Shore Western

Load Boundary Condition Box (LBCB)

Shore Western, in association with University of Illinois Urbana Champaign, has developed **a family of 6 degree of freedom motion bases** to simulate loading boundary conditions. Using a boxed frame, the system provides a **very stiff reaction to ground,** which is essential for precise measurements of component deflections.

The boxes provide a modular solution to the need for a unitized loading platform that can be mounted to strong-walls in any orientation, from one of three sides.

For example, columns can be mounted to the strong floor, with the LBCB on the top, grounded to one of the walls. **Multiple units can be tied together and programmed in one unified plane** using our highly configurable Multi-Degree-of-Freedom (MDoF) control algorithm.

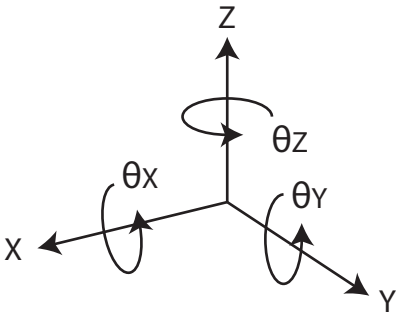
The Load Boundary Condition Box (LBCB) **ranges in size from full scale testing of large civil engineering structural elements to 1:5 scale models.** The scale models are used for instructional purposes and to develop test protocols and control strategies in preparation for full scale testing. The closed loop controls, sensors and hydraulic subsystem are basically the same, the only difference is the size of the servo mechanical subsystem. **User experience is identical on the scale model systems.** Other form factor units are available for standalone applications.

The LBCB may operate in displacement, or mixed mode load control. With mixed mode, the control loop itself is in displacement control, but we wrap a digital load loop around it, giving the best of both worlds: tight displacement control, while commanding load.

Features

- Stiff unitized box design for modular deployment on strong walls and floors
- SWCS Controller allows multiple units to be combined in a single virtual plane
- Loads and displacements in actuator or Cartesian coordinates
- Quasi-static, cyclic and time history testing in cartesian or actuator space
- Integration with pseudo-dynamic NEESgrid protocols such as Simcor and Open Fresco
- Adjustable low friction backlash-free bearings
- Optional actuator and valve combinations to tailor to your specific needs
- Optional Whisperpak low noise hydraulic power and distribution

Specifications



Full Scale*

Updated 8/6/2014	X		Y		Z	
Table Force Capacity Actuator(s) Retracting	1921 kN	432 kip	960 kN	216 kip	2882 kN	648 kip
Table Force Capacity Actuator(s) Extending	2918 kN	656 kip	1459 kN	328 kip	4377 kN	984 kip
Table Moment Capacity	862 kN-m	636 kip-ft	1152 kN-m	850 kip-ft	862 kN-m	636 kip
Table Displacement	±250 mm	±10 in	±125 mm	±5 in	±125 mm	±5 in
Table Rotation	±11.2°		±9.1°		±20.3°	

1/5 Scale*

Updated 8/6/2014	X		Y		Z	
Table Force Capacity Actuator(s) Retracting	18.68 kN	4.2 kip	9.34 kN	2.1 kip	28.02 kN	6.3 kip
Table Force Capacity Actuator(s) Extending	31.14 kN	7 kip	15.57 kN	3.5 kip	46.71 kN	10.5 kip
Table Moment Capacity	2.28 kN-m	20.16 kip-ft	2.66 kN-m	23.52 kip-ft	2.28 kN-m	20.16 kip
Table Displacement	±53 mm	±2.09 in	±25.4 mm	±1 in	±25.4 mm	±1 in
Table Rotation	±11.6°		±9.4°		±20.4°	

***Other sizes available on request**

All Units

Table range of motion	Full Scale while other axes are centered
Load Cell Accuracy	1% Full Scale
Cartesian Load Accuracy	Calculated loads, assuming ideal frictionless pivot points on an ideal rigid body: 0.1% Full Scale
Actuator Displacement Measurement Accuracy	0.05% Full Scale
Cartesian Displacement Accuracy	Calculated displacements, assuming ideal pivot points on an ideal rigid body: 0.1% Full Scale
Cartesian Angle Accuracy	Calculated angles, assuming ideal pivot points on an ideal rigid body: 0.1 deg
Control Modes	Actuator Displacement, Actuator Load, Cartesian Displacement and Angle, Cartesian Load and Moment