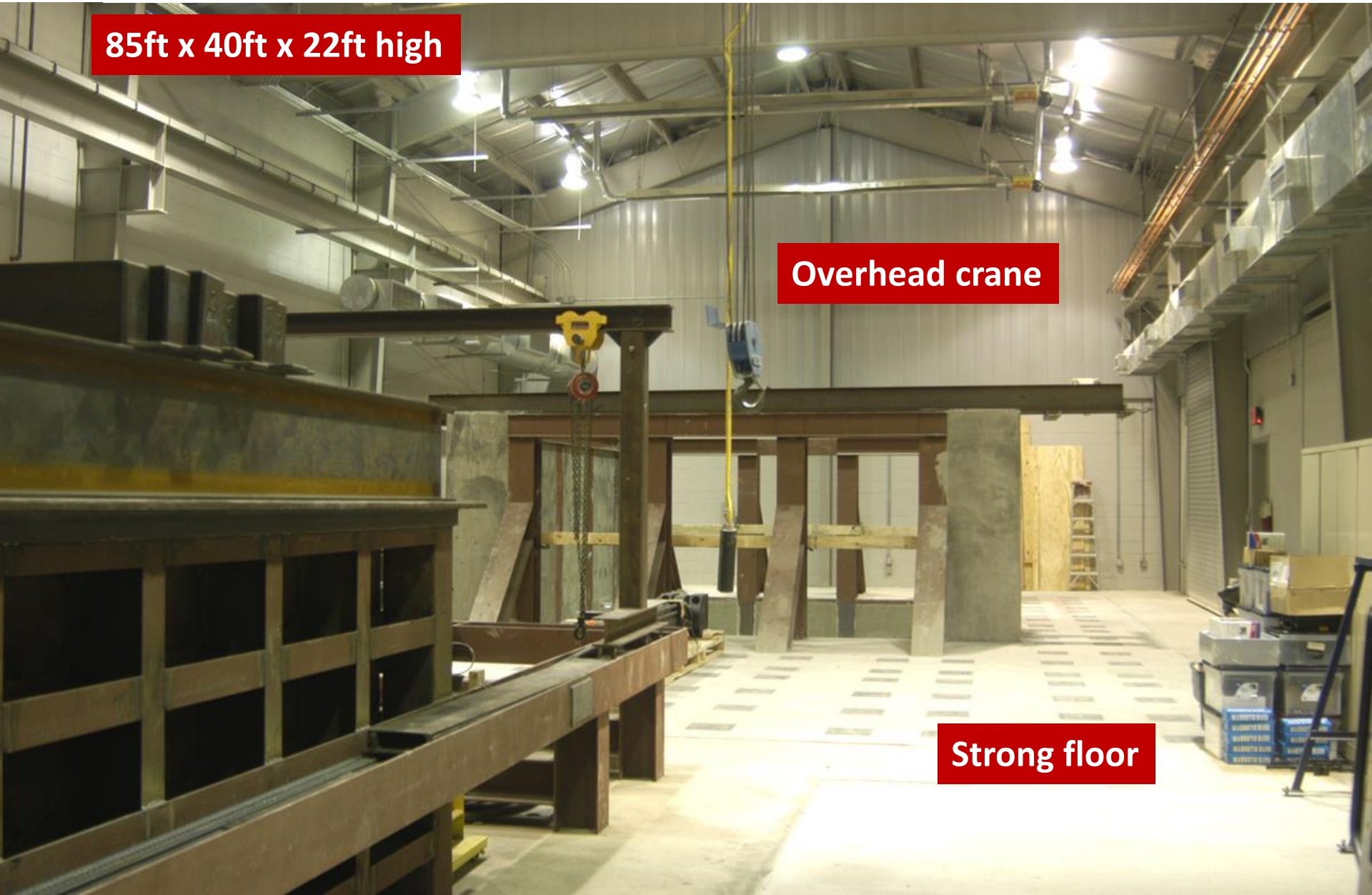
Microscope

Adjacent field test site

Meeting and seminar space for up to 24 participants

Graduate student space

High bay area with soil test chamber



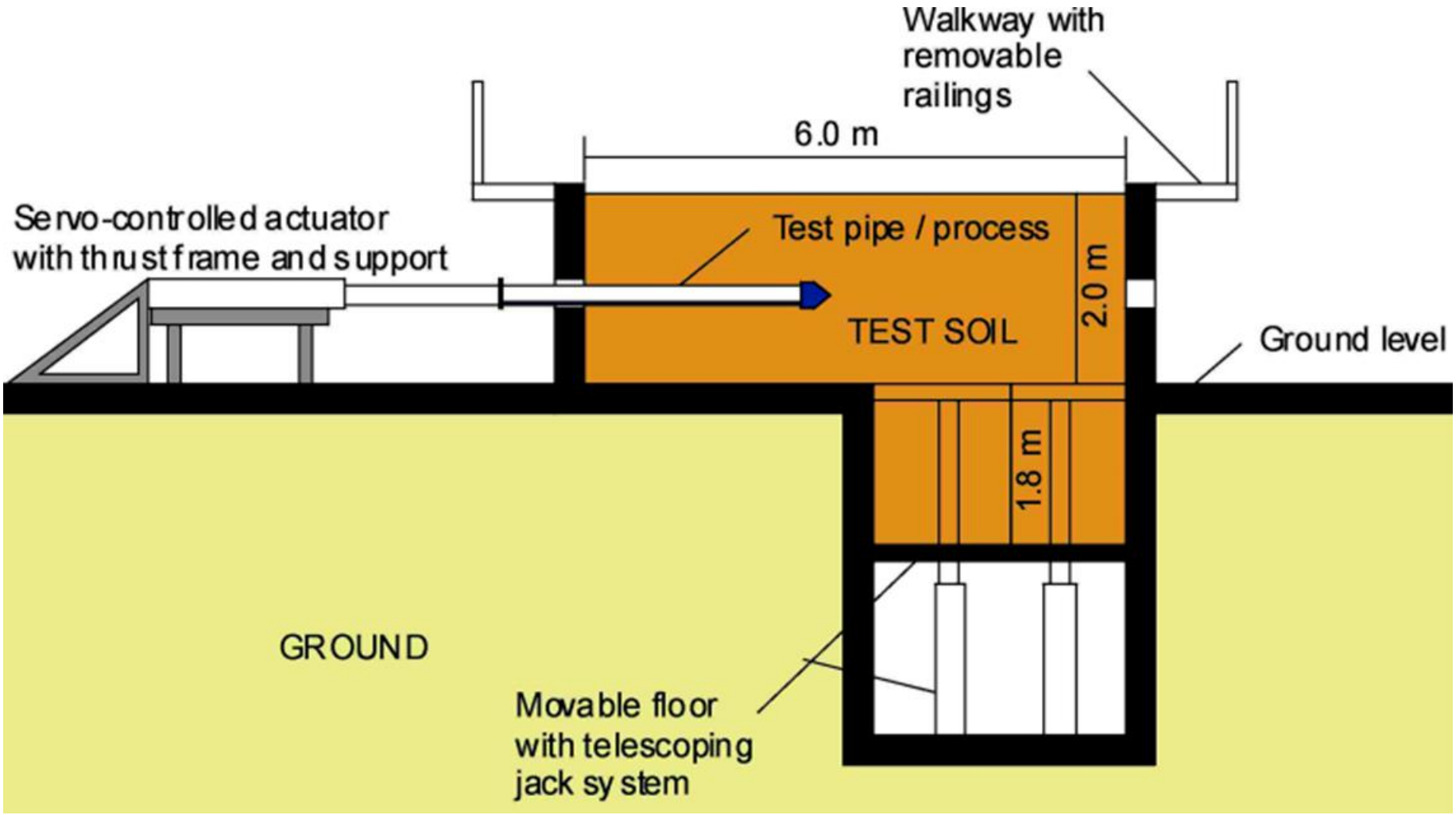
Strong floor, in construction, before concrete

Covers a big part of high bay research space (~ 65-70%)

Strong floor, finished

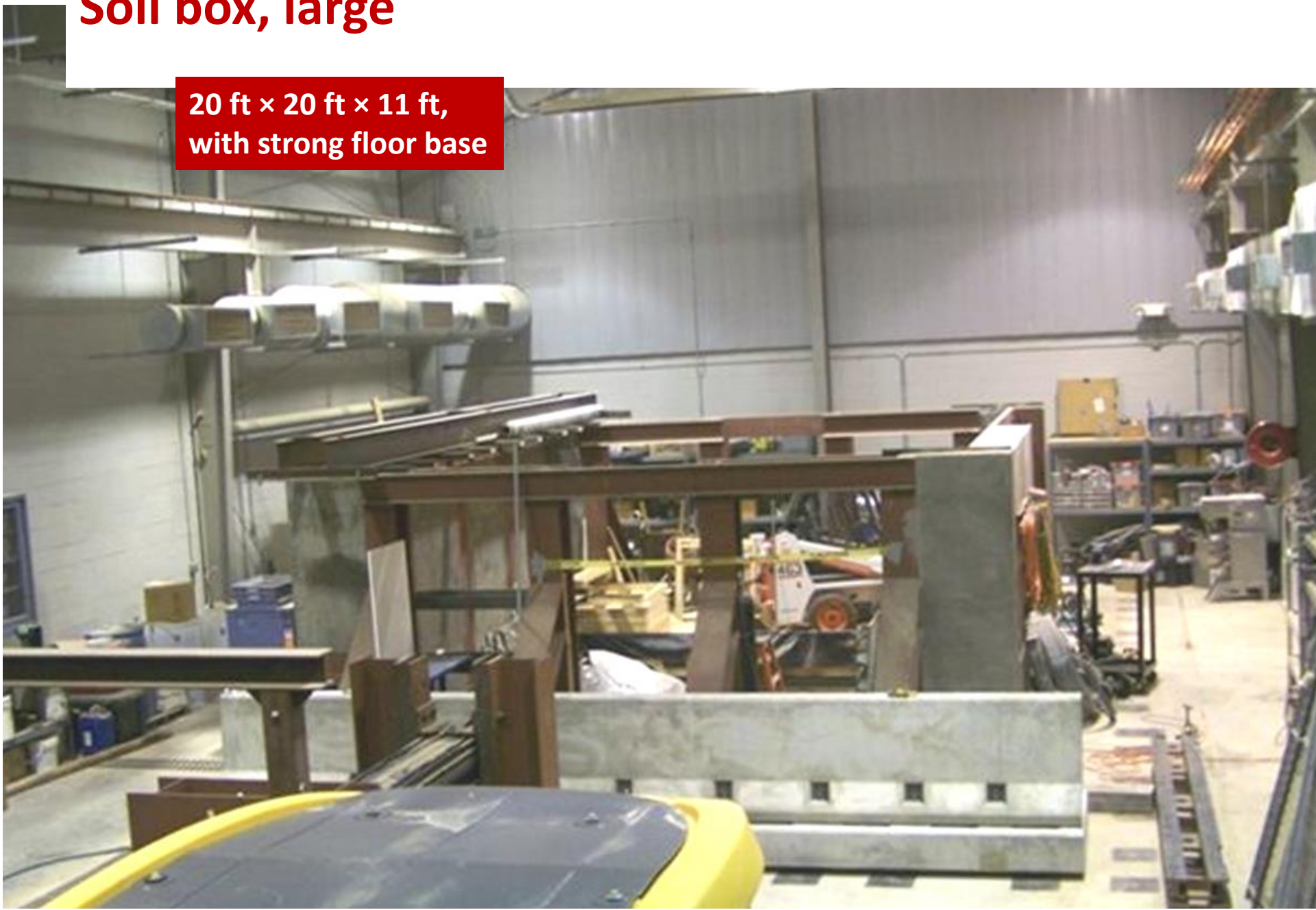
Soil box, large (plan)

20 ft × 20 ft × 11 ft, with strong floor base



Soil box, large

20 ft × 20 ft × 11 ft,
with strong floor base

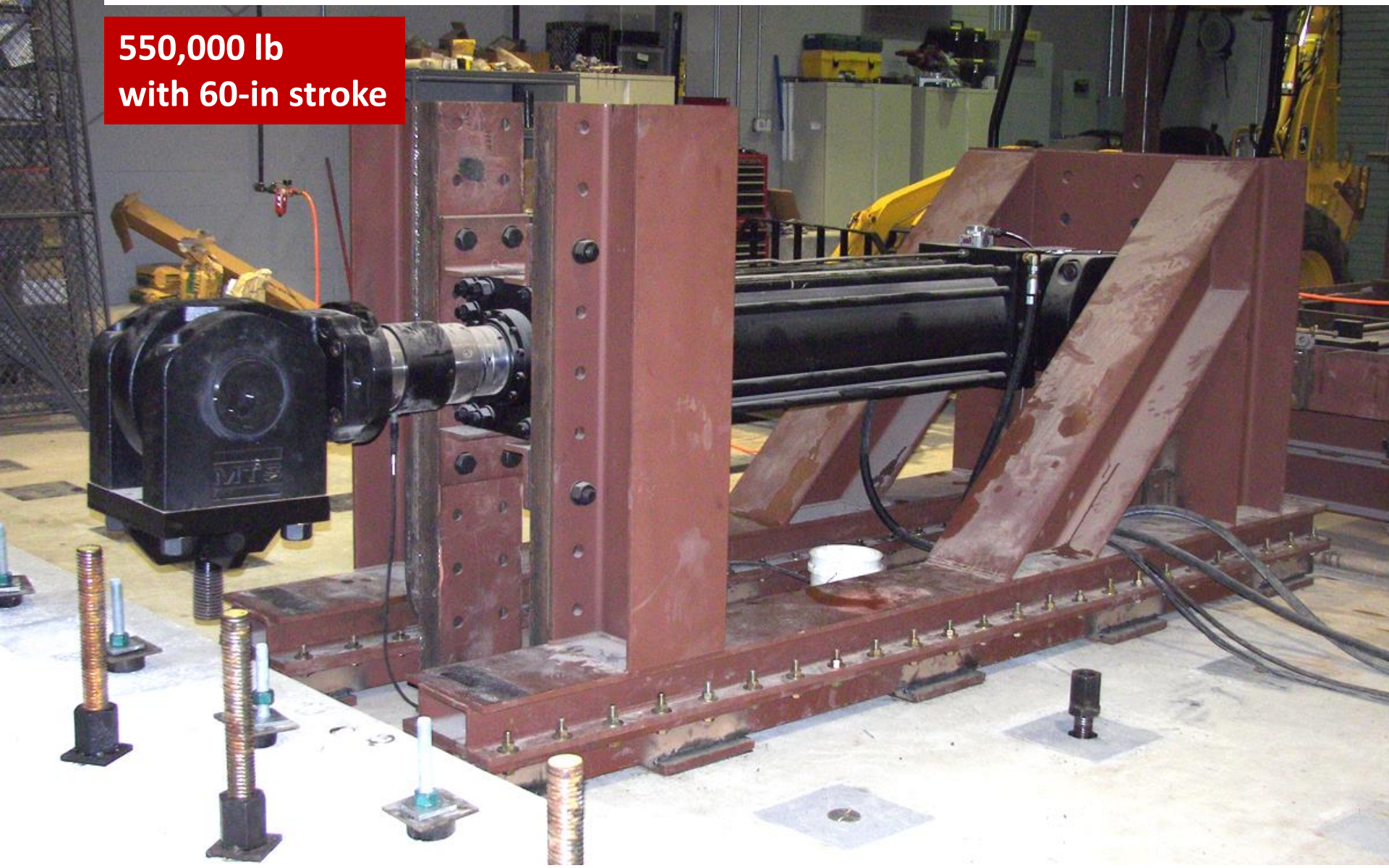


Soil box, small (bottom of soil chamber only)

Soil box, small (with air pressure cover)

Servo-controlled hydraulic ram, large

550,000 lb
with 60-in stroke



Servo-controlled hydraulic ram, small

150,000 lb
with 42-in stroke

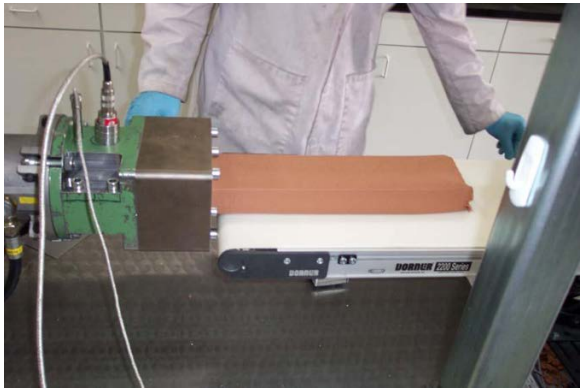
Test control and data acquisition equipment

Control box for the actuator

Road barrier testing using actuator

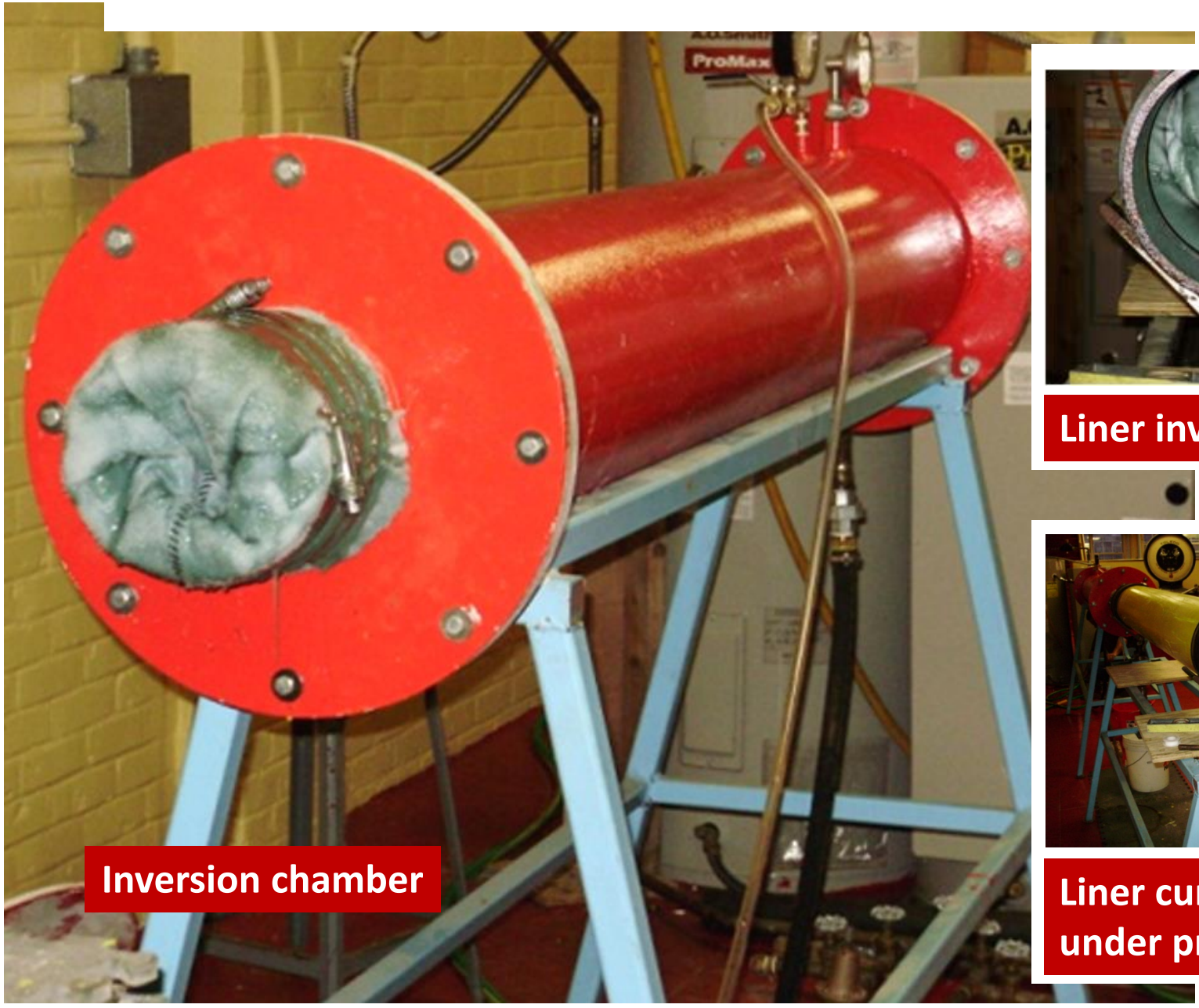
Material and sample preparation room

Extruder for cementitious samples



Cementitious sample

Liner Inversion Chamber

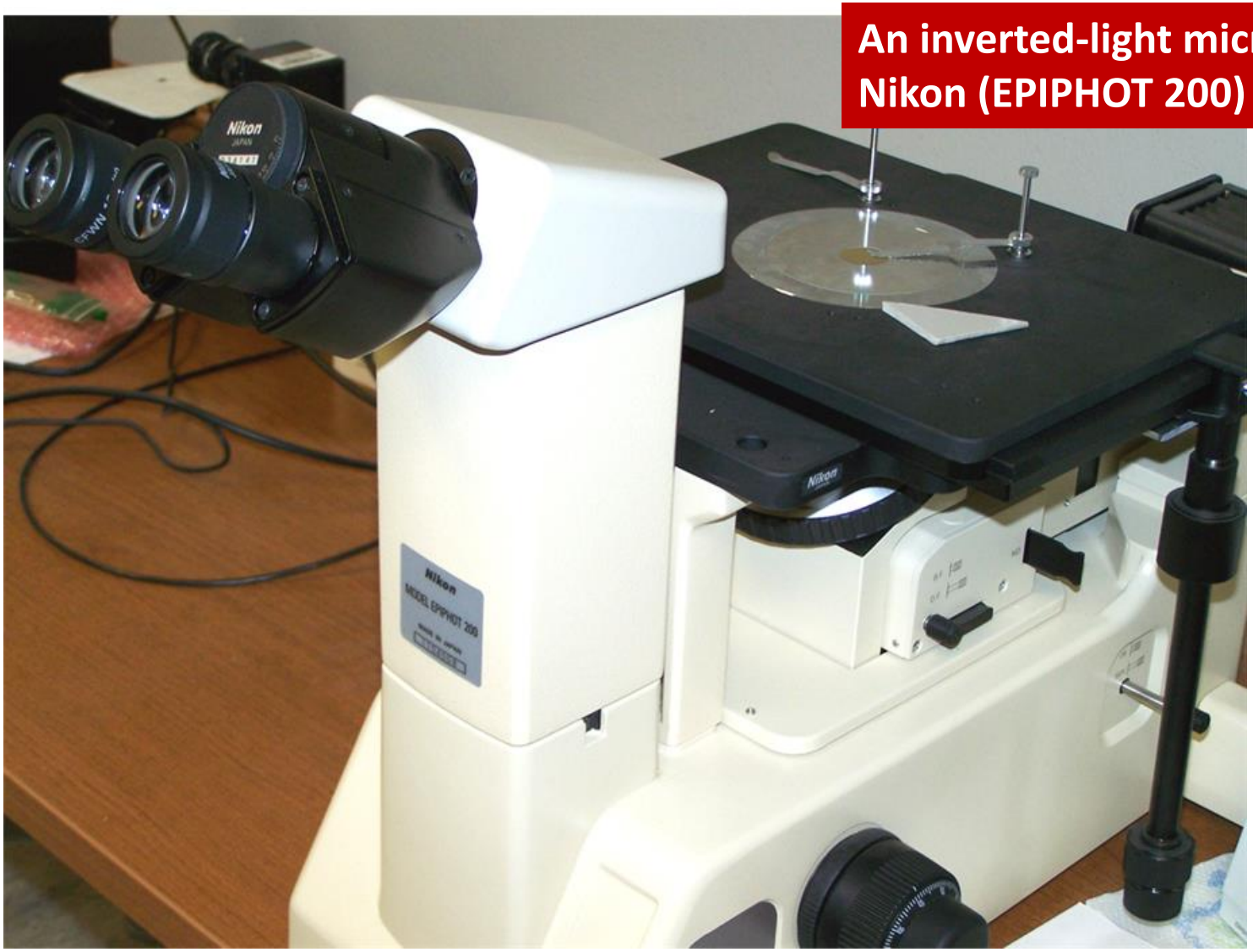


Inversion chamber

Liner inversion

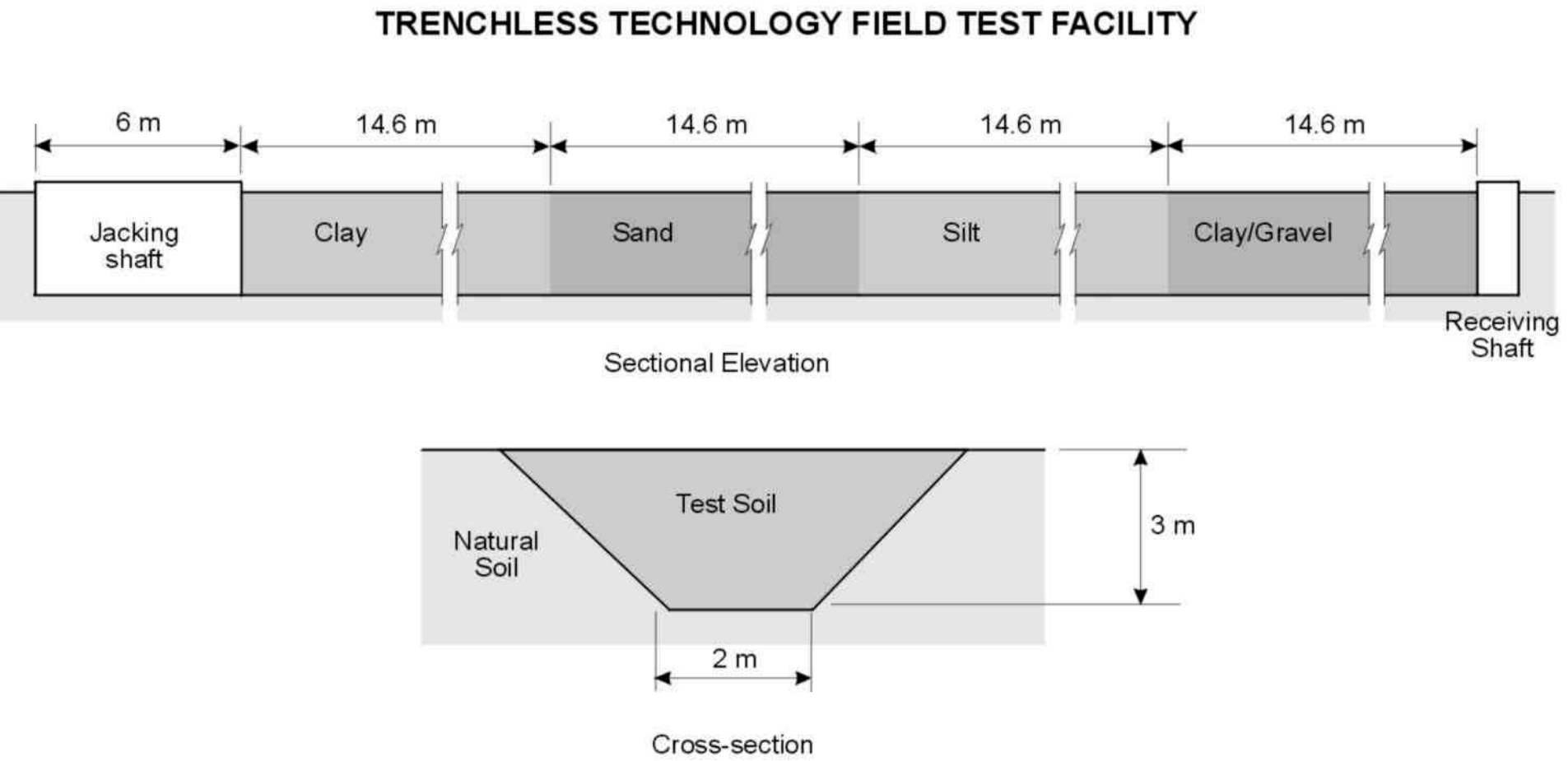
Liner cure under pressure

Microscope



An inverted-light microscope
Nikon (EPIPHOT 200)

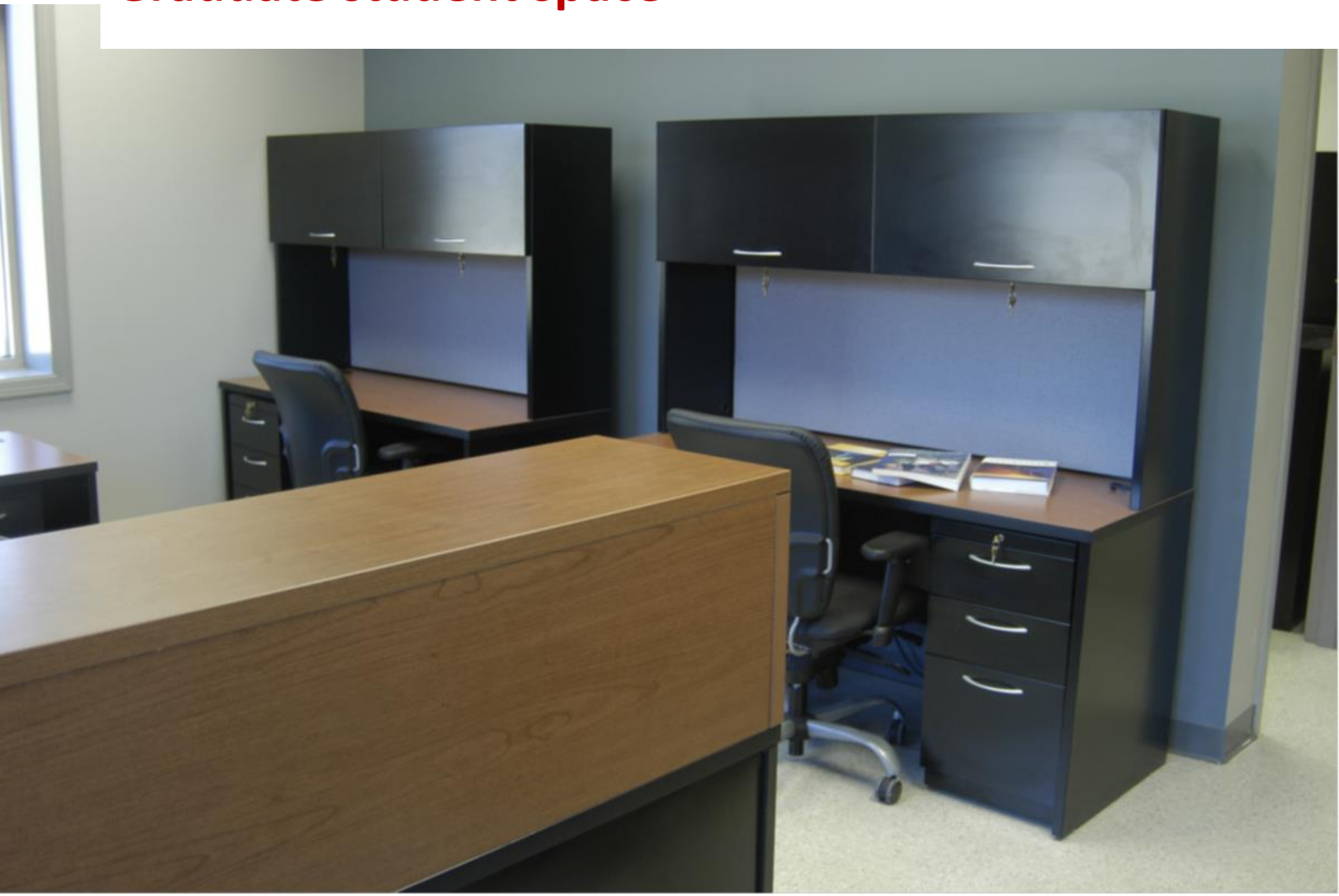
Adjacent field test site, plan



Adjacent field test site

Meeting and seminar space

Graduate student space



ELECTROMAGNETIC SENSORS LABORATORY (BOGARD HALL)

Electromagnetic Sensors Laboratory Overview

Anechoic chamber (20' x 20' x 10')

CNC machine for multi-layer microwave board fabrication

Reflow soldering oven

Multi-layer board press

Anritsu Vector Network Analyzer (up to 65 GHz)

Tektronix sampling oscilloscope with TDR (up to 50 GHz)

Tektronix real time oscilloscope (up to 6 GHz)

Spectrum analyzer (up to 20 GHz)

LCR impedance tester (up to 2 MHz)

Pulse generators (65 pico seconds to several nano seconds)

Probes for dielectric material characterization

Commercial EM simulation software packages

Multi-processor supercomputing cluster for large scale simulations

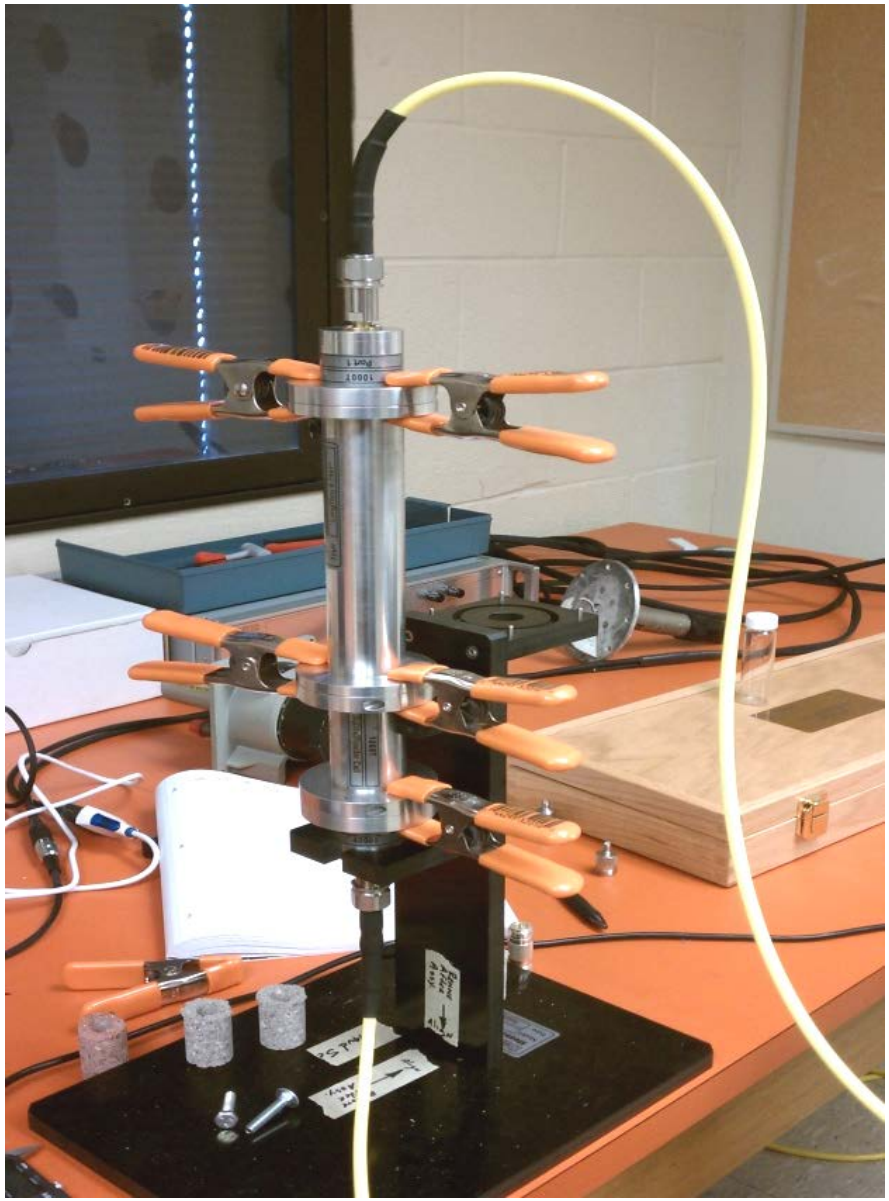
Anechoic Chamber

20ft x 20ft x 10ft high

Anritsu Vector Network Analyzer

CNC Machine for Microwave Board Fabrication

Probes for Dielectric Material Characterization



MATERIAL CHARACTERIZATION LABORATORY (BOGARD HALL)

Material Characterization Laboratory Overview

Servo controlled test machine, large and small

Small tensile and flexure testing machine

Flexure testing machine for concrete

Compression testing machine for concrete

Pressure testing unit for CIPP, pipes, panels etc

Custom built ovens for CIPP

Miscellaneous equipment for specimens preparation

Raman spectroscopy

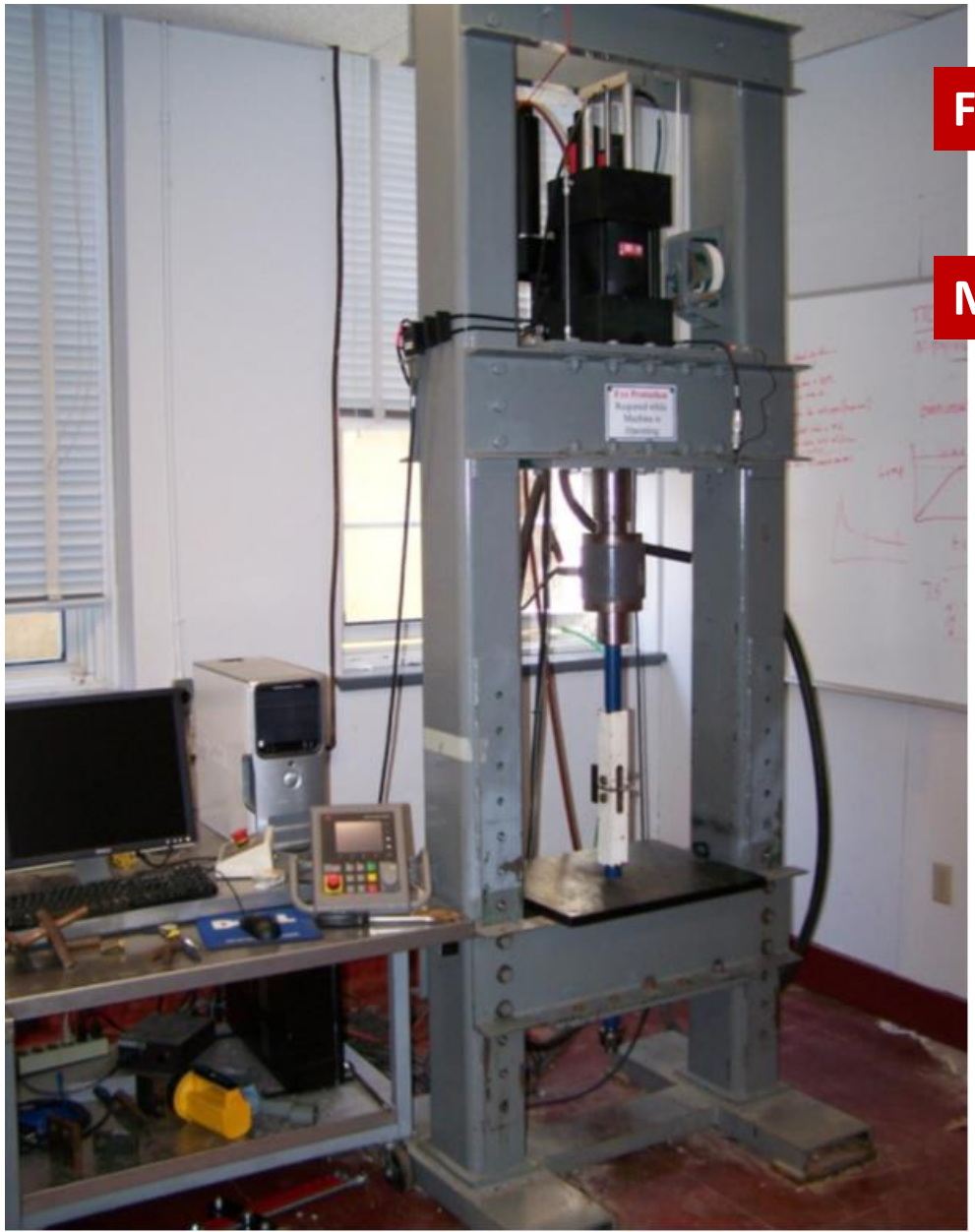
Rheology laboratory

Creep testing equipment

Environmental control chambers

Profile plotter

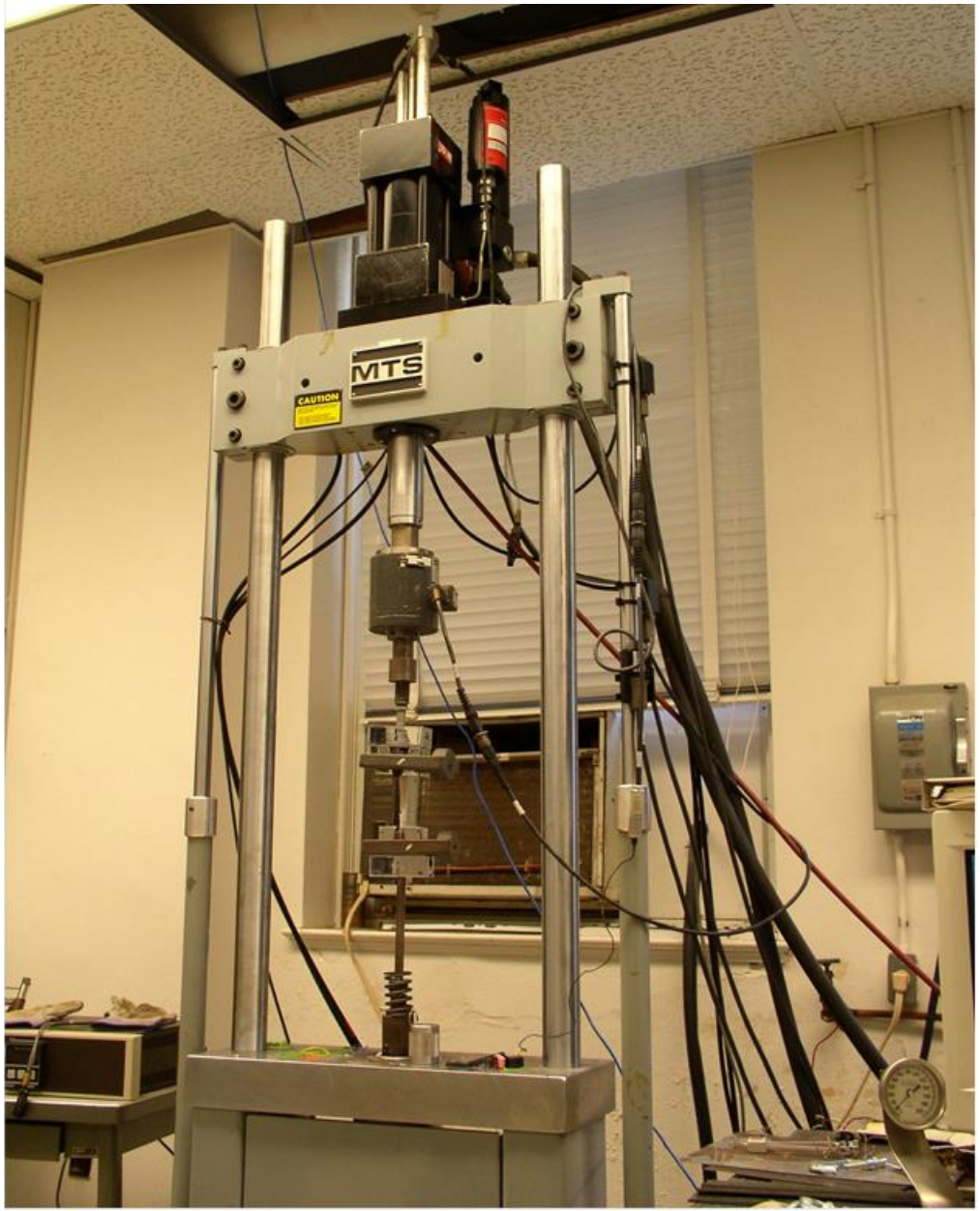
Servo controlled test machine, large



For tensile and flexure testing

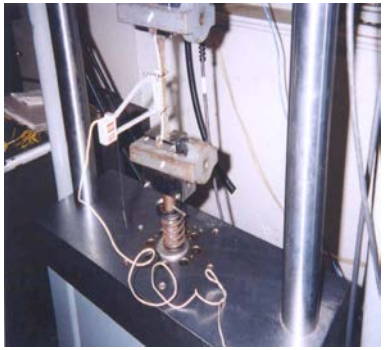
MTS machine, 55 kip

Servo controlled test machine, small



For tensile and flexure testing

MTS machine, 22 kip



Tensile test of CIPP

Tensile test of grout

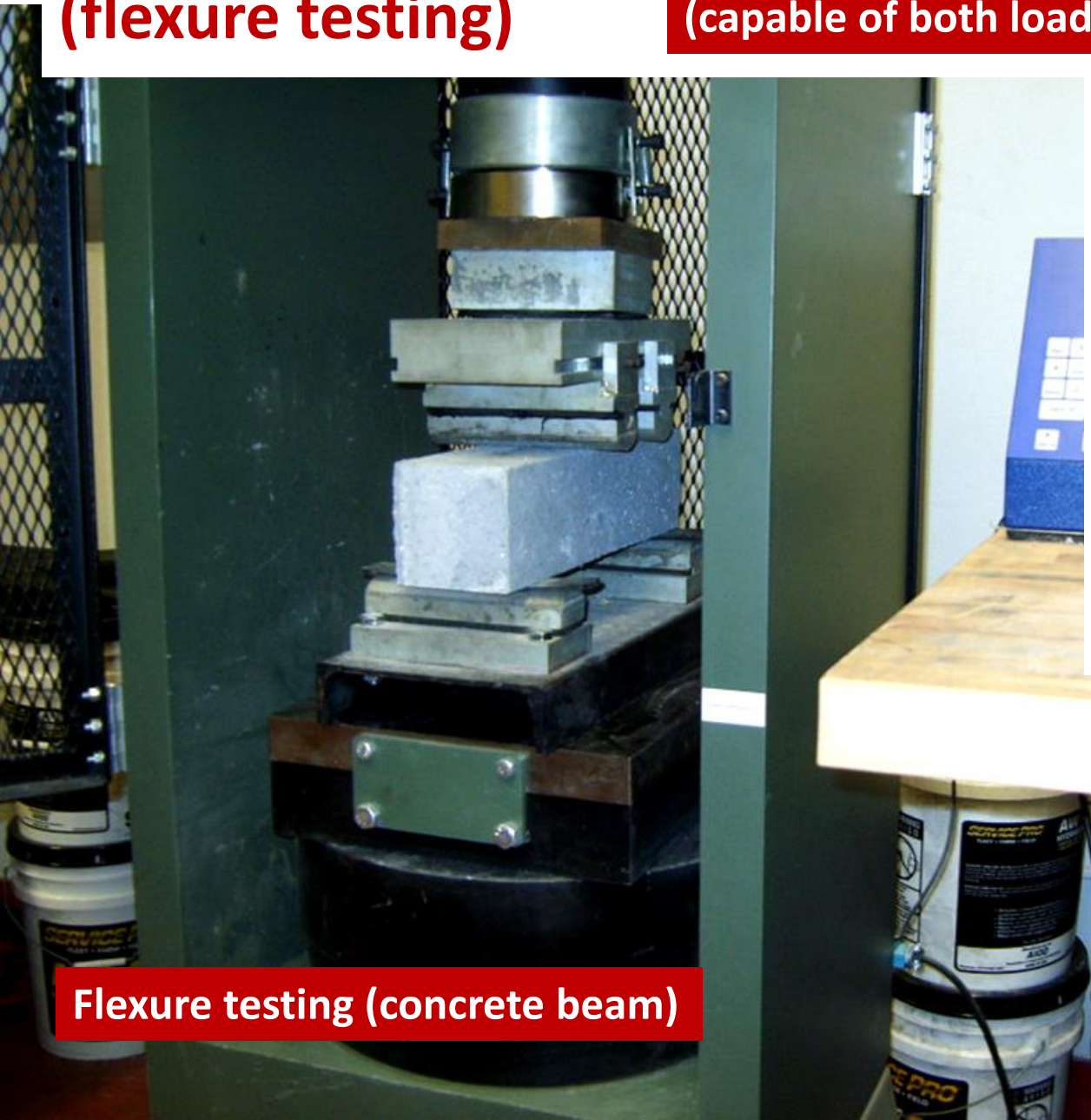
Small tensile and flexure testing machine

Universal testing machine, 2,500 lb capacity

(ADMET eXperT 2611)

Servo-controlled testing machine for concrete (flexure testing)

(capable of both load control and stroke control)



Flexure testing (concrete beam)

Concrete beam failure

Servo-controlled testing machine for concrete (compression testing)

(capable of both load control and stroke control)

Compression and modulus of elasticity testing (concrete cylinder specimen)

Concrete cylinder failure

Pressure testing unit for CIPP, pipes, panels, etc

Portable, custom-built double cell internal pressure test unit; capacity 800 psi

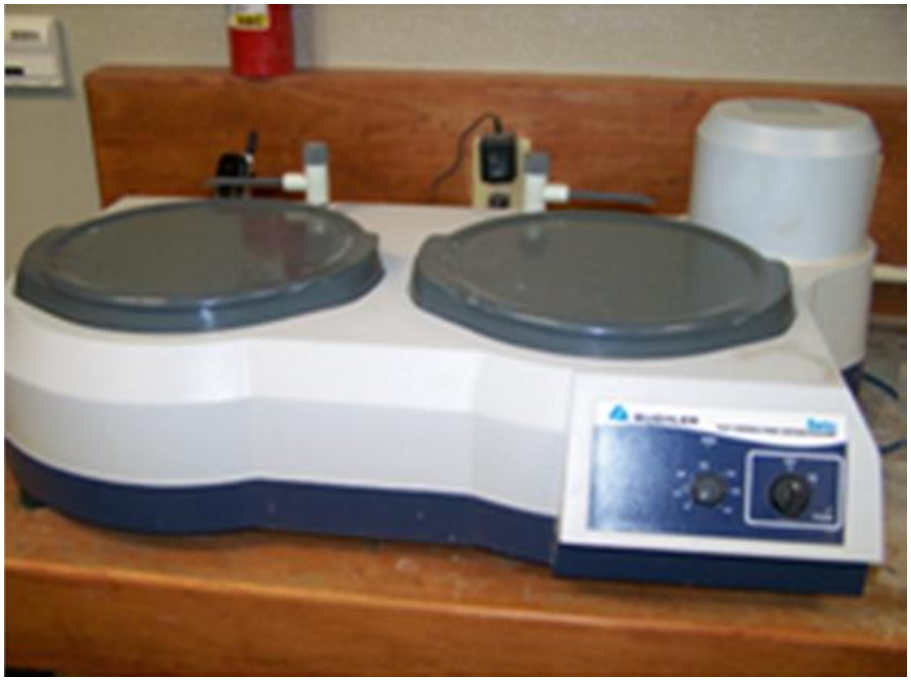
Long term cycling loading of CIPP (with LVDTs and strain gages shown)

Custom built ovens for CIP lined pipes

Programmable cyclic thermal loading

Each oven can accommodate 6 pipes

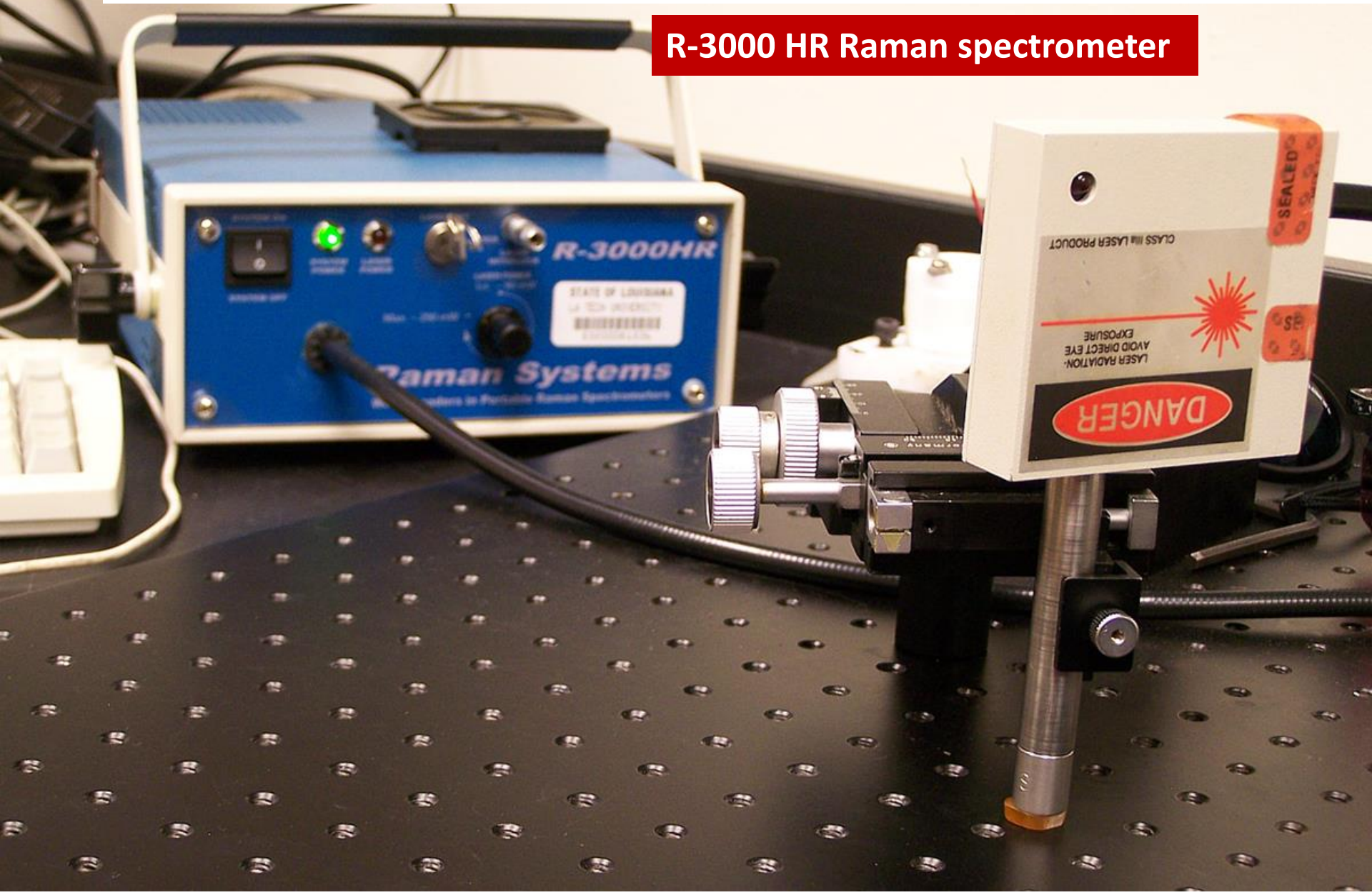
Miscellaneous equipment for specimen preparation



Mechanical polisher (e.g., for samples tested using Raman Spectroscopy)

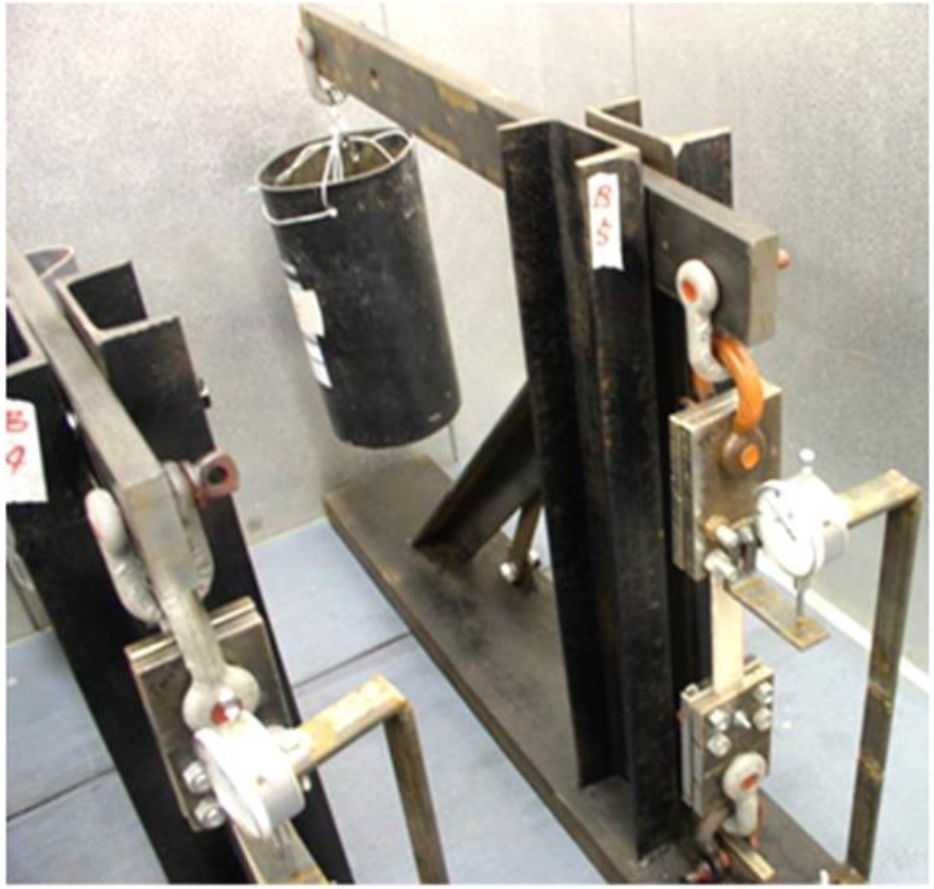
Water jet cutter (e.g., for specimens tested in accordance with ASTM D638, D790

Raman spectroscope

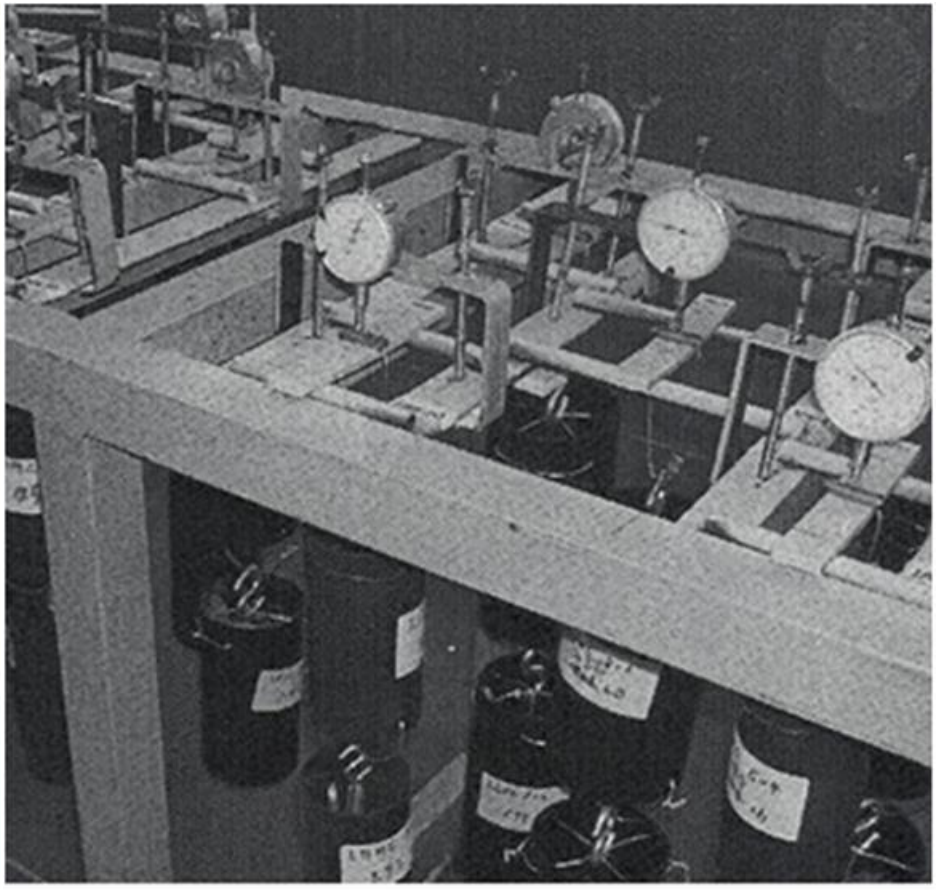


Rheology laboratory

Creep testing equipment



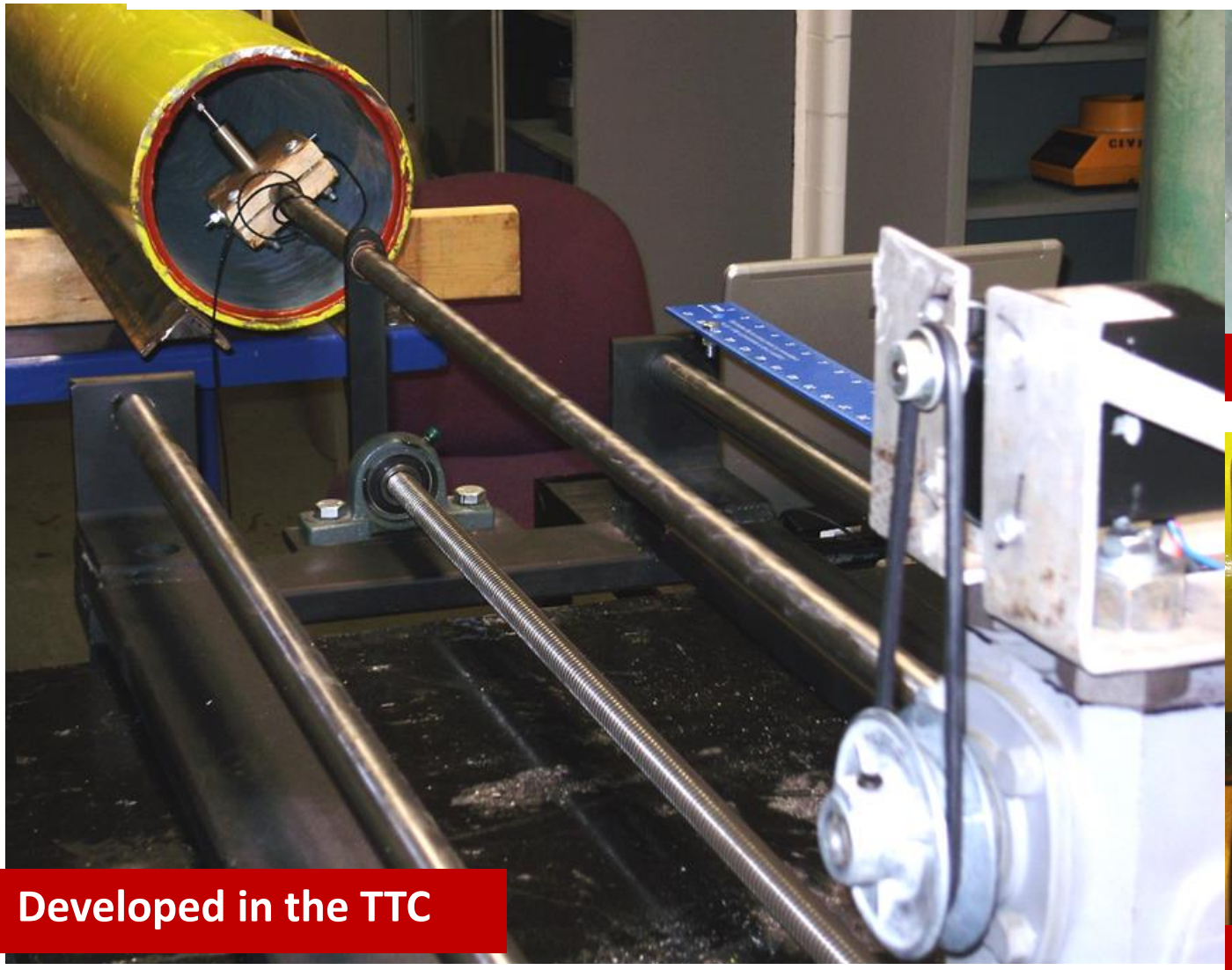
Long term loading of specimens
(load applied at the end of specimens)



Long term loading of specimens
(load applied in the middle of specimens)

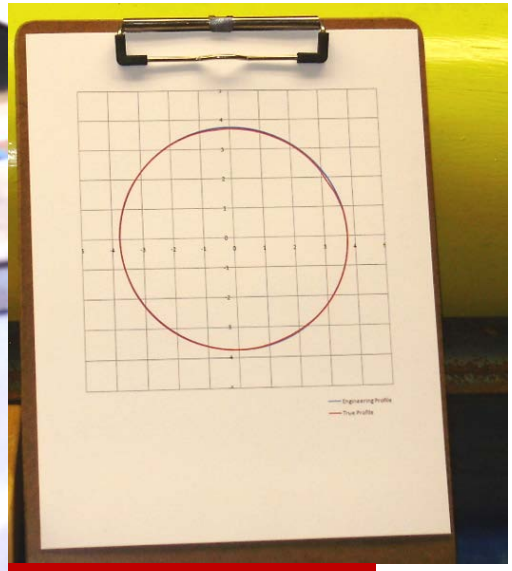
Environmental control chambers

Profile plotter



Developed in the TTC

View inside the pipe



Ovality of pipe

Physical Address

TTC Main Offices Bogard Hall across the street	South Campus National Trenchless Technology Research Facility & Field test site
Louisiana Tech University *Engineering Annex* *599 Dan Reneau Drive* *Ruston, LA 71270*	