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-2005-03-04-04**

Instrument Description: **Black Five-Channel Load Cell 4** **Location:** **SEESL**

Test Equipment

Instrument Identification:

	Type of Instrument:	Instrument Name:	Serial Number:	Instrument Range:
N	**Force Transducer**	**LC 4 CH-N**	**4**	± **100** **kip**
Sx	**Force Transducer**	**LC 4 CH-Sx**	**4**	± **20** kip
Sy	**Force Transducer**	**LC 4 CH-Sy**	**4**	± **20** **kip**
Mx	**Force Transducer**	**LC 4 CH-Mx**	**4**	± **220** kip-in
My	**Force Transducer**	**LC 4 CH-My**	**4**	± **220** kip-in

Conditioner Identification:

	Model Number	Serial Number:	Gain:	Excitation:
N	**Pacific 6000**	**0:11: 0**	**2000**	**10** V
Sx	**Pacific 6000**	**0:12: 1**	**1000**	**10** V
Sy	**Pacific 6000**	**0:11: 2**	**1000**	**10** V
Mx	**Pacific 6000**	**0:11: 3**	**500**	**10** V
My	**Pacific 6000**	**0:12: 0**	**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.	Type of Instrument:	Instrument Name:	Serial Number:	Instrument Range:
Ref	**Force Transducer**	**UB#300kip**	**LC300-01**	**300 kip (compression)**
	Calibration Trace:	Certificate Number:	Cal. Date:	Cal. Exp. Date:
2.	Type of Instrument:	Instrument Name:	Serial Number:	Instrument Range:
	Calibration Trace:	Certificate Number:	Cal. Date:	Cal. Exp. Date:
3.	Type of Instrument:	Instrument Name:	Serial Number:	Instrument Range:
	Calibration Trace:	Certificate Number:	Cal. Date:	Cal. Exp. Date:
	NIST Traceable UB#300kip	**UB-2005-03-02**	**3/2/2005**	3/2/2006

Calibration Factors:

	Full Scale Output:	Unamplified Full Scale Output	Amplified Output per Eng. Unit:
1.	**(update)**	**(update)**	**(update)**
2.	**(update)**	**(update)**	**(update)**
3.	**(update)**	**(update)**	**(update)**

Reference Lab Information:

1.	Address:	Phone/Website:	Accreditation:
	Ketter Hall SEESL **University at Buffalo** **Buffalo, NY 14225**	**645-2114** www.nees.buffalo.edu	
2.	Address:	Phone/Website:	Accreditation:
3.	Address:	Phone/Website:	Accreditation:

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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 labled "Arm"

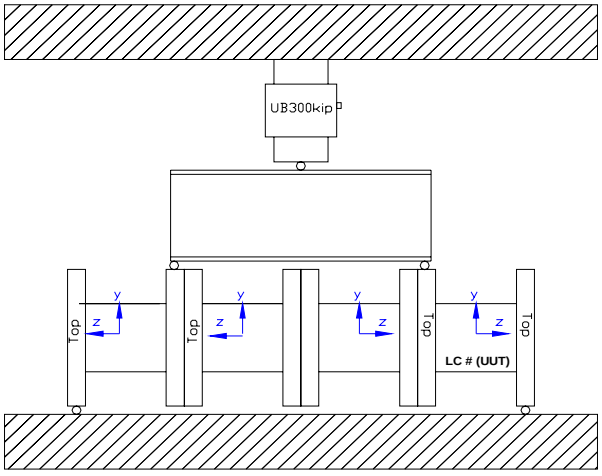

Figure 1: Shear Configuration (-y direction)

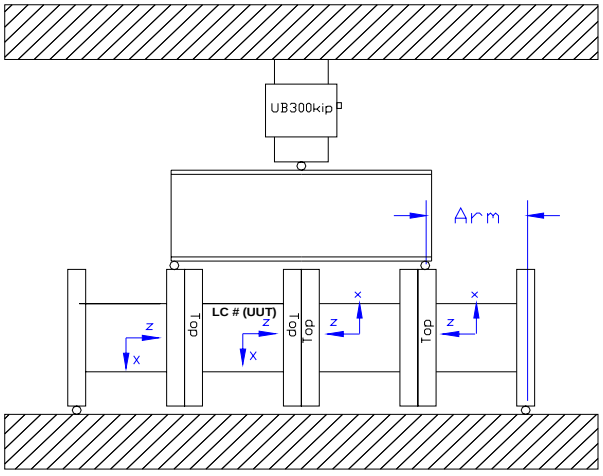

Figure 2: Moment Configuration (x-direction)

Standard:

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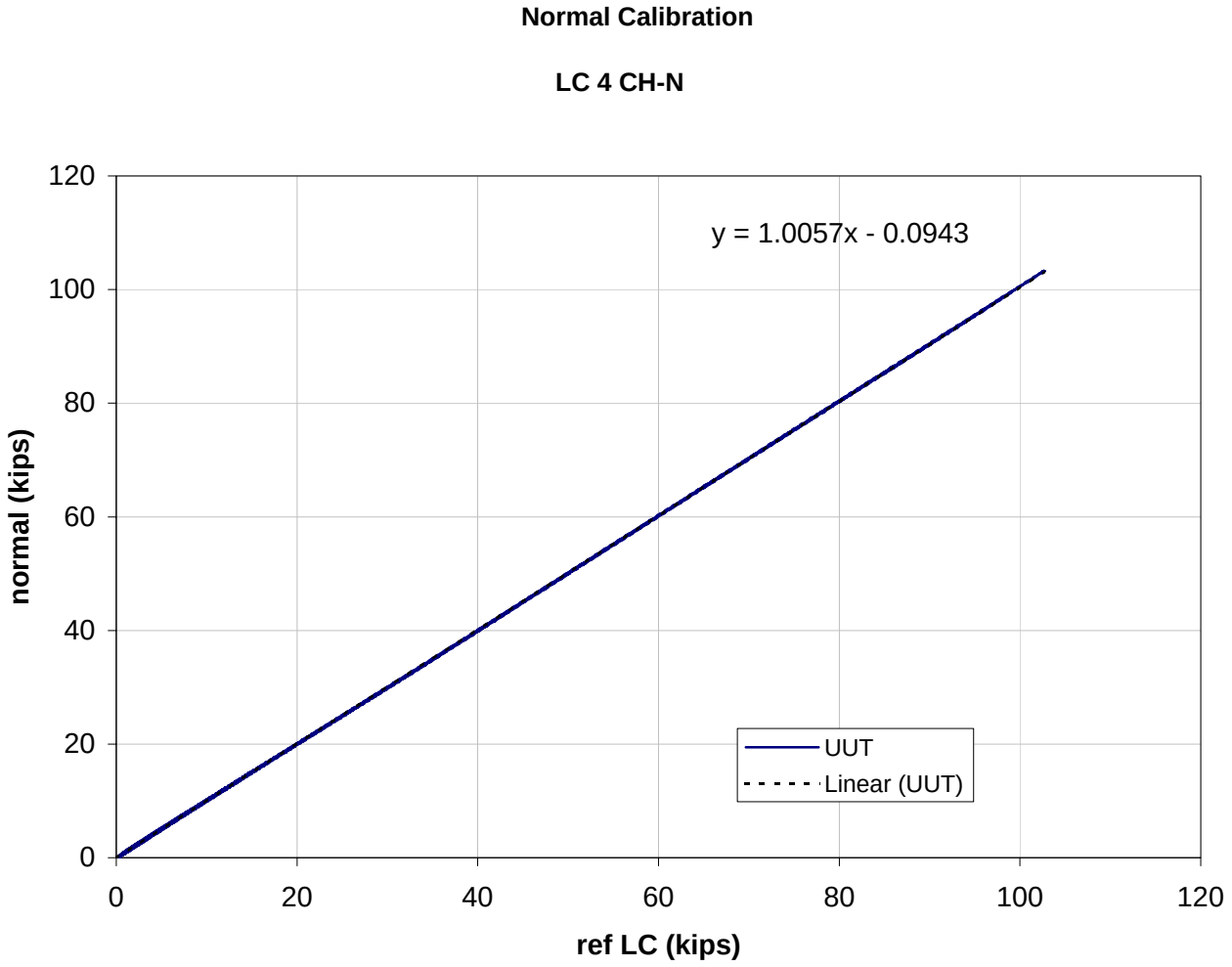
Calibration Data:

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

Normal Calibration Data

Graph:



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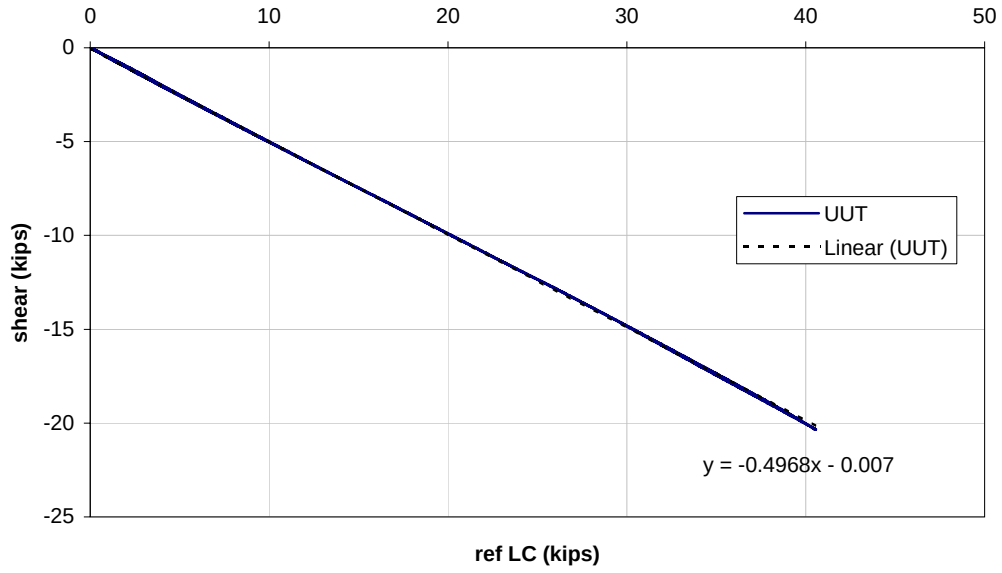
Shear Calibration Data

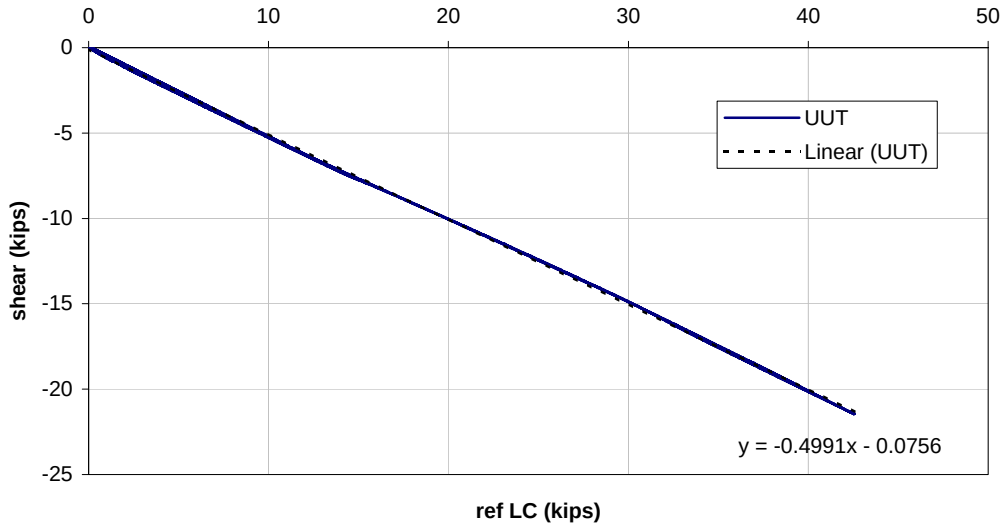
Graph:

Shear Calibration Black Five-Channel Load Cell 4 (±0.5 V/kip)

LC 4 CH-Sx



LC 4 CH-Sy



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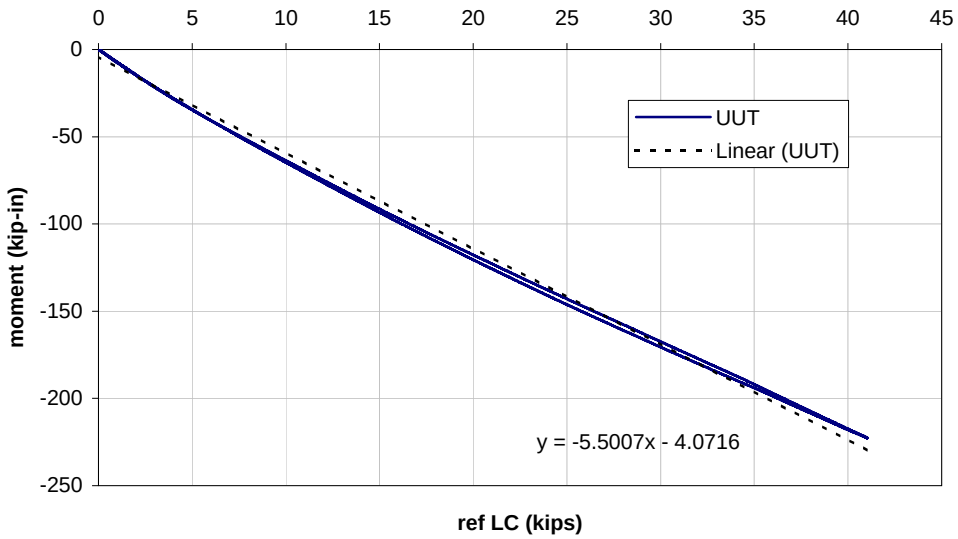
Moment Calibration Data

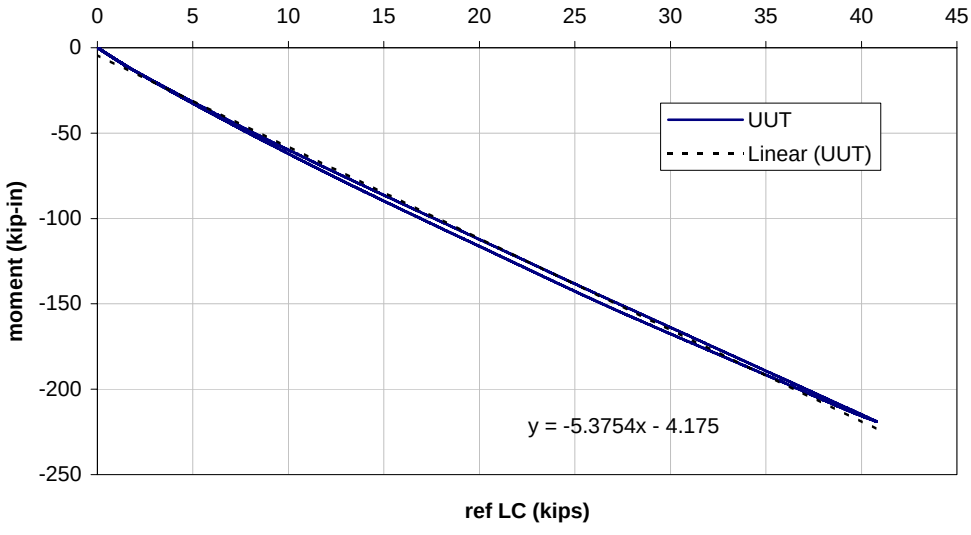
Graph:

Moment Calibration Black Five-Channel Load Cell 4 (±0.5 V/kip)

LC 4 CH-Mx



LC 4 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:
3/4/2004	3/4/2005