CEER
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The Center for Earthworks Engineering Research (CEER) is part of the Institute for Transportation (InTrans) at Iowa State University. The mission of CEER is to increase highway performance in a cost-effective manner by developing and implementing methods, materials, and technologies to solve highway construction problems in a continuing and sustainable manner.

MOBILE geotech research lab

A custom-built 66-foot truck and trailer fully equipped for conducting a comprehensive suite of state-of-the-art lab and in situ geomaterials tests

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CENTER FOR
CEER
EARTHWORKS ENGINEERING RESEARCH

IOWA STATE UNIVERSITY
Institute for Transportation

MOBILE GEOTECH RESEARCH LAB

Made Possible by Partnerships

Hydraulic tube sampling attachment

Advancing Intelligent Construction

Iowa State University's Geotechnical Mobile Lab helps researchers conduct projects in Iowa and beyond. The lab supports research conducted through the Institute for Transportation, the Center for Earthworks Engineering Research, and the Department of Civil, Construction, and Environmental Engineering's Geotechnical Engineering Division.

Research Focus

Geotechnical engineering focuses on soil mechanics, earth structures, foundations, and retaining structures. Iowa State University geotechnical researchers define and prioritize geotechnical problems and, through an understanding of these problems, develop applicable solutions that result in increased value through better life-cycle performance.

Vision for the Lab

Geotechnical construction projects will be built with specifications and processes that allow maximum efficiency and creativity on the part of the contractor, use acceptance criteria that ensure responsible use of public funds, and maximize value by increasing the performance life of roadways.

Objectives for the Lab

- Better understand the engineering properties of soils that relate to performance in highway construction and have a high degree of reliability for agencies and contractors.
- Improve earthwork construction quality and efficiency through the use of current and emerging construction equipment and intelligent construction technologies.
- Develop improved laboratory and field testing technologies and procedures for verification testing.
- Test and field measure the soil properties that relate to performance and use this knowledge to develop methods of quality control/quality assurance (QC/QA) for geotechnical applications.
- Provide field training opportunities to contractors, public agency personnel, and engineering students.

Benefits Being Sought

- Increased productivity and efficiency
- Reduced construction costs
- More responsible use of public investments
- Greater reliability
- Improved performance

Support/Tow Vehicle Details

- Freightliner M2 106
- Allison automatic transmission
- Mercedes Benz 300 hp diesel engine
- Air-brake equipped
- Rear air suspension
- Extended cab
- 16 ft steel flatbed with gooseneck ball hitch
- Six side toolboxes for securely stowing field equipment
- 2,500 watt, 12 v DC/110 v AC inverter
- 50 gal water tank with electric demand pump
- 40 gal diesel fuel nurse tank with pump
- Safety beacon
- Kawasaki 3010 diesel mule ATV for onsite transportation and testing
- ATV ramps and tie-downs
- Plate load reaction frame mounted under truck frame
- Hydraulic tube sampling attachment

Lab Trailer Details

- 44 ft long all-aluminum, insulated trailer
- 36 ft x 8 ft 6 in. lab area divided into three rooms
- 7 ft 6 in. interior height
- Gooseneck: 20 kw diesel electric generator on air suspension; 50 gal diesel fuel tank; 100 gal water tank
- Twin 10,000 lb capacity axles with air ride suspension
- Air brake system
- External front and rear electric (110 v) and water connections
- 110 v, 220 v, and 12 v DC electric systems
- Three room heaters and air conditioners
- Two large exhaust fans
- Two floor drains
- Four hydraulic leveling jacks
- Hot and cold water
- Stainless steel counter tops
- Rubberized floor coating
- Two Lista tool cabinets
- Twelve equipment tie-downs
- Conference/work area with 32 in. x 52 in. table and four chairs
- 64 in. x 28 in. desk area
- Satellite Internet
- Video presentation screen

Lab Equipment

- Pine "Brovold" gyratory compactor
- Proctor "Ploog" soil compactor
- Endecotts EFL 2000 vibratory sieve shaker
- Certified sieves for particle size analysis
- Hobart 12-quart mixer
- Humbolt rapid soil grinder
- Syntron vibrating table with molds for relative density testing of cohesionless soils
- Earth pressure cell calibration chamber
- Two Fisher Isotemp ovens
- Refrigerator
- Microwave oven
- Geocomp LoadTrac II with two FlowTrac II pumps and additional equipment for resilient modulus testing
- Triaxial and resilient modulus cell for 2.8 in. and 4 in. sample testing
- Triaxial and resilient modulus cell for 6 in. sample testing consolidation cell (2.5 in.)
- Soilmoisture PM 300 psi air compressor
- Ohaus Pro Series balances (4,100.00 g and 32,000.0 g)
- Hydrometer set
- Liquid and plastic limits testing equipment
- Davis Vantage Pro weather station with Weatherlink datalogger
- Fully equipped with tools and laboratory sample preparation equipment
- Desktop computer workstation
- Laser printer/scanner/copier
- Ideum MT65 large screen (65 in.) touch screen computer

Field Equipment

- Kessler dynamic cone penetrometer
- Plate load testing equipment
- Panasonic Toughbook
- Analytical Spectral Devices Agrispec portable near-infrared spectrometer
- Zorn and Dynatest light weight deflectometers with different plate sizes
- Clegg hammer (10 kg, 20 kg)
- TDR testing equipment
- Trimble GPS system model 851 and 881
- Bore hole shear tester
- Gas permeability test device
- GSSI SIR-20 ground penetrating radar

Geocomp LoadTrac II

Geocomp FlowTrac II pumps

Syntron vibrating table

Proctor "Ploog" soil compactor

Pine "Brovold" gyratory compactor

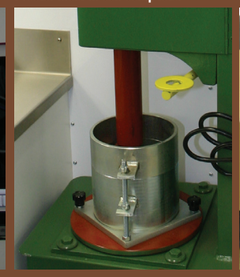
Hobart 12-quart mixer

Endecotts EFL 2000 sieve shaker

Humbolt rapid soil grinder

Video presentation screen

Proctor mold in soil compactor



Liquid and plastic limits testing equipment