nees@UCLA
The George E. Brown, Jr. Network for Earthquake Engineering Simulation

*nees@*UCLA
User Policies & Guidelines

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This handbook describes the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) user policies and guidelines for the University of California, Los Angeles Equipment Site (*nees*@UCLA).

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1. INTRODUCTION

The *nees*@UCLA Site provides state-of-the-art equipment for forced vibration testing and seismic monitoring of full-scale structural and geotechnical systems. This equipment is useful for identifying system properties through system identification analyses of recorded data, studying the nonlinear responses of systems with limited mass, and evaluating the interactions of various system components for realistic sets of boundary conditions. A full inventory of the *nees*@UCLA equipment portfolio is provided in Appendix A. Performance specifications and additional details of the equipment are available at http://nees.ucla.edu.

Projects involving the *nees*@UCLA Site can be categorized as determined by the NEES Consortium, Inc. as either:

a. **NEES projects**: These projects are subsidized by the National Science Foundation (NSF), and there are no user fees associated with the baseline level of service for the operation and maintenance of *nees*@UCLA facilities. Additional levels of service beyond the baseline will be subject to user fees as specified in Appendix B.

b. **Non-NEES projects**: These projects are unsubsidized by NSF, and subject to user fees for all project activities involving the *nees*@UCLA facilities. All costs will be determined based on the fee schedule in Appendix B.

Note that the term "Principal Investigator" throughout this report refers to the Principal Investigator(s) of the project utilizing the *nees*@UCLA site (i.e., not Professor Wallace of UCLA).

2. SAFETY AND SECURITY

2.1 SAFETY

The *nees*@UCLA Site is committed to the safety, health and well being of its students, faculty, staff and visitors. Faculty and staff have the responsibility to promote health and safety in their environments and operations. All users of the *nees*@UCLA Site are expected to support this commitment.

2.1.1 General

The Principal Investigator is expected develop a project-specific disaster preparedness kit as specified in the *nees*@UCLA Safety Handbook. This disaster preparedness kit should contain maps and information specific to the project site related to emergency contacts, nearby hospitals and evacuation routes. This disaster preparedness kit must be located on the project site at all times.

In addition, all project participants are expected to understand the *nees*@UCLA Safety Handbook and to complete the safety certification. Failure to comply with any of the *nees*@UCLA safety policies may result in the termination of the project. A complete listing of the safety rules and guidelines can be found in the *nees*@UCLA Safety Training Manual and UCLA EH&S Handbook for Employees and the School of Engineering Laboratory Safety Manual and Chemical Hygiene Plan.

As a general rule, all project participants (including visitors) must:

1. Wear appropriate protective equipment at all times.
2. When using *nees*@UCLA equipment, conduct only those activities that the *nees*@UCLA Facilities Manager has approved.
3. Use facilities, equipment and tools only for the purpose for which they were designed.

2.1.2 Experiment Configuration

The Principal Investigator must provide the *nees*@UCLA Project Management Team (PMT) with a description of planned experiments one month before testing commences. The *nees*@UCLA PMT will review the planned experiments to assess hazards that may compromise safety. However, the ultimate responsibility for the design of the experiment with regards to safety rests with the Principal Investigator.

2.2 SECURITY

The Principal Investigator is responsible for ensuring the security of *nees*@UCLA equipment at the project site, and developing a risk management plan. Security concerns at a field site include theft, vandalism, fire, rain, etc. In certain situations, the Principal Investigator may be required to hire security personnel to guard the *nees*@UCLA equipment.

3. NEES Shared-Use Projects

The *nees*@UCLA Site will provide a baseline level of service to all NEES Shared Use projects at no cost. This includes providing equipment and facilities, IT infrastructure for NEES connectivity, training, and research assistance throughout the ten-year operational period from 2004 to 2014.

3.1 EQUIPMENT & FACILITIES

NEES researchers will have access to all *nees*@UCLA equipment purchased through the George E. Brown, Jr. Network for Earthquake Engineering Program. In addition, visiting researchers can request to have office space allocated on a temporary basis on the UCLA campus, and have restricted access to the UCLA Structural Engineering Research and Teaching Laboratory (SERTL) for NEES project related activities.

The *nees*@UCLA Site will be responsible for maintaining all equipment at full function, operating the equipment, and reconfiguring (not modifying) the equipment for specific experiments, repairing or replacing failed equipment and providing basic training for selected equipment. Visiting researchers will be authorized by the Facilities Manager to perform certain activities using the *nees*@UCLA equipment upon successful completion of training.

Visiting researchers will be provided access to utilities and ancillary services (e.g., forklift, overhead crane) at the UCLA SERTL. For field project sites, the Principal Investigator and his/her team will be responsible for providing ancillary equipment (e.g., forklift, crane, etc.) and utilities (fuel or additional generators beyond what exists at *nees*@UCLA).

3.2 IT INFRASTRUCTURE

The *nees*@UCLA Site has unique networking requirements given that it is a field testing site without hard-wired connectivity to the NEEShub system[1]. Consequently, the *nees*@UCLA Site has developed a High Performance Mobile Network (HPMN) to support real-time telepresence through the NEESgrid architecture for off-campus experiments. The interface between the NEESgrid network and the various Equipment Sites is through a dedicated, flexible platform called NEES Point-of-Presence (NEESpop). A NEESpop server connects to the global NEESgrid network through Internet2 via a gigabit backbone, and serves as the central system to monitor, authenticate users, perform resource discovery, cache data, browse data, store and enable collaboration for each NEES site. The *nees*@UCLA site has two NEESpop servers (campus and field). The campus-NEESpop functions as the primary point of contact with NEESgrid since it is directly connected to the campus gigabit backbone. The field-NEESpop provides temporary data, video and metadata storage in the field. The campus-NEESpop and field-

[1] The NEEShub system enables remote participation via telepresence, provides computational capabilities and maintains a NEES data repository for the life of the project.

NEESpop communicate via the HPMN which utilizes broadband wireless and satellite telemetry.

The *nees*@UCLA staff will maintain and operate the HPMN, provide training for visiting researchers on the NEESgrid system and assist in data transfer to the NEES data repository.

3.3 RESEARCH ASSISTANCE

The *nees*@UCLA Site will assist researchers with post-award planning and design, experiment execution, and post-experiment data quality assurance

3.3.1 Post-award planning and design

Post-award planning includes ***assisting*** NEES researchers in:

- estimating experiment costs beyond the baseline level of service in using *nees*@UCLA equipment;
- scheduling tasks;
- developing a disaster-preparedness kit;
- assessing project safety;
- developing a risk management plan;
- clarifying equipment performance capabilities and configuration;
- reviewing instrumentation plan and configuration.
- providing training

3.3.2 Experiment execution

The *nees*@UCLA baseline level of service includes:

- Ensuring that all *nees*@UCLA equipment are calibrated and functioning properly, and repairing or replacing failed equipment.
- Assisting researchers with the installation of instrumentation and equipment. The *nees*@UCLA Site is not responsible for providing experiment-specific test fixtures such as plates, mounts, anchors or drilling anchor holes.
- Coordinating equipment shipping from the UCLA campus to the field project site.
- Operating field shakers once they are properly anchored.
- Operating the data acquisition system and wireless sensor networks.
- Operating the cone penetration testing truck.
- Installing and retrieving the Retrievable Subsurface Accelerometers (RSAs).
- Installing, configuring, and operating the HPMN including the satellite uplink.
- Using the *nees*@UCLA field generators, batteries and solar panels. This service does not include costs for fuel.
- Using utilities and ancillary equipment in the UCLA Structural Engineering Research and Teaching Laboratory (SERTL).

The following services are considered within the scope of *nees*@UCLA's services, but beyond the baseline level of service. **Costs for these services as determined using the rate schedule in Appendix B will be directly reimbursed by the individual research projects without involving the NEES Consortium funds**.

- Modifying equipment, instrumentation or facilities to meet specific experiment needs.
- Constructing and removing test specimens.
- Providing plates, mounts or anchors used for anchoring instrumentation or equipment.
- Using non-*nees*@UCLA equipment or instrumentation in experiments. This includes design and fabrication of cables to incorporate non-*nees*@UCLA sensors.
- Travel costs associated with performing NEES research off-campus.
- Shipping costs associated with deploying equipment. This includes fuel costs for mobilizing the mobile command center and/or the cone penetration testing truck.
- Providing ancillary equipment (e.g., forklift, cranes, etc.) at off-campus project sites.
- Providing fuel for operating the field generators.
- Costs associated with securing the equipment at the project site.
- Costs associated with leasing the project site.
- Costs associated with obtaining permits.

3.4 OPERATING PROCEDURES

a. A standard *nees*@UCLA work day consists of 8 hours of operation, generally between 8:00 am to 5:00 pm local time. These hours include time incurred traveling to and from the project site. Exceptions to this policy must be made in writing in advance and agreed upon by the *nees*@UCLA PMT.

b. Users are responsible for overtime hours incurred by *nees*@UCLA personnel during extended hours of operation. An exception to this policy is possible when extended hours of operation result from malfunction of the *nees*@UCLA equipment. It should be noted that ordinary delays incurred during the installation and configuration of the field data acquisition system are not considered malfunctions.

c. All safety guidelines detailed in the *nees*@UCLA Safety Handbook must be strictly followed.

4. Non-NEES Projects

4.1 PROJECT INITIATION

Investigators with non-NEES projects desiring to utilize the *nees*@UCLA facility are requested to first contact the Facilities Manager to discuss the nature and scope of the project. Following this discussion, potential users are requested to submit a 1-page project summary which describes the project objectives, test site, planned test series, requested *nees*@UCLA equipment and tentative project schedule.

The *nees*@UCLA Project Management Team will review the non-NEES project requests and make a final determination based on scheduling, safety and other considerations. If the *nees*@UCLA PMT authorizes the project, the Facilities Manager will work with the user to develop a cost estimate and project schedule in a Gantt chart.

4.2 COST ASSESSMENTS

Project testing costs will be determined using the fee schedule provided in Appendix B. Non-NEES users are responsible for all project costs related to:

- Design, setup, installation, execution and removal of the experiment.
- Modification of equipment, instrumentation or facilities to meet specific experiment needs.
- Construction and removal of test specimens.
- Providing plates, mounts or anchors used for connecting instrumentation or equipment to specimen.
- Travel costs for nees@UCLA personnel associated with performing NEES
- research off-campus.
- Shipping costs associated with deploying equipment. This includes fuel costs for mobilizing the mobile command center and/or the cone penetration testing truck.
- Providing ancillary equipment (e.g., forklift, cranes, etc.) at off-campus project sites.
- Providing fuel for operating the field generators.
- Costs associated with securing the equipment at the project site.
- Costs associated with leasing the project site.
- Costs associated with obtaining permits.

In turn, the *nees*@UCLA Site will be responsible for maintaining all equipment at full function and will bear costs related to repairing or replacing the equipment due to failure. However, the *nees*@UCLA Site will not be responsible for extra per diem, travel, or lease costs incurred by the Principal Investigator that arise from equipment malfunction.

4.3 OPERATING PROCEDURES

a. A standard *nees*@UCLA work day consists of 8 hours of operation, generally between 8:00 am to 5:00 pm local time. These hours include time incurred traveling

to and from the project site. Exceptions to this policy must be made in writing in advance and agreed upon by the *nees*@UCLA PMT.

b. Users are responsible for overtime hours incurred by *nees*@UCLA personnel during extended hours of operation. An exception to this policy might occur when extended hours of operation result from malfunction of the *nees*@UCLA equipment. It should be noted that ordinary delays incurred during the installation and configuration of the field data acquisition system are not considered malfunctions.

c. All safety guidelines detailed in the nees@UCLA Safety Handbook must be strictly followed.

Appendix A – Equipment Portfolio

Equipment	*Quantity*	*Description*
MK-15A eccentric mass shaker	2	100 kip capacity uni-directional eccentric mass shakers purchased from Anco Engineers
MK-14 eccentric mass shaker	1	20 kip capacity omni-directional eccentric mass shaker refurbished by Anco Engineers
Linear inertial shaker	1	15 kip force capacity, ± 15 inch stroke, 90 gpm digitally controlled linear inertial shaker
125 kVA diesel generator	1	Trailer mounted diesel generator to provide 480V 3-phase power to the mechanical shakers
Kinemetrics Q330 data logger	20	State-of-the-art broadband data loggers with 145 dB dynamic range and 0-200 Hz frequency range
Kinemetrics triaxial Episensor accelerometer	15	Triaxial broadband force balanced accelerometers
Kinemetrics uniaxial Episensor accelerometer	55	Uniaxial broadband force balanced accelerometers
Battery box with wireless adapter	20	External power supply for data loggers with embedded 802.11 wireless card adapters for sensor network
Wireless access points	4	802.11 access points for sensor network
Data concentration point	1	Field data collection point which transfers data streams to mobile command center
National Instruments DAQ	3	SCXI-PXI combo chassis with integrated GPS time synchronization for data acquisition of strain gauges, LVDTs and transducers. Each system has 36 channel capacity.
LVDTs	40	Sensors providing measurement of local displacements
Cone penetration testing (CPT) truck	1	Provides in-situ subsurface characterization of soil stratigraphy
Retrievable subsurface accelerometer (RSA)	10	Hermetically sealed MEMS accelerometers for subsurface vibration monitoring; installed and retrieved with CPT truck
Mobile command center	1	Satellite truck with servers for data collection and real-time connectivity to NEESgrid
Satellite uplink	1	Satellite system with 1.28 Mbps capacity
NEESpop server	2	Provides connectivity to NEESgrid
Telepresence server	1	Enables field telepresence of nees@UCLA
Data server	1	Workstation for temporary data storage
Axis video servers	2	Internet device for video streaming
Axis audio servers	2	Internet device for audio streaming

Appendix B – Recharge Rates

	Hourly
LABOR	
Research Engineer	$96
Programmer Analyst	$65
Sr. Development Engineer	$104
Research Associate	$60
Technician	$50
Administrative Specialist	$45
EQUIPMENT	
1. MK-15 Eccentric Mass Shaker	$94
2. MK-14 Eccentric Mass Shaker	$94
3. Linear Inertial Shaker	$196
4. Satellite System	$133
5. 125 kVA Diesel Generator (excluding fuel)	$4
6. Antelope Data Acquisition System	$25
7. Q330 Data Logger	$6
8. Battery Box & Wireless Adapter	$2
9. Data Concentration Point	$16
10. Triaxial Episensor Accelerometers with cable	$3
11. Uniaxial Episensor Accelerometer with cable	$1
12. LVDTs	$1
13. National Instruments System	$19
14. Mobile Command Center	$24
15. Cone Penetration Testing Truck	$45
16. Retrievable Subsurface Accelerometer	$2

Travel Fees and Policies

1. Users are responsible for all travel costs associated with their project. This includes lodging, per diem, airline fares, rental cars, mileage reimbursement and parking for *nees*@UCLA staff.
2. If a project extends through a weekend, users are responsible for either costs for *nees*@UCLA personnel to travel home or lodging, per diem and rental car at the project location.
3. Per diem rates may vary from region to region. However, a rate of $150/person/day can be used in most cases to estimate lodging and per diem costs.
4. Mobilization fees for the mobile command center and the cone penetration testing truck can be estimated using the rate of $0.40/mile.
5. Fuel costs for operating a generator can be estimated using the following rates:

i. $75/day for the diesel generator ii.

$10/day/gasoline generator