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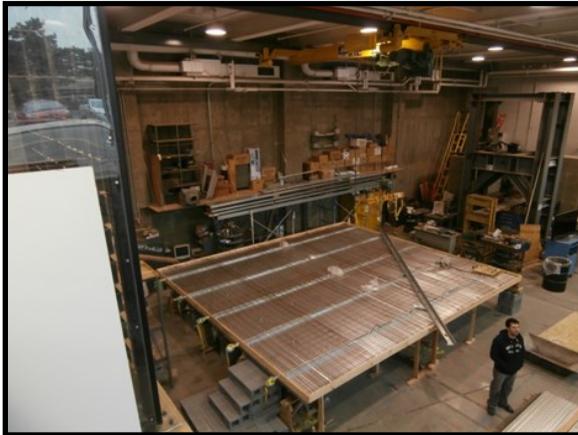
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# NJIT

JOHN A. REIF, JR. DEPARTMENT OF CIVIL  
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## LAB GUIDE

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STRENGTH OF MATERIALS LAB

### Euler's Column Buckling Lab

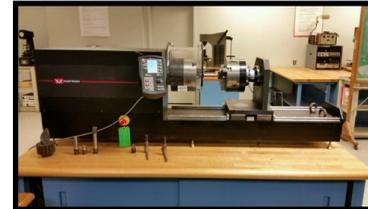
New Instron Compression Tester, 30,000 lb load

- ◇ This lab is designed to demonstrate the effects of column buckling on an assortment of intermedi-



### Torsion Testing

New In-



- ◇ This lab focuses on breaking cylindrical steel rods in shear by torquing them until rupture, to prove the legitimacy of the Modulus of Rigidity
- ◇ The samples that are used are generally mild grade steel that is cnc machined in house to

### Pure Beam Bending Test



- ◇ This lab is set up as a large beam taking a 4 point bending load to create a zone of pure moment bending in the mid-span
- ◇ Both mechanical and electrical strain measurements are recorded at various loads on the beam and at various heights along the beams axis

STRUCTURAL TESTING LAB

- ◇ The lower level contains our largest MTS machine which is able to test complete structures or other building systems.
- ◇ Houses our main tensile testing machine
- ◇ Used for our Mech 237 classes and our CE 431 classes
- ◇ Research is also conducted by both our PhD students and faculty
- ◇ The floor space in this room is provided to allow for to-scale building systems to be created and tested
- ◇ The upper area is being converted into a new laboratory for research in the area of sustainable infrastructure

### MTS Large Scale Compression



*(200,000lbs Capacity vertically, 100,000lbs capacity hori-*

- ◇ This machine is capable of testing large specimens in two directions, if desired
- ◇ The strong-wall around the machine was specially built for this application as was the 5 ton overhead crane that is used for lifting test specimens
- ◇ This machine is primarily used in our graduate level structural research and will be at the forefront of our research in sustainable infrastructure

### MTS Tension Tester

*(25,000 Lbs Capacity)*

- ◇ This machine handles all the classes and research projects for tensile loading
- ◇ A classroom surrounds the machine with a large screen for better class viewing of real time graphs created by the machine
- ◇ It is used to test welded and glued specimens created by students in our CE 431 class as well as test specimens, CNC machined in house, of various met-

- ◇ The top level is used primarily for class work and has testing equipment tailored to match the labs provided in our CE 431 class as well as an array of CIM and CET classes.
- ◇ The lower level is also being transformed into a more usable space with the addition of our CNC prototyping machine shop that is

### Compression Machine

(400,000 lb capacity)



### Soil Test Split Tensile

Tests traditional sized con-



### MTS Beam Tester (250,000 lb capacity)

Tests beams that need additional information than load at failure



### MTS Compression

Our largest cylinder tester, designed to crush high strength 6x12 concrete cylinders or any other speci-



### CNC Lathe and CNC Mill



## SOIL MECHANICS LAB

- ◇ Variety of testing options are available as listed below
- ◇ Also utilize a soil extruder, soil sampling and field soil testing equipment

### Sieve Analysis

Sieves (4, 10, 20,40, 60, 140, 200), sieve

### Hydrometer Analysis

Hydrometer

### Atterberg Limits

Casagrande Apparatus

### Field Compaction

Sand cone

### Compaction

Proctor mold and Proctor ham-

### Constant Head Permeability Test

Permeameter

### Consolidation Test

Consolidator (ASTM D2435, D4546, D38 Manual and Automated

### Unconfined Compression Test

Unconfined compression (3 manual and 1 automated)

### Direct Shear Test

3 Geo-Jack machines (2,000 lbs loading sen-

### Drive Cylinder Test

### Automated Triaxial Test

CD, CU, UU



## ITS VIDEO ANALYTIC/ INSTRUMENTATION LAB

The mission of the ITS Labs is to provide resources and assistance to New Jersey DOT in improving safety, mobility, and efficiency of New Jersey's surface transportation systems. By implementing ITS, and innovative transportation planning and management methods and strategies this can be accomplished.

- ◇ By conducting planning and research studies, operational tests, evaluation of deployment scenarios and strategies, training, and outreach.
- ◇ Specifically focusing on technology assessment, development of new technology applications, testing deployments of new technologies, evaluation of ITS implementation strategies and scenarios, application of advanced transportation and traffic modeling tools for ITS deployment evaluation and planning, maintain-



- ◇ Variety of different functions are performed in the various labs.
- ◇ Wireless traffic sensors for work zone travel time and vehicle volume data collection (Bluetooth, Radar, Video, RFID, and WiFi detectors)
- ◇ High speed internet infrastructure
- ◇ High-end workstations for development of the WIMAP application
- ◇ Workstations for traffic simulation and computer modeling
- ◇ Small Unmanned Aerial Vehicles (UAV)
- ◇ Traffic data collection technologies
- ◇ Driving Simulator
- ◇ Adaptive traffic signal controllers
- ◇ Adaptive signal control software
- ◇ Large HD screen for adaptive signal control monitoring and management in simulation environment
- ◇ Traffic simulation modeling software

## HYDRAULICS LAB

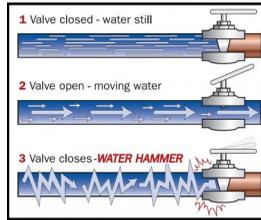
### Water Flume



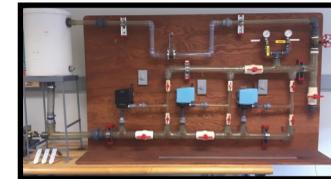
Demonstrates weirs and abutments for lab

### Water Ham-

Demonstrates shock waves in water at sonic



### Water Wall



Demonstrates flow controls, minor loss differences and pumps

## ENVIRONMENTAL TEACHING LAB



- ◇ Houses a variety of regular wet laboratory functioning facilities and instruments
- ◇ This lab provides students with hands-on experiences and learning of class subjects ranging from environmental technologies for water/wastewater treatment to microbiological operations such as disinfection
- ◇ This facility has all major regular wet laboratory functioning facilities such as microbalances, pH/conductivity/ion

## HIGH PERFORMANCE CONCRETE LAB