



# Civil Infrastructure Testing and Evaluation Laboratory (CITEL)

CITEL is a 45,000-square-foot facility that utilizes advanced testing and computational systems to examine numerous issues related to the performance of the world's civil infrastructure.

The laboratory enables evaluation of a broad range of standard and state-of-the-art concrete materials testing; measurement and characterization of pavement surfaces; in situ instrumentation; the effects of tire types and pressure on pavement performance; testing of concrete, masonry, composite structures, and subassemblies; AASHTO and ASTM cement, grout, mortar, and concrete testing; reinforcement bars and external repair/rehabilitation materials, static/dynamic/repeated loading, environmental effects, and life-cycle costs.

## For more information:

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## Laboratory features include:

- Concrete mixing and curing area
- Chemistry lab for sample preparation and testing of cements, pozzolans, and geopolymers
- Concrete mechanical and durability testing (freeze-thaw, shrinkage, corrosion, and ASR)
- 9 environmental chambers, ASTM and AASHTO restrained rings
- An optical and petrographic microscopy facility
- Mechanical testing capabilities, which include a test bed with a 2,500-square-foot structural floor for large-scale steel or concrete members
  - 12-ton crane
  - 3 test frames
  - Servo-controlled hydraulic actuator with capacities ranging from 11 kip to 210 kip
- A broad suite of standardized concrete durability testing
- Testing capabilities for concrete, steel, soil, aggregate, and asphalt
- 3D printing capabilities
- Non-destructive evaluation and monitoring
  - Field in-situ evaluation
  - Ultrasonic testing
  - Impact resonance testing
  - Non-contact measurements
- Third-Scale Model Mobile Load Simulator (MMLS3) for accelerated traffic loading of pavement surfaces
- Seismic soil testing utilizing
  - Shake table and laminar shear box
  - Large-scale direct shear box

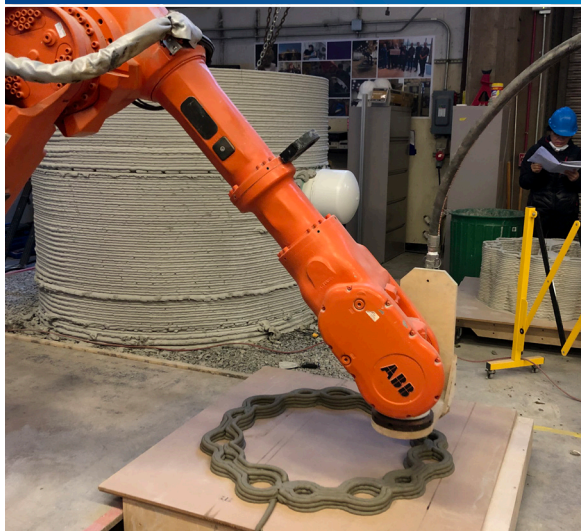
[cee.psu.edu/research/citel.aspx](http://cee.psu.edu/research/citel.aspx)



**Large-scale dynamic direct shear box**



**MTS 110 kip actuators**



**3D printing of concrete**



**Shake table with laminar shear box**



**Third-Scale Model Mobile Load Simulator (MMLS3)**



**Hydraulic flume**

