



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-2004-06-20-08 (lc9)**

Instrument Description: **lc9** Three-Channel Load Cell Location: **SEESL**

Test Equipment

Instrument Identification:

Type of Instrument:	Instrument Name:	Serial Number:	Instrument Range:
Ax Force Transducer	LC9 CH-Ax	9	± 30 kip
Sx Force Transducer	LC9CH-Sx	9	± 5 kip
Mx Force Transducer	LC9 CH-Mx	9	± 30 kip-in
N1 Force Transducer	LC5CH-Ax	5	± 30 kip
N2 Force Transducer	LC6CH-Ax	6	± 30 kip

Conditioner Identification:

Model Number	Serial Number:	Gain:	Excitation:
Ax 6032	0:7:2	500	10 V
Sx 6032	0:7:3	500	10 V
Mx 6032	0:8:0	500	10 V
N1 6032	0:9:1	500	10 V
N2 6032	0:6:0	500	10 V

Readout Device Identification:

Model Number	Serial Number:	Channel:
Ax 6000 DAS	1445183	59
Sx 6000 DAS	1445183	60
Mx 6000 DAS	1445183	61
N1 6000 DAS	1445183	74
N2 6000 DAS	1445183	49

Calibration Factors:

Full Scale Output:	Unamplified Full Scale Output	Amplified Output per Eng. Unit:
Ax ± 10 V	8.8 mV/Full Scale	± 0.1460 mV/kip
Sx ± 10 V	-4.9 mV/Full Scale	± -0.4902 mV/kip
Mx ± 10 V	16.9 mV/Full Scale	± 0.2809 mV/kip-in
N1 ± 10 V	8.8 mV/Full Scale	± 0.1471 mV/kip
N2 ± 10 V	8.9 mV/Full Scale	± 0.1475 mV/kip



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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	LC5	5	\pm 30 kip
<u>Calibration Trace:</u>	<u>Certificate Number:</u>	<u>Cal. Date:</u>	<u>Cal. Exp. Date:</u>
	ub-2004-06-20-04	06/20/2004	06/20/2005
2. <u>Type of Instrument:</u>	<u>Instrument Name:</u>	<u>Serial Number:</u>	<u>Instrument Range:</u>
N2 Force Transducer	LC6	6	\pm 30 kip
<u>Calibration Trace:</u>	<u>Certificate Number:</u>	<u>Cal. Date:</u>	<u>Cal. Exp. Date:</u>
	ub-2004-06-20-05	06/20/2004	06/20/2005
3. <u>Type of Instrument:</u>	<u>Instrument Name:</u>	<u>Serial Number:</u>	<u>Instrument Range:</u>
Ref Force Transducer	UB#300kip	LC300-01	300 kip (compression)
<u>Calibration Trace:</u>	<u>Certificate Number:</u>	<u>Cal. Date:</u>	<u>Cal. Exp. Date:</u>
NIST Traceable	NMC - 1044276	11/21/2003	11/20/2004
NEM-8115: 300k Load Cell			
822/2650366-01			

Calibration Factors:

<u>Full Scale Output:</u>	<u>Unamplified Full Scale Output</u>	<u>Amplified Output per Eng. Unit:</u>
1. 30 Kip	20mV	\pm 0.1460 mV/kip
2. 30 Kip	20mV	\pm -0.1412 mV/kip
3. 300 Kip	20mV	33.300 mV/kip

Reference Lab Information:

1. <u>Address:</u>	<u>Phone/Website:</u>	<u>Accreditation:</u>
Ketter Hall SEESL	645-2114	
University at Buffalo	www.nees.buffalo.edu	
Buffalo, NY 14225		
2. <u>Address:</u>	<u>Phone/Website:</u>	<u>Accreditation:</u>
Ketter Hall SEESL	645-2114	
University at Buffalo	www.nees.buffalo.edu	
Buffalo, NY 14225		
3. <u>Address:</u>	<u>Phone/Website:</u>	<u>Accreditation:</u>
Northeast Metrology Corp.	716-827-3770	ISO/IEC 17025
2601 Genesee Street	www.vantek-nem.com	
Buffalo, NY 14225-2916		

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Calibration Information

Calibration Procedure:

Basic Description:

AXIAL CALIBRATION:

The three load cells (LC5, LC6, and lc9) were placed on top of the UB#300kip reference load cell in the Tinius Olsen machine. The load cells were loaded several cycles to allow the gains of the amplifiers to be adjusted to match the calibrated reference. LC5 and LC6 were calibrated to be used as normal force references 1 and 2 respectively.

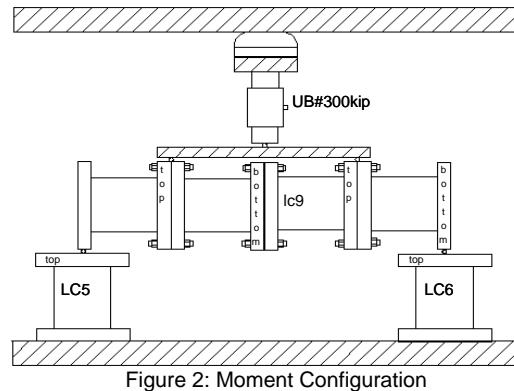
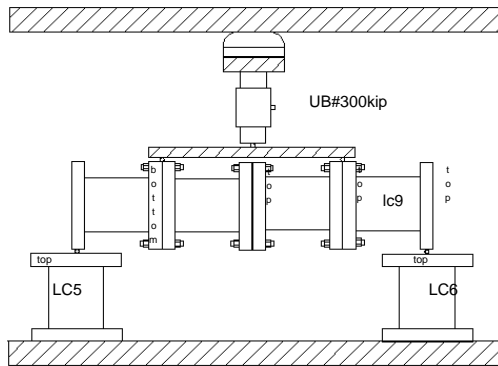
SHEAR CALIBRATION:

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 reaction matched that of LC6.

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 LC6 times the distance from the loading point to moment strain gages.

Distance from moment gages to: **top = 3.500 in** bottom = **2.750 in**



Standard:



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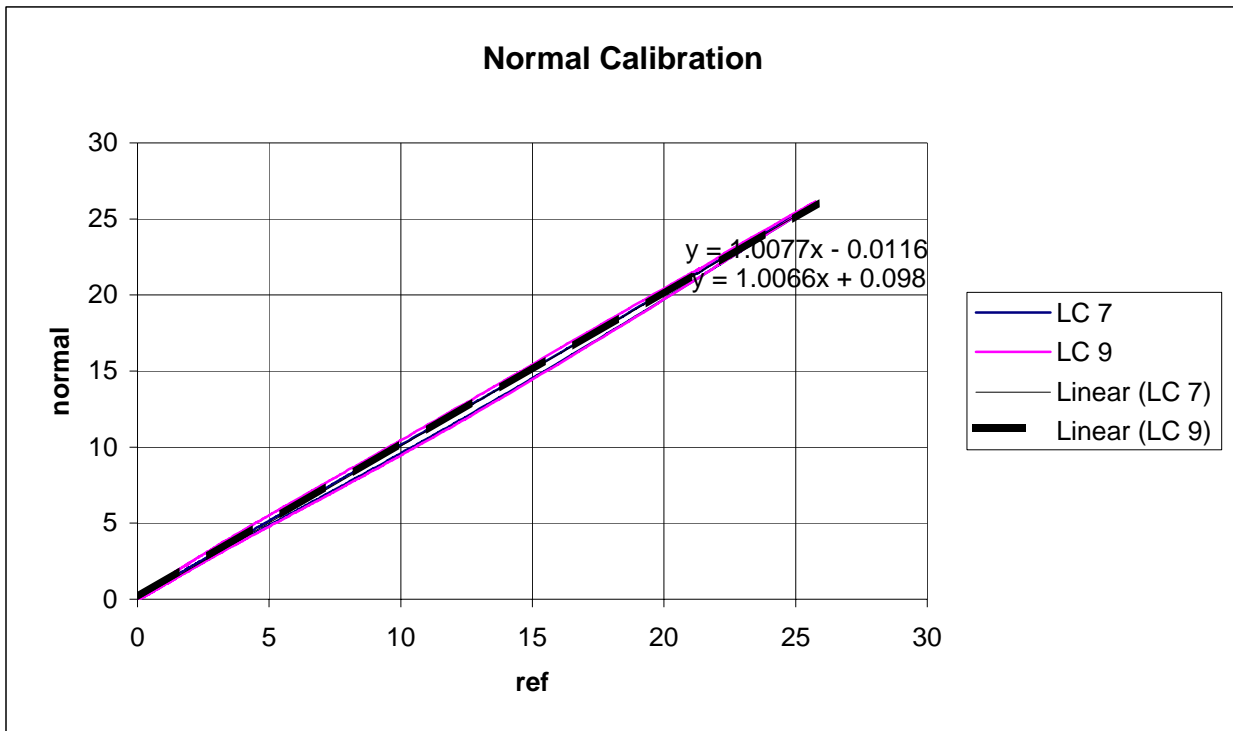
Calibration Data:

Certificate Number: UB-2004-06-20-08 (lc9)

[Normal Calibration Data](#)

Graph:

Normal Calibration





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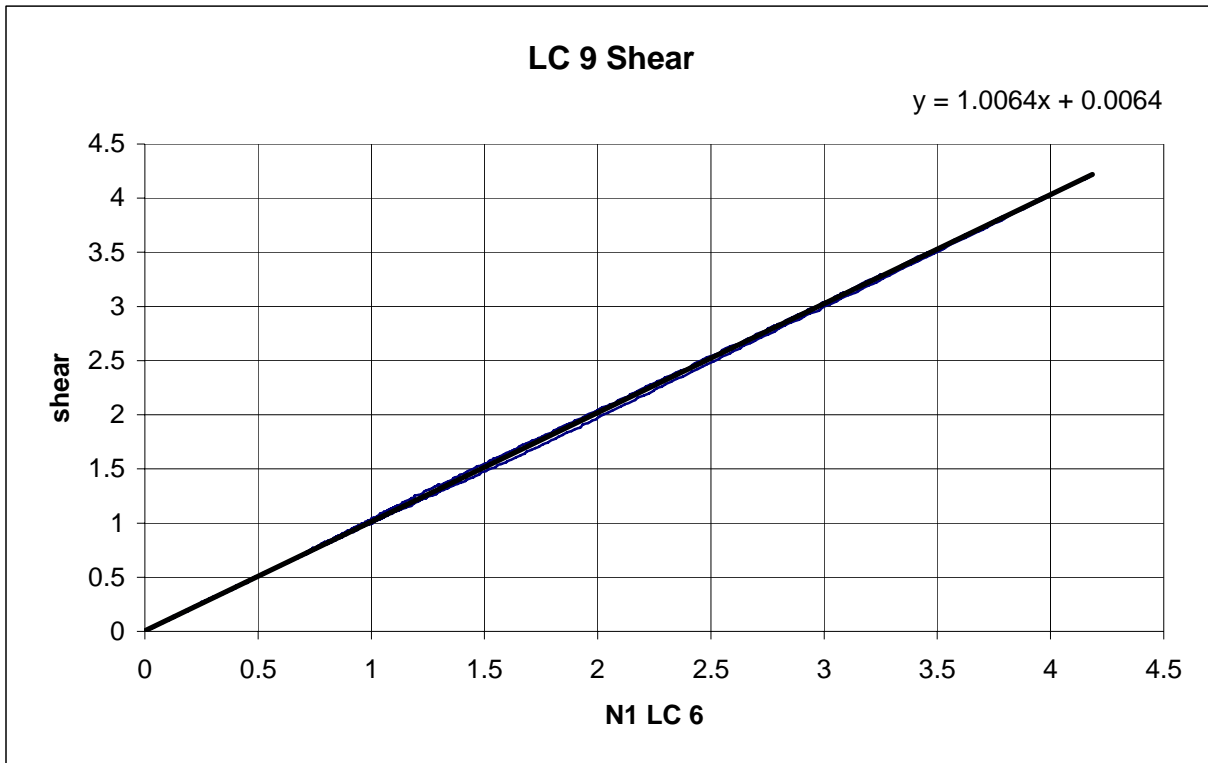
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[Shear Calibration Data](#)

Graph:

Shear Calibration Ic9 (± 0.49 mV/kip)





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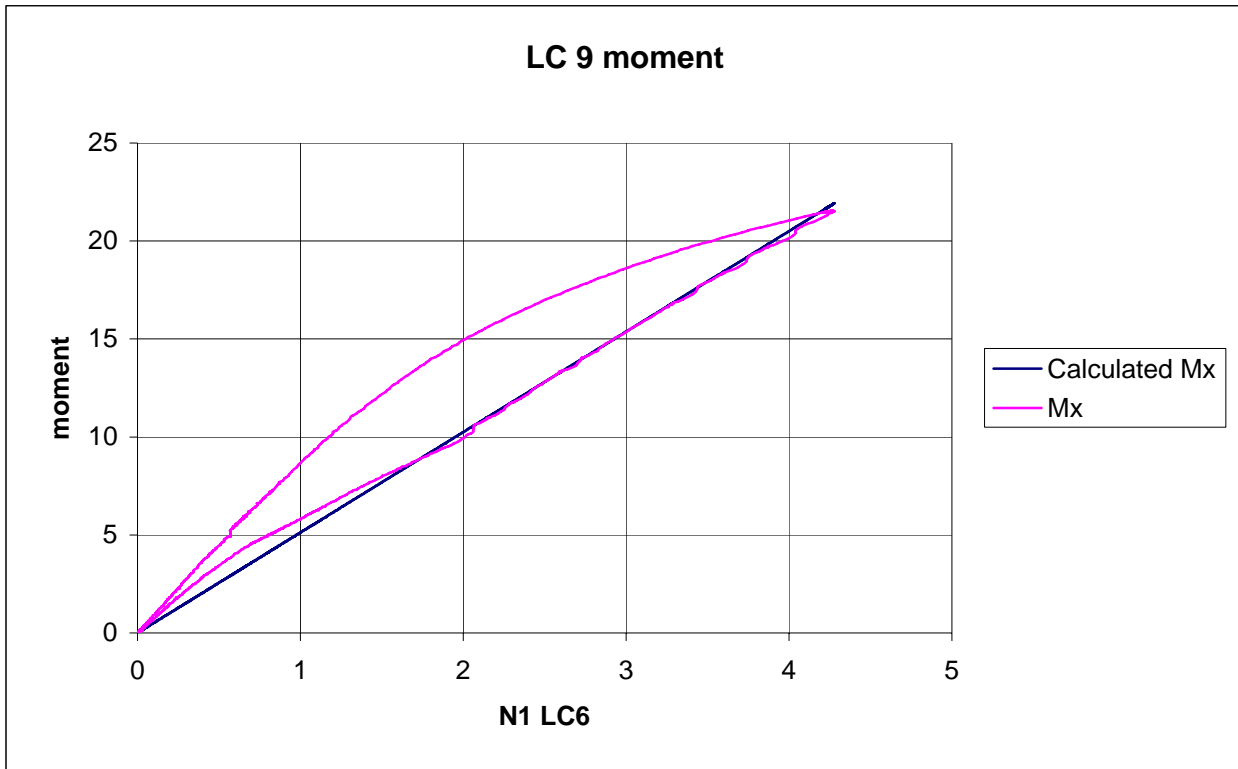
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Moment Calibration Data

Graph:

Moment Calibration Ic9 (± 0.281 mV/kip-in)



Calibration Factors:

Ax ± 0.146 mV/kip

Sx ± 0.49 mV/kip

Mx ± 0.281 mV/kip-in

Comments:

Personnel Identification:

Name:

Scot Weinreber

Company:

UB

Signature:

Date:

6/20/2004

Calibration Period:

Cal. Date:

6/20/2004

Cal. Exp. Date:

6/20/2005



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