MAST Laboratory
Safety Training Memorandum

MAST Laboratory
September 15, 2014
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This publication is also available electronically in PDF format at the MAST Laboratory website:

http://nees.umn.edu/training/MAST Safety Memo.pdf

The MAST Laboratory Safety Plan is also available on the website:


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**Introduction**

This memo outlines the policy regarding safety, safety gear, clothing requirements, crane operation, and hydraulic test equipment operation for all personnel working or observing activities in the University of Minnesota MAST Laboratory.

**Safety training sessions**

**Employees**

The MAST Laboratory requires that all Employees who will be working for some length of time at the MAST Laboratory take part in a Lab safety and awareness training session. In this session, the person reviews the contents of the Safety Training Memorandum directly with Project Manager or Operations Manager, and then signs the Agreement Statement. The Agreement Statement affirms that the person has read the Safety Memo and agrees to abide by its contents. New workers will be trained on MAST tools and equipment to ensure proper and safe use. An equipment training record will be filed for each worker for each tool or piece of equipment they have been trained on.

**Visiting Researchers, Volunteers, Trainees and Others**

The MAST Laboratory requires that all Visiting Researchers, Volunteers, Trainees, and others (this includes subcontractors affiliated with the University, the NEES Consortium, and Visiting Research Teams) who will be working for some length of time at the MAST Laboratory take part in a Lab safety and awareness training session. In this session, the person reviews the contents of the Safety Training Memorandum directly with Project Manager or Operations Manager, and then signs the Agreement Statement. The Agreement Statement affirms that the person has read the Safety Memo and agrees to abide by its contents. Visiting researchers, volunteers, trainees, and others will be trained on MAST tools and equipment to ensure proper and safe use. An equipment training record will be filed for each worker for each tool or piece of equipment they have been trained on.

**Potential safety hazards**

The MAST Laboratory is active with research projects that are associated with the heavy civil construction industry. In order to accomplish the requirements of a project, a wide range of equipment is utilized to construct and perform experimental tests on various size specimens. This is cause for numerous potential safety hazards. Following the proper safety procedures and wearing the proper safety gear and clothing can reduce the chance of injury caused by improper use of hydraulic test equipment (MTS Equipment), crane operation, power tools, scissors lifts, ladders and scaffolding, or contact with hazardous objects.

A wide variety of equipment and hazardous procedures are necessary to complete tasks in the MAST Laboratory. Experimental research has many potential safety hazards and may include the following:

- Unsafe workers
- Insufficient, cluttered, and/or shared work space
- Hydraulic test equipment:
  - hydraulic actuators and material test frames
  - hydraulic fluid at an operating pressure of 3000 psi and operating temperature of approximately 140 degrees Fahrenheit, which has the potential to burn skin
  - high-force testing
  - brittle material testing
  - large scale specimen testing
- Equipment and tools:
  - hand tools
  - welding and torching equipment
  - pneumatic and electric power tools
  - pallet jacks and portable lift equipment
  - concrete mixers
- Ladders, scaffolding, and scissor lifts
- Confined spaces such as the pump room or crosshead for which there is no clear path for exit
- Working at elevated heights
- Overhead cranes and trolley systems
- Rigging and moving loads
- Chemical and bio-hazards

**Safety gear and proper clothing**

When working in hazardous surroundings, hard hats, steel-toe boots, work gloves, safety glasses, coveralls or work pants, and sleeved shirts are necessary items. When working in the MAST Laboratory, these items must be in your possession at all times, and must be worn when involved in the following activities:

- Conducting activities adjacent to personnel operating the crane
- Conducting activities involving the construction, removal, or demolition of a specimen or load frame
- Removing or placing items into storage
- Operating the scissors lift
- Conducting/observing experiments involving hydraulic actuators, screw jacks, or other testing apparatuses capable of generating large forces

- Using any hand tool or power tool

**Personal protective equipment requirements (PPE)**

- Hearing protection, consisting of earplugs and/or earmuffs, is required when operating equipment that creates loud noises. A dust mask or powered air purifying respirator (PAPR) is required when working in dusty or vaporous conditions. Rubber gloves are available when working with wet concrete and other chemicals. A full-face shield is required when grinding.

- Hard hats, safety glasses, steel-toe rubber boots, steel shoe coverings, foam inserts for hearing protection, dust masks, and rubber gloves are available in the MAST Lab. Please see a MAST staff member if you cannot locate these items or if replacement items need to be ordered.

- When using welding or torching equipment, an approved upper-body leather jacket must be worn with leather welding gloves to prevent burns, and earplugs must be used to prevent sparks from entering your ear canal. When torching, you must use tinted goggles or face shield. When welding, you must wear a full-face welding helmet. You must be pre-qualified by the Project Manager or Operations Manager to use the welding equipment.

- It is your responsibility to purchase steel-toe boots.

  Steel-toe boots are available at most shoe stores, and range in price from under $50 to over $150. Steel-toe boots are required in the MAST Laboratory and shall have, at a minimum, an impact rating of 50 and a compression rating of 50.

- Each worker who works in the lab will be issued a pair of work gloves and safety glasses. When the gloves are worn out, you may exchange them for a new pair.

- When a project requires work at heights above six feet, fall protection equipment must be worn and affixed to a secure tie-off point. Fall protection gear consists of a full-body harness and a lanyard. Please see the Project Manager or Operations Manager for training and the location and procedures for installing fall protection equipment.

- Shorts, skirts, dresses, tank tops, and open-toe (sandals) and high-heel shoes are not considered proper apparel in the MAST Laboratory at any time. A limited number of lockers are available in the Lab for people interested in storing work clothes. Contact the Project Manager or Operations Manager for locker space.

**Chemical safety**

Minnesota Employee Right-To-Know Act, MERTKA, requires special training for employees who work in hazardous conditions and with hazardous substances (chemicals, bio-hazards, etc…). This training is required for all employees of the
University of Minnesota and if you have not had this training please see the Operations Manager or the Safety Officer to arrange a training session.

MAST Staff provide MERTKA required training for Visiting Researchers, Volunteers, Trainees and Others, identifying the dangers associated with hazardous substances, harmful physical or infectious agents, or physical hazards to which they may be exposed in the course of their effort in the MAST Laboratory

A copy of the Department of Civil, Environmental, and Geo-Engineering Chemical Hygiene Plan is located in the office area bookcase at the MAST Laboratory, Room 115, which contains procedures for the handling and storage of chemicals, and information about what hazards might exist with the chemical you are using. You may also obtain general information concerning hazardous chemicals at www.dehs.umn.edu (Department of Environmental Health and Safety).

**MAST Policies**

**Crane operation**

Only permanent MAST Employees may operate the crane.

**Scissors lift and fork lift**

Only permanent MAST Employees may operate the forklifts. All other workers will be trained by MAST Employees in scissors lift operation and an equipment training record will be filed once training is complete.

**Hydraulic testing equipment**

Only permanent MAST Employees may operate the hydraulic testing equipment.

**Work Plan Information**

Before any project can begin work at the MAST Laboratory, a work plan must be completed and approved by the Lab Director.

The work plan shall include a list of tasks, specimen and load frame drawings, calculations, schedule, list of equipment and personnel to carry out the work tasks, instrumentation plan, rigging plan, and space requirements.

**General Lab rules**

**Number one rule**

- Do not be afraid to ask questions. We are here to assist you.

**The following rules apply:**

- **Do not step on or set equipment or debris on any signal or actuator controller cable.**

  Damage that is not visible may occur in the cable. Please cover all cables that are on the floor with angle or channel sections.
Never use your finger to align bolt holes.
When you are erecting objects that require aligning bolt holes of two separate components, always use a spud wrench or drift pin.

You must keep your work area clean and free of debris.

Never place any part of your body in an area that is considered a crush point.
Crush points include areas adjacent to all hydraulic equipment, rigging components, lifting equipment, pallet jacks, torque multipliers, torque wrenches, etc.

If you break or notice any defects in the equipment you are using, immediately inform the MAST Employee. This ensures that you will not be held responsible for repairing the equipment.

Do not leave tools on load frames or specimens, and at the end of the day put all tools back where they belong. Never leave brooms, pry bars, etc. against actuators or camera towers. Do not put tools on camera tower shelves.

You are prohibited from operating any equipment or conducting any physical work in the MAST Laboratory if you have taken cold or flu medication (over-the-counter or prescription), pain medication, or you are under the influence of mood altering substances (drugs, alcohol, etc.).

If you are taking medication(s) prescribed by a doctor, please inform the Operations Manager and provide a note from the doctor stating what physical activities you can and cannot perform. This information will be kept private.

If you have a medical or physical condition that prevents you from doing certain tasks, please inform the Operations Manager so other arrangements can be made. This information will be kept private.

On objects that have the potential to impale someone, for example, rebar sticking out of concrete, place a piece of Styrofoam or plastic cap on the end of the bar. It is everybody’s responsibility to be aware of these risks.


Work methodically and at a steady pace, and do not be afraid to ask your fellow workers to assist you. Assistance is available, and you should schedule with the Project Manager prior to undertaking any major activities that require additional assistance.

When you invite visitors/volunteers to work in the lab, file a “Release of Liability” form with the Operations Manager.
All electrical cords must be protected and removed from aisle/walkways on a daily basis. If the electrical cord is cut or broken, do not repair it. Throw away any cut or broken electrical cord. Use a properly rated electrical cord for the equipment you are using. An underrated electrical cord is a safety and fire hazard.

Know the location of all fire extinguishers (shown in floor plan below). If you use one, inform the Operations Manager or the Project Manager immediately so the fire extinguisher can be refilled.

In case of injury

All injuries must be reported to a Project Manager or the Operations Manager.

If you are a University employee, file an employee “First Report of Injury”. This can be completed online at https://webapps-prd.oit.umn.edu/froi/ or a paper copy filled out and faxed to Sedgwick CMS at 952-826-3785.

Visiting Researchers, Volunteers, Trainees, and others will need to seek medical assistance through their medical provider

Policy violations

Employees

For employees not adhering to this policy, the following shall apply.

First offense – verbal or email reminder.

Second offense – email or written notification of violation(s) to the MAST Lab Director.

Third offense – suspension of work and a mandatory safety review.
Visiting researchers and research teams
For Visiting Researchers, Volunteers, Trainees, and others who do not adhere to the MAST Laboratory safety policy, the following shall apply.

➢ First offense – the Operations Manager reviews the situation with the involved individual and/or team. Also, the MAST Lab Director will be notified.

➢ Second offense – the Operations Manager makes a verbal or written report to the Principal Investigator and MAST Lab Director. For NEES projects, the NEESComm Director of Site Operations will also be notified.

➢ Third offense – the Operations Manager sends written notification of violation(s) to the Principal Investigator, MAST Lab Director, and, if a NEES project, to the NEESComm Director of Site Operations. The individual and/or team will not be allowed to work until a safety review has been conducted.

Agreement Statement
I, _______________________________________, have read the MAST Laboratory Safety Training Memorandum dated September 15, 2014.

I fully understand its content and agree to abide by it.

Signature: ___________________________ Date: ___________________