



STRUCTURES LABORATORY

Safety & Operations Protocols

Contacts

Shahria Alam, 250-807-9397,
shahria.allam@ubc.ca

Ahmad Rteil, 250-807- 9626,
ahmad.rteil@ubc.ca

Lukas Bichler, 250-807- 8816,
lukas.bichler@ubc.ca

Kim Nordstrom, 250-807-9778,
kim.nordstrom@ubc.ca

Alec Smith, 250-807-8535,
alec.smith@ubc.ca

David Zinz, 250-807-8047,
david.zinz@ubc.ca

Urgent contacts

Emergency / First Aid / Security
250-807-8111 or 911

Hazardous Materials Response
911

Poison Control Centre
1-800-567-8911

SoE Safety Website
<https://soesafety.ok.ubc.ca>

Incident Report
<http://riskmanagement.ok.ubc.ca/safety/accidents.html>

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School of Engineering Responsibilities

- Provide a safe, healthy and secure working environment
- Ensure regular inspections are made and take action as required to improve unsafe conditions
- Ensure that health, safety, and personal security considerations form an integral part of the design, construction, purchase and maintenance of all buildings, equipment and work processes
- Provide first aid facilities where appropriate
- Support supervisors and safety committees in the implementation of an effective health, safety and security program
- Ensure compliance with WCB and other applicable legislation
- Establish department or building safety committees
- Communicate with the university community or affected groups about events or situations when potentially harmful conditions arise or are discovered
- Ensure adequate resources are available to implement appropriate procedures

Supervisor Responsibilities

- Formulate specific safety rules and safe work procedures for their area of supervision
- Ensure that all employees under their supervision are aware of safety practices and follow safety procedures
- Provide training in the safe operation of equipment
- Inspect regularly their areas for hazardous conditions
- Correct promptly unsafe work practices or hazardous conditions
- Be responsive to concerns expressed about personal security and investigate any accidents, incidents or personal security concerns which have occurred in their area of responsibility
- Report any accidents or incidents involving personal security to the appropriate University authority
- Participate, if requested, on department or building safety committees
- Keep training records

A supervisor is anyone who has been delegated responsibility for others working or studying at UBC

User Responsibilities

- Observe safety rules and procedures established by supervisory staff, administrative heads of unit and the University
- Be safety-conscious in all activities, be they work, study or recreation
- Report as soon as possible any accident, injury, unsafe condition, insecure condition or threats to personal security to a supervisor or administrative head of unit
- Use properly and care for adequately personal protective equipment provided by the University
- Participate, if elected or appointed, on departmental or building safety committees
- Have the right to refuse unsafe work

- Ensure a clean and safe working area
- Familiarize themselves with facility equipment, chemicals, and hazards to ensure that everyone is safe at all times
- Not to misuse equipment and to not tamper with, handle, or use items belonging to other facility users without explicit permission
- Adhere to this Safety and Operations Protocols Document. The Structures Laboratory is a user-operated facility. Many groups share the workspace, which increases the potential of hazards. Be aware of your surroundings and of others. Failure to comply will result in disciplinary actions.

Before beginning any work in the Structures Laboratory, users must receive a documented safety orientation by their supervisor. Users must also review the UBC Emergency Response Procedures (red flipbook next to all entrances of the Structures Laboratory), School of Engineering safety website (soesafety.ok.ubc.ca), and UBC Emergency website (<http://emergency.ok.ubc.ca/welcome.html>).

Access to the Structures Laboratory is granted only after the successful completion of the Safety Orientation and the UBC Chemical Safety Course with practical session. Chemical Safety is a course offered by Risk Management Services. Users can enrol in the course through <http://riskmanagement.ok.ubc.ca/register.html>.

Introduction

All students must understand the information in this document with regard to laboratory safety and emergency procedures **PRIOR** to receiving access to the facility. Your personal safety is your responsibility. The School is committed to providing a safe work environment for all users. It is imperative that all safety policies and protocols are followed, equipment is used in the way it was designed and all incidents, near misses or potential hazards are reported to ensure improvements can be made. It must be stressed no one will be punished for reporting unsafe conditions. It is legislated that all unsafe work or hazards are to be reported and there can be no penalty to the individuals who report it.

All safety protocols must be followed at all times. Failure to follow the protocols will result in disciplinary action, which may lead to the permanent ban from using the facility. Even if your PhD, Masters, or other project requires the use of the facility, if safety policies are not followed you will be banned, which may mean you cannot complete your degree requirements. There are no excuses for not working safely and not following policies in place.

Minimum personal protective equipment must be worn at all times in the facility. These items include safety glasses, approved footwear, long pants with no holes. Footwear must have a green CSA triangle present on the outside of the boot. Additionally a white square with orange ohm symbol is recommended. Hard hats must be worn by all users in the facility, no matter of their location, at anytime an overhead hazard exists or while working on the strong floor. This includes, but not limited to the use of the crane, users working overhead, and forklift. The personal protective equipment must not be removed for any reason other than using the safety shower/eyewash until you leave the facility. It does not matter if you run in to grab something, have a tour, or just walking through, all safety equipment must be worn.

Many instruments have safeguards in place. These must not be removed or altered in any way. All guards must be used according to manufacturer's instructions. If the instrument has a guard, it must be used at all times.

Students must always adhere to written and verbal safety instructions. With good judgement and safe work practice, incidents can be mitigated. It is your right to refuse unsafe work and you cannot be penalized for doing so. Hazard will always exist in the Structures Laboratory with the potential to cause serious injury and/or costly damage to equipment. Working alone and unsupervised in laboratories is forbidden. With prior approval, and with your supervisor signing off on risk assessments according to the University's work alone policy, working outside of regular hours when at least two people are present may be granted.

It is expected that each student will work in a responsible manner and exercise good judgement and common sense. If at any time you are not sure how to handle a particular situation, ask for training and advice. **DO NOT TOUCH ANY EQUIPMENT UNLESS YOU HAVE DOCUMENTED TRAINING.** It is always better to ask questions than to risk harm to yourself or damage to the equipment.

The Chemical Safety Course with practical session must be completed before commencing work in the Structures Laboratory. <https://www.hse2.ubc.ca/moodle/login/index.php>

Entry Protocol

- All persons entering the facility must wear at minimum CSA approved safety glasses, CSA approved footwear, long pants
- If any overhead work is being conducted, no matter where in the facility, all users must wear CSA approved hard hats. Hard hats are required at all times on the strong floor.
- The personal protective equipment must be worn at all times
- No single user shall be in the facility. Strict adherence to the no work alone policy is required

Visitors

- Visitors must be provided with at least the same standard of PPE as is required to be worn by workers.
- All visitors, including tour groups, must wear full personal protective equipment – CSA approved safety glasses, CSA approved footwear. CSA approved hard hats must be worn when the overhead crane is in use.
- If hazardous work is being conducted in the Structures Laboratory, visitors and tours will be rescheduled
- Visitors must be at all time accompanied by a qualified staff member. The staff member is responsible for safety of the visitors.

General Laboratory Safety

1. CSA approved safety glasses must be worn at ALL times
2. CSA approved safety shoes must be worn at ALL times. Green CSA triangle on outside of shoe. White square with orange ohm symbol recommended
3. Long pants with no holes are required at ALL times
4. UBC WHMIS (Chemical safety) certificate is a requirement for working in the facility
5. Everyone in the facility must wear a hard hat at any time an overhead hazard exists. Work must not commence until this requirement is met
6. Understand and follow safety rules, procedures and protocols
7. Report all accidents, injuries, and breakage of accessories or equipment to lab manager and supervisor immediately.
8. Never eat, drink, or smoke while working in the laboratory.
9. Never work alone
10. Know the location of the fire extinguisher, eye wash, and safety shower and know how to use them
11. Be aware of hazards, and the procedures for dealing with those hazards, before you start your work
12. Do not use any equipment unless you are trained and approved as a user by your supervisor
13. Wear hearing protection when noise levels are above 80 dB
14. Do Not wear loose or baggy clothing

15. Wear the correct gloves for the task
16. Tie back long hair
17. Maintain clean and tidy workplace
18. Properly store and dispose of all chemicals according to WHMIS
19. Ensure up to date SDS are readily available for all hazardous materials
20. Never block emergency exits, eye wash stations or showers, emergency equipment or electrical panels
21. Report any equipment failures or malfunctions
22. If leaving a lab unattended, turn off all ignition sources and lock the doors
23. Use proper UBC protocols for unattended experiments
24. Leave your work station clean and in good order before leaving the lab
25. Wash hands before leaving the lab and before eating
26. Keep solids out of the sink and floor drains

Working Alone

See UBC working alone policy (Appendix 1). There must be at minimum two (2) trained users for any work being conducted in the Structures Laboratory. All work outside of the regular work week must be approved by your supervisor with appropriate risk assessments completed.

Emergency Response

General Emergency Response

- The red Emergency Procedures and Information booklets located at all entrances to the Structures Laboratory contain all general emergency response procedures. It is your responsibility to read and understand the material outlined in this booklet
- Know the location of the fire extinguisher, eye wash, and safety shower in your lab and know how to use them
- Notify your supervisor immediately after any injury, fire, explosion, or spill
- Fill out appropriate incident reporting form
- Know the building evacuation procedures
- Know how to contact emergency responders
- Always have a way out

Fire

- Only fight a fire if you are comfortable and safe doing so
- Only fight a fire if it is small and contained
- Only fight a fire if you have a way out

First Aid

- Know where the nearest first aid kit is.
- All first aid is provided through campus security (250-807-8111)
- All injuries and near misses must be reported

Electrical Safety

General Electrical Safety

- Obtain permission before operating any high voltage equipment
- Maintain an unobstructed access to all electrical panels
- No electrical modifications are to be made to building or equipment

Extension Cords

- Must not be modified in any manner
- Cords with grounding plugs removed must be removed from service
- Avoid use whenever possible
- Must be of the correct rating and for outdoor use
- Do not run under doors , across aisles, or hang from ceiling

Mechanical safety

Compressed Air

- Use only approved nozzles
- Never direct the air towards yourself or anyone else.
- Avoid creating dust
- Wear Personal Protective Equipment (safety glasses, gloves, dust mask and hearing protection)

Cutting and Grinding

- Wear Personal Protective Equipment (safety glasses, gloves, dust mask and hearing protection)
- Do not wear loose-fitting clothing or jewelry, and keep hair away from moving parts
- Do not overreach
- Maintain proper footing and balance at all times
- Position yourself to the side of the grinder opposite the wheel and wheel guard
- Ensure bystanders are a safe distance away from your work area
- Take care to work only with accessories designed for the grinder you are using
- Do not expose the tool to rain or wet conditions. Water entering a power tool increases the risk of electric shock
- Never grind with a wheel that is designed exclusively for cutting

- Always visually inspect the wheel for possible damage before mounting it on the grinder. If in doubt, don't use it
- Don't use a wheel if it has nicks, cracks, or if it has been dropped
- Allow newly mounted wheels to run at full no-load speed on the grinder (with guard in place) for at least one minute before beginning to grind or cut

Hydraulic and Pneumatic Device Safety

- Only trained personal can operate hydraulic and pneumatic devices
- Report any leaks or spills around devices and attached equipment
- **Never** touch or turn valves without prior authorization
- **Never** detach hoses or lines without prior authorization
- Maintain safe distance when working around hydraulic and pneumatic devices

Chemical safety

- Know and understand WHIMS requirements. Complete the Chemical Safety Course.
- Treat every chemical as if it were hazardous
- Label all chemical according to WHMIS: substance name with concentration, date, and name of the individual responsible, pertinent safety information, “refer to SDS”
- Never return chemicals to reagent bottles
- Comply with fire regulations concerning storage quantities, types of approved containers and cabinets, proper labeling, etc. If uncertain about regulations, contact the building coordinator.
- Use volatile and flammable compounds only in a fume hood. Procedures that produce aerosols should be performed in a hood to prevent inhalation of hazardous material
- Dispose of waste and broken glassware in proper containers
- Dispose of chemicals properly
<http://riskmanagement.ok.ubc.ca/environment/hazardousmaterials.html>
- Clean up spills immediately
- Maintain SDS library of all chemicals

Crane and Hoisting

General Guidelines

- Only certified crane operators may operate lifting equipment
- Only approved lift operations will be performed (some lifts will not be approved)
- NO LIFTS MAY BE PERFORMED WHERE THE LOAD PASSES OVER ANOTHER PERSON
- NO LIFTS MAY BE PERFORMED WHILE WORKING ALONE
- HARD HATS MUST BE WORN BY EVERYONE IN THE FACILITY NO MATTER OF LOCATION FOR ALL LIFT OPERATIONS

- In general, the equipment will only be used during normal operating hours and be locked-out when not in use
- Persons in care and control of any hoisting equipment are responsible for the safety of all personnel in vicinity
- Any lift operations after normal operating hours must have the prior approval of the operator's supervisor and the Departmental Manager
- DO NOT use crane for lifting persons
- DO NOT use damaged chains or slings
- DO NOT load hoist, chains or slings beyond the rated capacity
- DO NOT allow load to swing or twist while hoisting
- DO NOT leave suspended load unattended
- DO NOT allow load to bear against the hook latch
- DO NOT wrap load chain around load or choke the chain around load
- Ensure attachments to the hook are firmly seated in hook saddle
- Tag lines are only to be used to control rotation, swing, or placement of the load, ONLY if the handler has a clear open work area and it is safe for the handler
- DO NOT load the point of hook; avoid off-center loading of any kind
- DO NOT operate hoist if reeved hoist chains are twisted
- NEVER operate the hoist when flammable materials or vapors are present. Electrical devices produce arcs or sparks that may cause a fire or explosion
- DO NOT use hoist when tired, distracted or under the influence of drugs, alcohol or medication which cause diminished control
- STAY ALERT, watch what you are doing and use common sense

Crane Pre-operation Inspection

- Complete and document crane use log book located in sling box.
- Visually inspect cables, rope drum, hook (hook should turn freely), and safety latches ensuring they are in good working conditions
- Test limit switches by raising the hook block without load (Hook block should stop when there is 3 cable loops on drum) and then lowering the hook block (Hook should not touch the floor). DO NOT operate crane if limit switches are not operating properly
- Ensure the hoist trolley and brakes work properly by moving crane in all directions

Sling and Chains

- All slings must have a certificate. If the certificate is not attached or unreadable the sling must not be used
- All slings must have a log sheet of use and must be filled out each time the sling is used
- Slings that are damaged or defective shall not be used
- Slings shall not be shortened with knots or bolts or other makeshift devices
- Sling legs shall not be kinked
- Slings shall not be loaded in excess of their rated capacities

- Slings used in a basket hitch shall have the loads balanced to prevent slippage
- Slings shall be securely attached to their loads
- Slings shall be padded or protected from the sharp edges of their loads
- Suspended loads shall be kept clear of all obstructions
- All employees shall be kept clear of loads about to be lifted and of suspended loads
- Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load
- Shock loading is prohibited
- A sling shall not be pulled from under a load when the load is resting on the sling
- Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the employ

Working at Heights

- Fall protection must be used when a fall from 3m (10ft) or more may occur
- Where a fall from less than 3m involves risk of injury greater than the risk of injury from the impact on a flat surface
- Fall arrest training is required to use fall protection equipment and work may not commence until training is received

Fork Lift

- Only trained and certified users can use fork lift
- Establish eye contact with the forklift driver
- Keep a safe distance from the lift truck and pay attention
- **Never** assume the lift truck operator knows that you are there
- Watch out for the tail swing when a lift truck turns
- Stay clear of the fall zone. This is a full circle around the lift truck equal to twice the height of the carried load
- Check the mirrors that are installed at corners, etc. If there are no mirrors, talk to your supervisor and bring this up at your next safety meeting
- Never walk under the raised forks of a lift truck

Testing Equipment

- Review equipment safety manual prior to use
- **Must have** documented training prior to use
- **Must wear** proper personal protective equipment
- **Must have** clear work area

Shop Cleanliness

- **Always** maintain clean and tidy work area
- **Always** return tools to designated storage location
- **Always** store chemicals properly
- **All** experiments must be appropriately labeled
- Disposes of waste in accordance to UBC waste management procedures

New Projects

- Hazard and Risk assessment must be completed and document at the beginning of each new project
- Always update risk assessment when scope of work changes

Disciplinary Procedures

Introduction

Safety is the main concern when working in the Structures Laboratory. All safety protocols are expected to be followed. With many users utilizing the space, it is imperative that the Structures Laboratory remains tidy and ready for the next person to use. Failure to follow common courtesies, safety protocols, proper use of equipment and UBC's policies and procedures will lead to disciplinary actions. A user may be expelled from the facility even if the facility is needed by the user to complete their research work.

Process

To enforce the protocols outlined in the Structures Laboratory – Safety & Operations Protocols handout, a strike policy will be in effect. A strike will be issued, in writing, outlining the concern and what corrective actions are required. The user will have three warnings, or strikes, that their use of the Structures Laboratory is not up to protocols outlined in this document. The first warning will be issued to the user and corrective action explained. Further training will be mandatory if required. On the second and third infraction, the user's supervisor will be informed that infractions have occurred. On the fourth infraction, Structures Laboratory access will be revoked for a period of time. A meeting will be held with the user, user's supervisor, and the safety committee. The length of the suspension will be determined at this meeting. After the suspension, access may be reinstated. If a further three strikes are issued, permanent ban from the facility will be instated (on the third strike), regardless of why the user needs to use the facility. At each strike following the first suspension from the Structures Laboratory the user's supervisor will be informed of the misuse of the facility. The technicians, supervisors and managers or members of the safety committee have the right to revoke access at their discretion, without strictly adhering to the procedure above.

All disciplinary actions will be documented. The user will sign to acknowledging the errors and what corrective actions are needed to ensure proper use of the Structures Laboratory. A letter will also be sent to the user's supervisor outlining the situation. There will be no tolerance for those who fabricate scenarios. All reported incidences will be kept anonymous. It is not our goal to punish people, it is simply so that everyone can have a positive experience in a safe working environment. The rules and regulations are outlined in the Structures Laboratory – Safety & Operations Protocols handout, which is available both inside and outside the Structures Laboratory. All UBC policies and procedures apply when using the Structures Laboratory and the disciplinary procedure outlined above will be used to enforce them.

Document History and Version Control Table

Version	Action	Approval Authority	Action Date
1.0	Initial draft	Kyle Charles	June 7 2016
2.0	Major update	David Zinz	April 19 2017
2.1	Updated visitor requirements	David Zinz	June 19 2017
3.0	General update	David Zinz	July 23 2018

Safety Committee Review

Date	Version	Committee Chair	Signature

Appendix

Working Alone or in Isolation

<http://riskmanagement.ok.ubc.ca/safety/general/isolation.html>

Background

It is required that staff should work in teams or minimally with another worker in a buddy system. It is inevitable that during the course of performing duties on behalf of or related to the University, there are occasions that would necessitate workers to be working alone or in isolation. Under these conditions, workers will benefit by regularly having their well being monitored at predetermined intervals in the event a quick response and assistance is required.

Regulation

Working Alone or in Isolation: <http://www2.worksafebc.com/Publications/OHSRegulation/part4.asp>

Purpose

UBC Okanagan strives to minimize worker risks at worksites and while performing their duties. The goal is to minimize disabling injuries; reduce exposures to hazards inherent to the tasks through risk analysis and by using adequate engineering controls, given sufficient training, implementing safe operating procedures and employing appropriate personal protective equipment.

Scope

All individuals including such persons as contractors, staff, students, visiting scientists and faculty who work alone or in isolation whose well-being may be compromised by factors such as health (ie: unexpected heart attack), hazard exposure (ie: chemical burn, toxic gas release, microbial exposure) and/or physical trauma (ie: result of a slip and fall being knocked unconscious, injuries from machinery).

Authorization

Prior to initiating working alone or in isolation, the supervisor must perform a detailed risk assessment in consultation with the worker(s) and submit a safe work alone plan to the local safety committee for review and approval.

Risk assessment

Supervisors must review historical data of injuries and incidents and conduct a detail risk assessment in consultation with the worker(s). [Risk Assessment for Working Alone can be found here.](#)