UNIVERSITY AT BUFFALO
State University of New York
SCHOOL OF ENGINEERING AND APPLIED SCIENCES
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: **LC5** 5-Channel Load Cell **Location:** **SEESL**

Test Equipment

Instrument Identification:

	Type of Instrument:	Instrument Name:	Serial Number:	Instrument Range:
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:

	Model Number	Serial Number:	Gain:	Excitation:
Ax	**6032**	**NA**	**3000**	**10** V
Sx	**6032**	**NA**	**3000**	**10** V
Sy	**NA**			
MX	**NA**			
MY	**NA**			

Readout Device Identification:

	Model Number	Serial Number:	Slope
Ax	**pacific 6000**	**NA**	**7.198808**
Sx	**pacific 6000**	**NA**	**2.165984**
Sy	**NA**		
MX	**NA**		
MY	**NA**		

Calibration Factors:

	Full Scale Output:	Unamplified Full Scale Output	Amplified Output per Eng. Un
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 accomidate 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.

Reference Equipment

Reference Instrument Identification:

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

Calibration Factors:

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

Reference Lab Information:

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

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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 she 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 r 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

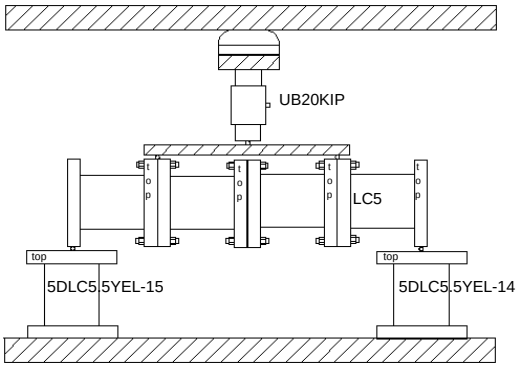


Figure 1: Shear Configuration

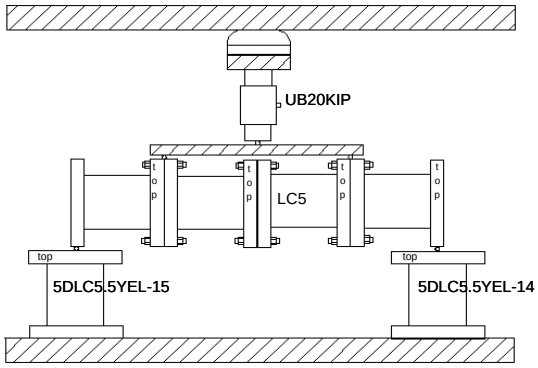


Figure 2: Moment Configuration

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 possisition as units shown on the diagram.

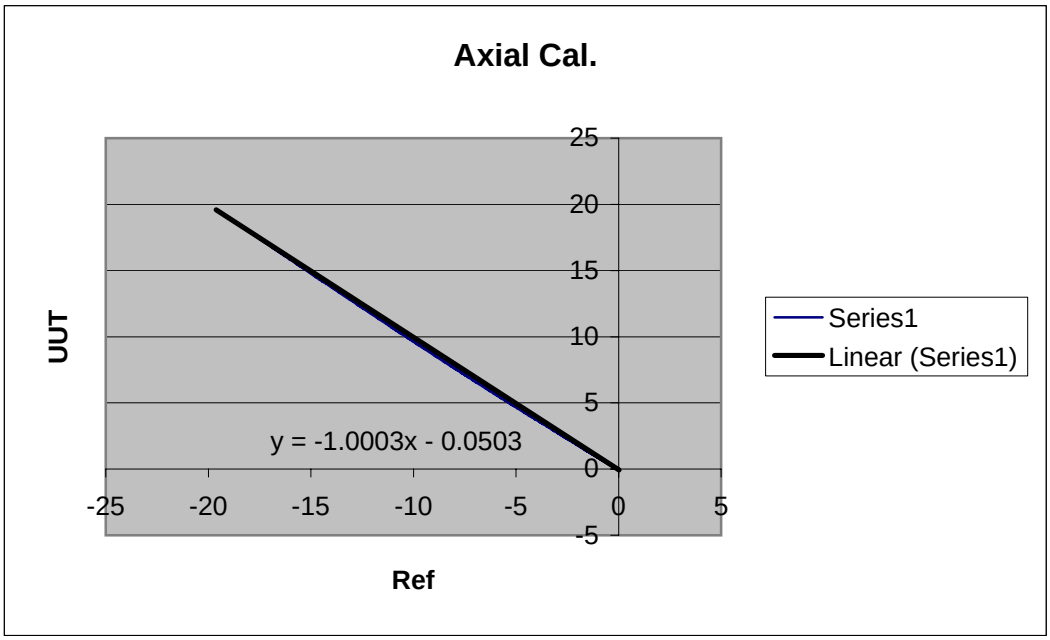
Calibration Data:

Certificate Number: UB 2009-04-01-1

Normal Calibration Data

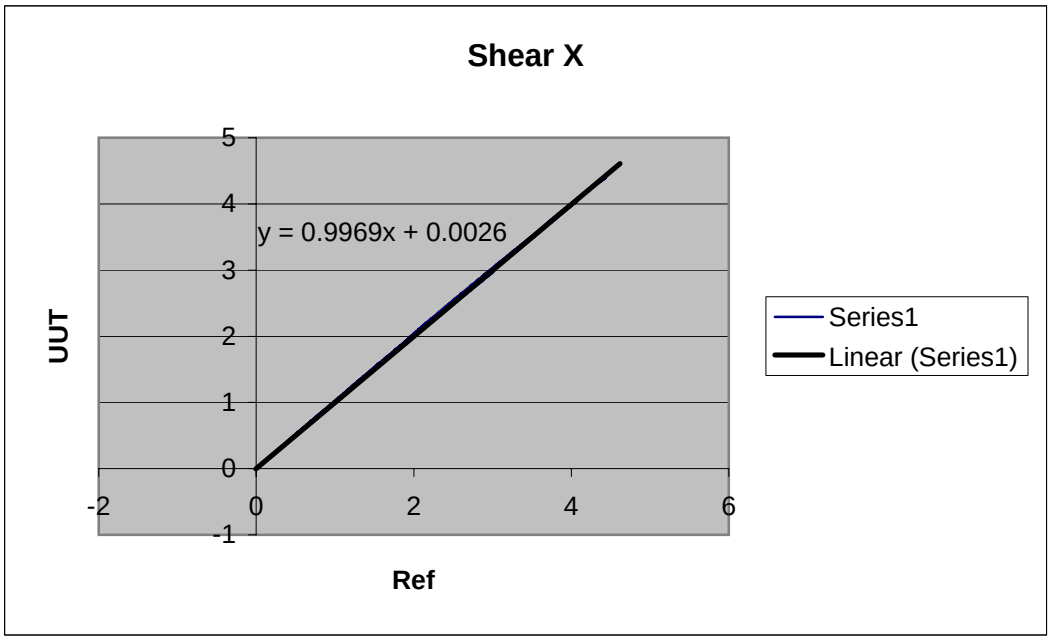
Graph:

Normal Calibration



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:	Company:	Signature:	Date:
Chris Budden	**UB**		4/1/2009

Calibration Period:

Cal. Date:	Cal. Exp. Date:
4/1/2009	4/1/2010