



**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-2005-03-04-02**

Instrument Description: **Black Five-Channel Load Cell 2**

Location: **SEESL**

Test Equipment

**Instrument Identification:**

	Type of Instrument:	Instrument Name:	Serial Number:	Instrument Range:
N	Force Transducer	LC 2 CH-N	2	± 100 kip
Sx	Force Transducer	LC 2 CH-Sx	2	± 20 kip
Sy	Force Transducer	LC 2 CH-Sy	2	± 20 kip
Mx	Force Transducer	LC 2 CH-Mx	2	± 220 kip-in
My	Force Transducer	LC 2 CH-My	2	± 220 kip-in

**Conditioner Identification:**

	Model Number	Serial Number:	Gain:	Excitation:
N	Pacific 6000		2000	10 V
Sx	Pacific 6000		1000	10 V
Sy	Pacific 6000		1000	10 V
Mx	Pacific 6000		500	10 V
My	Pacific 6000		500	10 V

**Readout Device Identification:**

	Model Number	Serial Number:	Channel:
N			
Sx			
Sy			
Mx			
My			

**Calibration Factors:**

	Full Scale Output:	Unamplified Full Scale Output	Amplified Output per Eng. Unit:
N	± 10 V	5.0 mV/Full Scale	± 0.10 V/kip
Sx	± 10 V	10.0 mV/Full Scale	± 0.50 V/kip
Sy	± 10 V	10.0 mV/Full Scale	± 0.50 V/kip
Mx	± 10 V	20.0 mV/Full Scale	± 0.05 V/kip-in
My	± 10 V	20.0 mV/Full Scale	± 0.05 V/kip-in



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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>
Ref <b>Force Transducer</b>	<b>UB#300kip</b>	<b>LC300-01</b>	<b>300 kip (compression)</b>
<u>Calibration Trace:</u>	<u>Certificate Number:</u>	<u>Cal. Date:</u>	<u>Cal. Exp. Date:</u>
<b>NIST Traceable</b>	<b>UB-2005-03-02</b>	<b>3/2/2005</b>	<b>3/2/2006</b>
<b>UB#300kip</b>			

2. <u>Type of Instrument:</u>	<u>Instrument Name:</u>	<u>Serial Number:</u>	<u>Instrument Range:</u>
<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>
<u>Calibration Trace:</u>	<u>Certificate Number:</u>	<u>Cal. Date:</u>	<u>Cal. Exp. Date:</u>

**Calibration Factors:**

	<u>Full Scale Output:</u>	<u>Unamplified Full Scale Output</u>	<u>Amplified Output per Eng. Unit:</u>
1.	<b>(update)</b>	<b>(update)</b>	<b>(update)</b>
2.	<b>(update)</b>	<b>(update)</b>	<b>(update)</b>
3.	<b>(update)</b>	<b>(update)</b>	<b>(update)</b>

**Reference Lab Information:**

1. <u>Address:</u>	<u>Phone/Website:</u>	<u>Accreditation:</u>
<b>Ketter Hall SEESL</b>	<b>645-2114</b>	
<b>University at Buffalo</b>	<a href="http://www.nees.buffalo.edu">www.nees.buffalo.edu</a>	
<b>Buffalo, NY 14225</b>		
2. <u>Address:</u>	<u>Phone/Website:</u>	<u>Accreditation:</u>
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Calibration Information

**Calibration Procedure:**

Basic Description:

**AXIAL CALIBRATION:**

The normal channel of the load cell was calibrated simultaneously and in series with three other identical load cells against the UB#300kip reference load cell using the Tinius Olsen machine.

**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 one half that of UB#300kip.

**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 moment reading matched that of UB#300kip divided by two times the distance labeled "Arm"

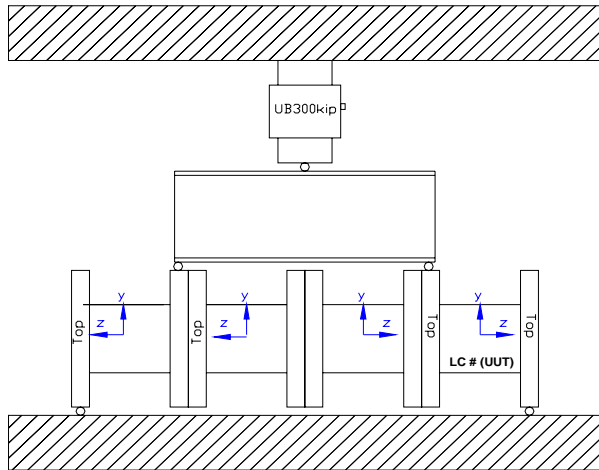


Figure 1: Shear Configuration (-y direction)

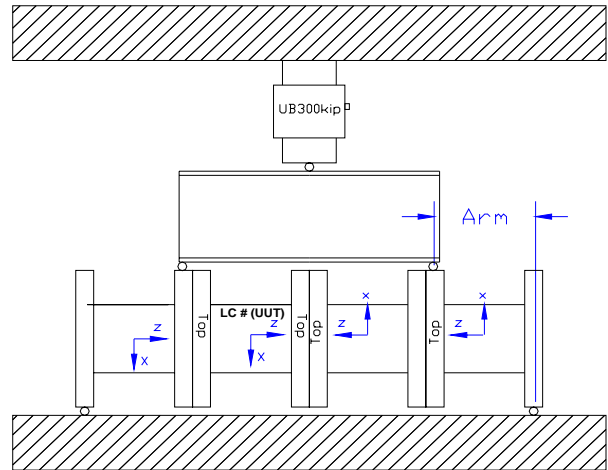


Figure 2: Moment Configuration (x-direction)

Standard:



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Calibration Data:

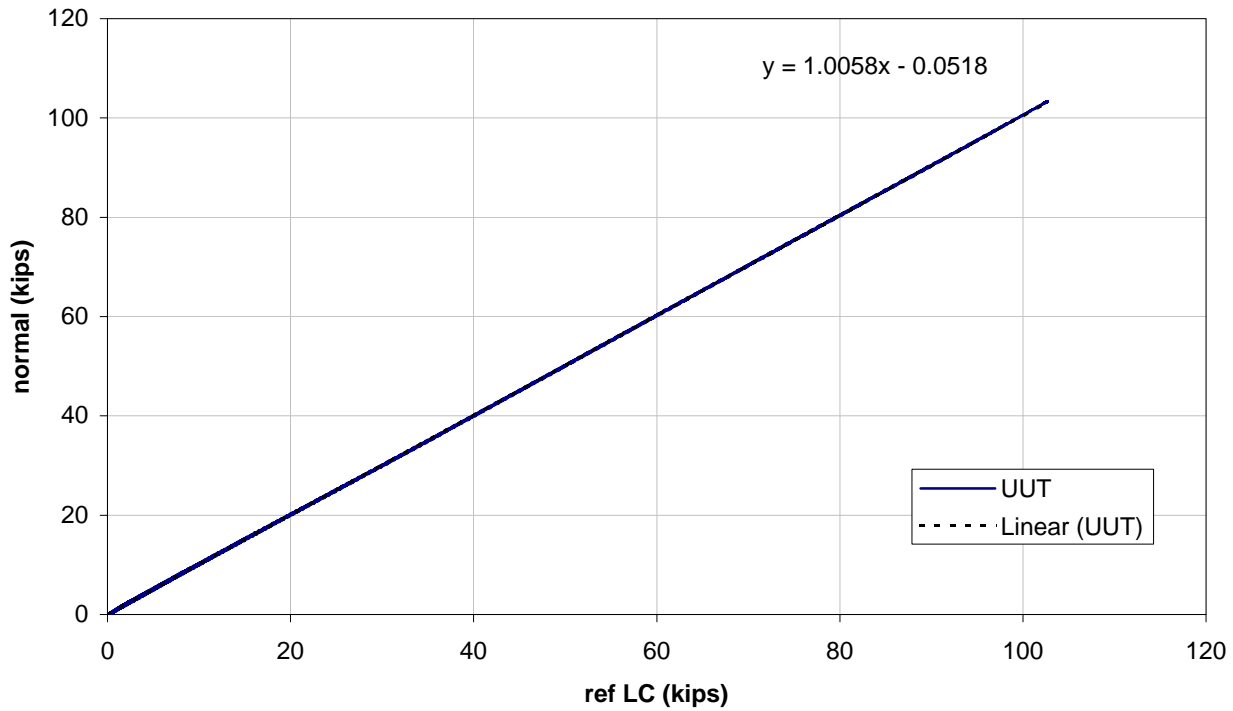
Certificate Number: UB-2005-03-04-02

[Normal Calibration Data](#)

Graph:

Normal Calibration

LC 2 CH-N





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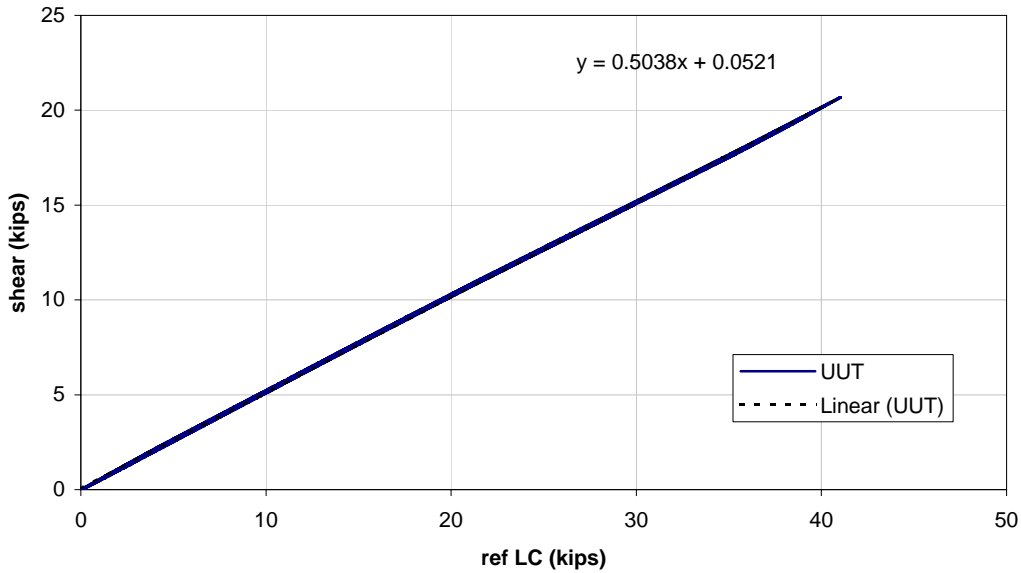
<http://www.nees.buffalo.edu>

[Shear Calibration Data](#)

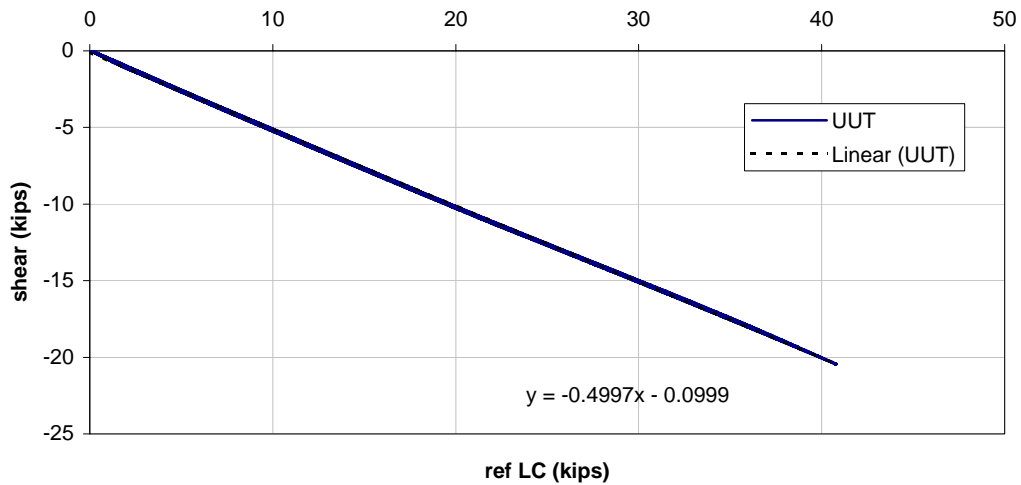
Graph:

Shear Calibration Black Five-Channel Load Cell 2 ( $\pm 0.5$  V/kip)

LC 2 CH-Sx



LC 2 CH-Sy





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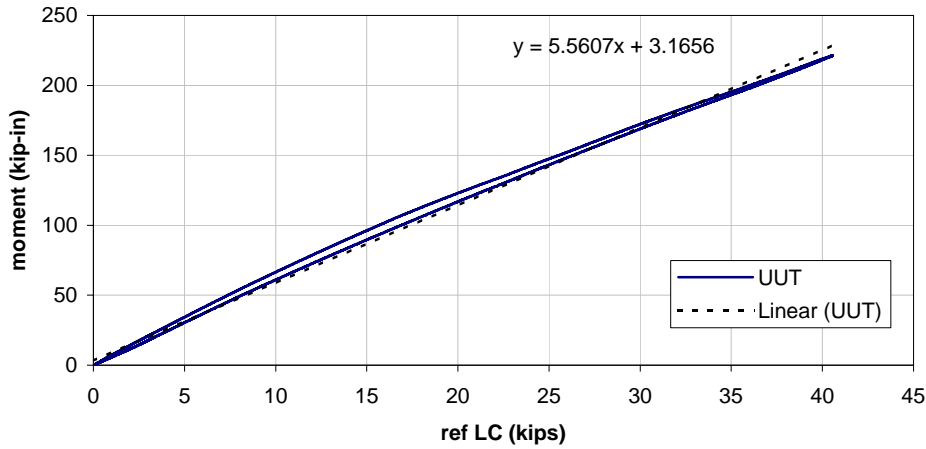
<http://www.nees.buffalo.edu>

Moment Calibration Data

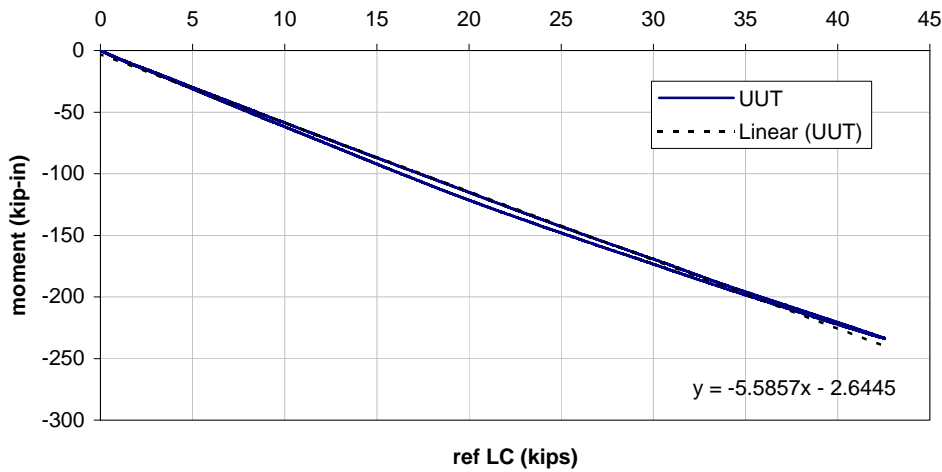
Graph:

Moment Calibration Black Five-Channel Load Cell 2 ( $\pm 0.5$  V/kip)

LC 2 CH-Mx



LC 2 CH-My





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Calibration Factors:

Comments:

- Ax** ± 0.1 V/kip
- Sx** ± 0.5 V/kip
- Sy** ± 0.5 V/kip
- Mx** ± 0.045 V/kip-in
- My** ± 0.045 V/kip-in

**Personnel Identification:**

Name:

Company:

Signature:

Date:

Scot Weinreber

UB

3/11/2005

Christopher Budden

UB

3/11/2005

Gordon Warn

UB

3/11/2005

**Calibration Period:**

Cal. Date:

Cal. Exp. Date:

3/4/2005

3/4/2006