







Dan Radulescu Site Operations Manager University of California, San Diego December 12, 2016



NHERI @ UCSD Workshop, 12-13 December, 2016

Objectives

Provide quality management system

Provide National and International recognized testing data and reports

Maintain a calibrated sensor and equipment inventory

Provide quality data to industry

Instrumentation and Data Acquisition **Documentation**

- Documentation Master Log File
- General Documentation
- Standard Operation Procedures
- In-house Calibration Procedures
- Sensor Inventory
- Equipment Inventory
- Calibration Records

In-house Calibration

- •DAQ Channels → 768
- •Accelerometers →150
- String potentiometers →100
- •Linear potentiometers →300
- •DAQ Cost outsource **→**768*100=\$76,800
- •Sensors Cost out-source → 550*100=\$55,000
- •Reference standard calibration →\$1,500
- Labor in-house calibration 1mo →~\$7,000

In-house Calibration Equipment

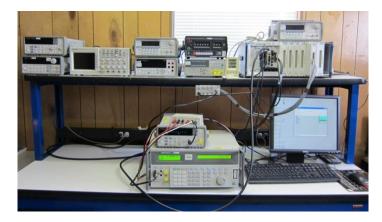


Accelerometer



Accelerometer Linearity





DAQ SCXI 1520



Reference Rented Equipment

Displacement Transducers

In-house Calibration Certificate DAQ

Tracking Number: 6 Serial Number: 11/2302 Notes Address: 9050 Gillman Drive MC 0226 La Jole, CA 92093-0826 Pervious Driver: Pervious Driver MC 0226 La Jole, CA 92093-0826 Pervious Driver: Dervision Driver MC 0226 La Jole, CA 92093-0826 Pervious Driver: Dervision Driver MC 0226 La Jole, CA 92093-0826 Pervious Driver: Dervision Driver MC 0226 La Jole, CA 92093-0826 Pervious Driver: Dervision Driver MC 0226 La Jole, CA 92093-0826 Pervious Driver: 70.0 F Number: 70.0 F Dervision Date: Dervision Date: Tuesday, March 10, 2009 10 20:32 Notes: Dervision Date: Tuesday, March 10, 2009 10 20:32 Notes: Notes:					Generator\OutputFiles\UCSI		and to be an and the		- 47 × 1		5
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In-house Calibration Certificate Sensor

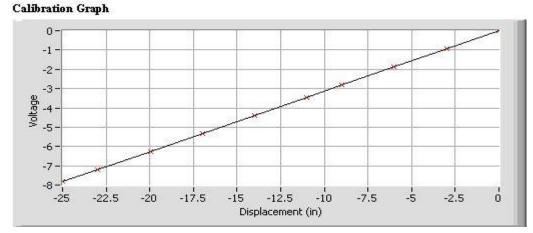
Date: Thursday, January 11, 2007 9:44:51 AM

Customer Information:

Name: UC San Diego Structural Engineering Dept. Address: 9500 Gilman Drive La Jolla Ca. 92093 **Sensor Information:** Sensor Type: Displacement Model No: PT8101-0030-211-1110 Sensor Full Scale Value: 30 in. Tracking No: 175 Excitation Voltage: +10Vdc **Calibration Information:** Operator Name: Steve Morris Notes: Temperature: 74.8 °F Humidity: 45% Equipment used for calibration: Trimos V1002+ height stand sn: 10312 / A calibration date: 07.04.2006 due date: 07.04.2007

NI PXI 6251 DAQ sn: DFF3F0 tracking no: DFF3F0 calibration date: 28sep2006 due date: 28sep2007

NI SCXI 1520 sn: CFD976 tracking no: 73 calibration date: 19oct2006 due date: 19oct2007 **Standards:** Procedure no: SD400030 Version: 0 Date: 1/11/07



Displacement [inch]	Voltage [volt]		
0.000	0.000	Sensitivity	MSE
-2.995	-0.939	[V/in/Vexc]	
-5.993	-1.879	0.031	5.211E-6
-8.989	-2.817		
-10.986	-3.446		
-13.984	-4.384		
-16.983	-5.318		
-19.981	-6.260		
-22.980	-7.195		
-24.980	-7.820		

Data Acquisition System

Twelve (12) Data Acquisition Nodes with 64channels 16-bit resolution each. Each channel can be configured to accept any type of sensor (strain gauges, displacement transducers, accelerometers, pressure cells, load cells, etc)

Top picture shows two nodes (hardware) Bottom picture shows the corresponding DAQ software



GPS System

The GPS system uses **RTD_NET** software by Geodetics. A network of three NAVCOM ANT-2004T antennae (two mobile and one reference) provides dynamic displacement monitoring in three coordinates. The dedicated standalone computer allows continuous monitoring via three NAVCOM NCT2030M receivers operating at 50-Hz.





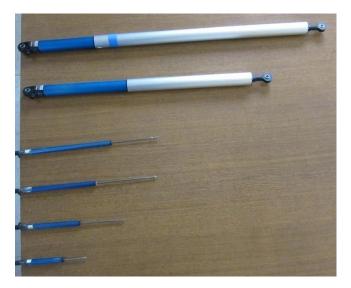


Relative Displacement Transducers

To measure displacement, the facility has a number of linear and string potentiometers.

A total of 100 linear displacement transducers with full-scale range from 12in to 2in.

A total of 100 string potentiometer transducers with full-scale range from 50in to 2in.



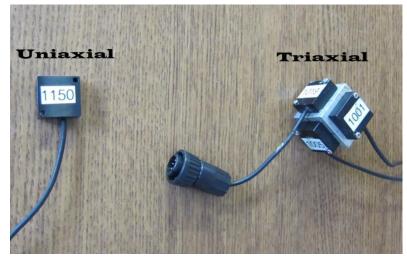


Accelerometers

To measure acceleration, the facility has a total of 100 MEMS based accelerometers.

Main parameters:

- Full-scale: +/-10g
- Freq. Response: DC to 200Hz
- Damping: 70%
- DC power: 8-30Vdc
- Output signal: 0.2 V/g



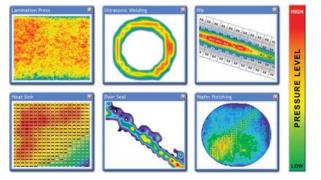
Soil Pressure Transducers

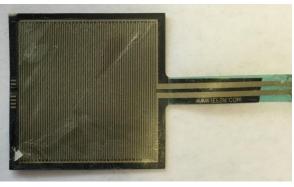
Tactilus system After testing two systems, we decided to purchase one Tactilus system:

32 channelsData acquisition software40 sensors

We are testing another soil pressure sensor PS-C Miniature Pressure Sensor manufactured by KYOWA:

- Strain gauge based
- Ultra-thin
- Installed by adhesives
- linear response







Site Accreditation



Thank you