



Department of Civil, Structural, and Environmental Engineering

SEESL Structural Engineering and Earthquake Simulation Laboratory SEESL

212 Ketter Hall, North Campus, Buffalo, NY 14260-4300

Fax: (716) 645-3733 Tel: (716) 645 5400 X 16

<http://www.nees.buffalo.edu>

Calibration Certificate

Certificate Number: **UB 2009-04-01-1**

Instrument Description: **LC7** 5-Channel Load Cell Location: **SEESL**

Test Equipment

Instrument Identification:

	<u>Type of Instrument:</u>	<u>Instrument Name:</u>	<u>Serial Number:</u>	<u>Instrument Range:</u>
Ax	Force Transducer	5D-LC-5.5-YEL-01	1	± 20 kip
Sx	Force Transducer	5D-LC-5.5-YEL-01	1	± 5 kip
Sy	Force Transducer	5D-LC-5.5-YEL-01	1	± 5 kip
MX	Force Transducer	5D-LC-5.5-YEL-01	1	± 30 Kip-in
MY	Force Transducer	5D-LC-5.5-YEL-01	1	± 30 kip-in

Conditioner Identification:

	<u>Model Number</u>	<u>Serial Number:</u>	<u>Gain:</u>	<u>Excitation:</u>
Ax	6032	NA	3000	10 V
Sx	6032	NA	3000	10 V
Sy	NA			
MX	NA			
MY	NA			

Readout Device Identification:

	<u>Model Number</u>	<u>Serial Number:</u>	<u>Slope</u>
Ax	pacific 6000	NA	-6.607632
Sx	pacific 6000	NA	-1.999370
Sy	NA		
MX	NA		
MY	NA		

Calibration Factors:

	<u>Full Scale Output:</u>	<u>Unamplified Full Scale Output</u>	<u>Amplified Output per Eng. Un</u>
Ax	± 10 V	5.0 mV/Full Scale	± 2 V/kip
Sx	± 10 V	5.0 mV/Full Scale	± .5 V/kip
Sy	NA		
MX	NA		
MY	NA		

Note: All shear forces are positive values in reference to the direction of the static load placed on the **top** plate of the load cell, indicated by the label pointing in the positive direction for X and Y. To accommodate the correct positive direction in respect to the test lab the sign on the slope may or may not need to be changed accordingly.

This does not effect calibration.

Direction Labels on load cell plates are for UB ref only and are used to determin correct orientation according to a given application. These Load cells were calibrated for "Axial and Shear "X" only.



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Reference Equipment

Reference Instrument Identification:

1.	<u>Type of Instrument:</u>	<u>Instrument Name:</u>	<u>Serial Number:</u>	<u>Instrument Range:</u>
N1	Force Transducer	5DLC5.5YEL-15	15	30KIP
	<u>Calibration Trace:</u>	<u>Certificate Number:</u>	<u>Cal. Date:</u>	<u>Cal. Exp. Date:</u>
2.	<u>Type of Instrument:</u>	<u>Instrument Name:</u>	<u>Serial Number:</u>	<u>Instrument Range:</u>
N2	Force Transducer	5DLC5.5YEL-14	14	30KIP
	<u>Calibration Trace:</u>	<u>Certificate Number:</u>	<u>Cal. Date:</u>	<u>Cal. Exp. Date:</u>
3.	<u>Type of Instrument:</u>	<u>Instrument Name:</u>	<u>Serial Number:</u>	<u>Instrument Range:</u>
Ref	2310 Force Transducer	UB20KIP	67709 1862	20 kip compression Due 10/29/2009
	<u>Calibration Trace:</u>	<u>Certificate Number:</u>	<u>Cal. Date:</u>	<u>Cal. Exp. Date:</u>
	NIST Traceable Daytronic 3270 Strain guage cond. Fluke 8842A	Lebo3194-20K	"4/12/2007 3/11/2008 12/18/2007	4/12/2009 3/11/ 2010 12/18/2008

Calibration Factors:

	<u>Full Scale Output:</u>	<u>Unamplified Full Scale Output</u>	<u>Amplified Output per Eng. Un</u>
1.	20 KIP Load ccell	-11.086m/V	-9.951 Volts
2.			
3.			

Reference Lab Information:

1.	<u>Address:</u>	<u>Phone/Website:</u>	<u>Accreditation:</u>
	Ketter Hall SEESL University at Buffalo Buffalo, NY 14225	645-2114 www.nees.buffalo.edu	
2.	<u>Address:</u>	<u>Phone/Website:</u>	<u>Accreditation:</u>
	Ketter Hall SEESL University at Buffalo Buffalo, NY 14225	645-2114 www.nees.buffalo.edu	
3.	<u>Address:</u>	<u>Phone/Website:</u>	<u>Accreditation:</u>
	Caltronix Inc. 100 Town Centre Dr. Rochester, NY 14623	585-359-3780	ISO/IEC17025

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Calibration Information

Calibration Procedure:

Basic Description:

AXIAL CALIBRATION:

The 4 load cells were placed in a "Tinius Olsen" load frame. The reference load cell was placed on top.

The load cells were loaded several cycles to allow the gains of the amplifiers to be adjusted to match the calibrated reference.

5DLC5.5YEL-15 and 5DLC5.5YEL-14 were calibrated to be used as normal force references 1 and 2 respectively.

SHEAR CALIBRATION:

The load cells were set up as shown in Figure 1, then loaded. The gain of the shear conditioner was adjusted such that the shear reading matched that of 5DLC5.5YEL-14.

MOMENT CALIBRATION:

The load cells were set up as shown in Figure 2, then loaded. The gain of the moment conditioner was adjusted such that the reading matched that of 5DLC5.5YEL-14 times the distance from the loading point to moment strain gages.

Distance from moment gages to: **top = 5.500 in** bottom = **5.500 in**

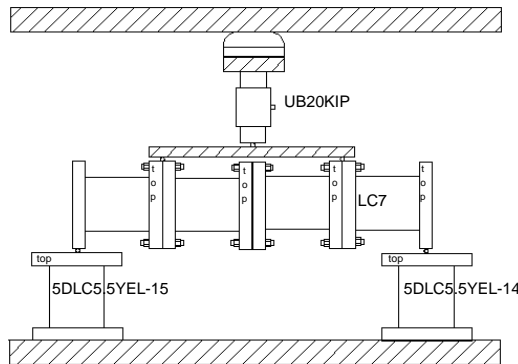


Figure 1: Shear Configuration

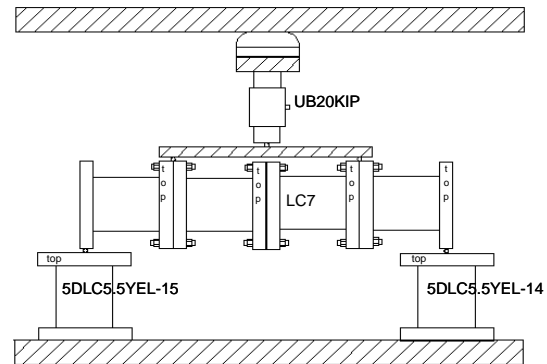


Figure 2: Moment Configuration

Standard:

Note: The diagram depicted above is for ref. only, and to show a typical calibration setup. Not all load cells are calibrated with their tops all in one direction or in the same position as units shown on the diagram.



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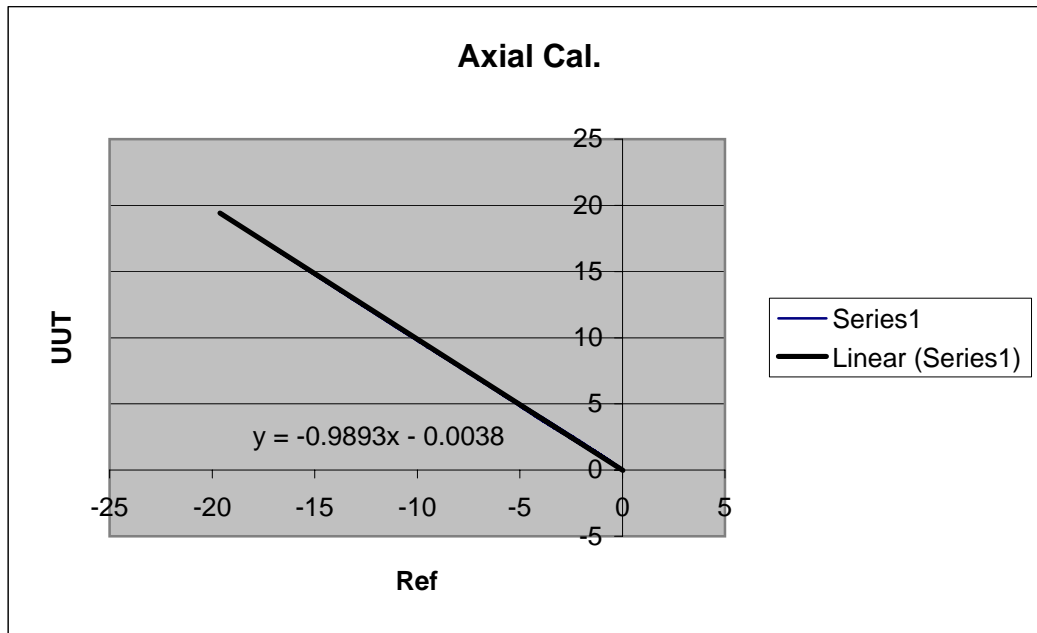
Calibration Data:

Certificate Number: UB 2009-04-01-1

[Normal Calibration Data](#)

Graph:

Normal Calibration





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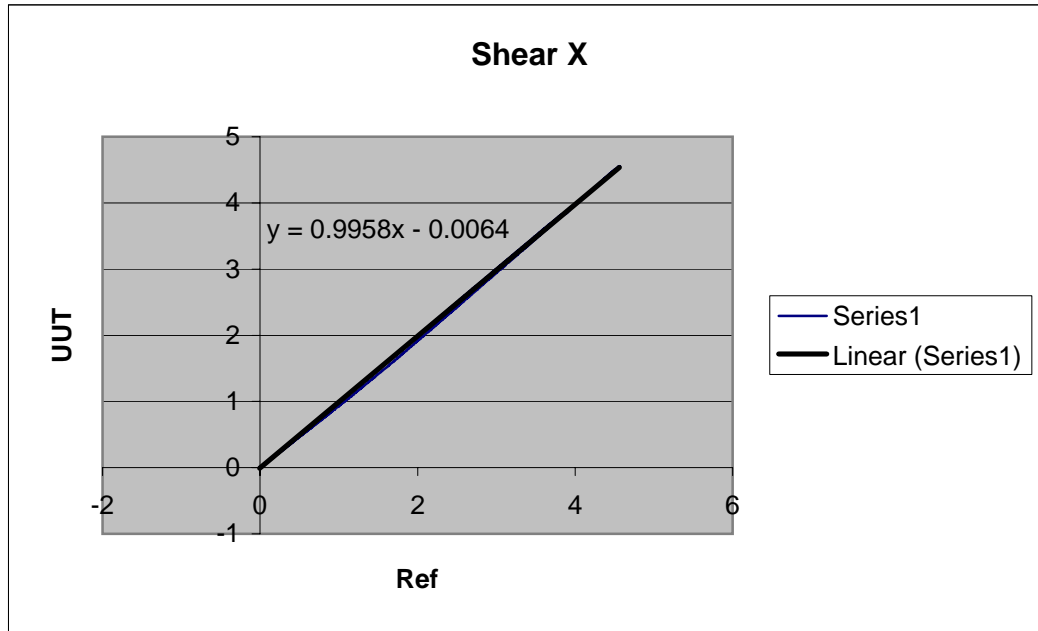
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[Shear Calibration Data](#)

Graph:



Calibration Factors:

Comments:

Ax ± 2 V/kip
 Sx ± 0.5 V/kip
 SY NA
 MX NA
 MY NA

Personnel Identification:

Name:

Chris Budden

Company:

UB

Signature:

Date:

4/1/2009

Calibration Period:

Cal. Date:

4/1/2009

Cal. Exp. Date:

4/1/2010