Civil Engineering Department Safety Manual

2017-2018
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The Civil Engineering Department Safety Manual is divided into two main sections:

1- The first identifies the undergraduate civil engineering courses delivered in 2017-2018 and that include safety-related information shared with students throughout the course. A copy of that information can be found in Appendix A.

2- The second identifies the undergraduate teaching laboratories used by undergraduate civil engineering students in 2017-2018. A copy of the safety-related information shared with them in those laboratories can be found in Appendix B.
## 1. Courses

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>Safety-Related Information</th>
</tr>
</thead>
</table>
| ENG 1440      | Introduction to Statics               | Number of Labs: 1  
Lab Type: Hands-On/ Demo  
Lab Used: Engineering Mechanics Laboratory  
Lab Supervisor: Scott Sparrow  
Lab Demonstrator: Teaching Assistants  
Safety Documentation Reference: N/A  
Safety Instruction Method: Teaching Assistants  
Is Lab Safety Tested: No |
| CIVL 2770     | Civil Engineering Materials           | Number of Labs: 10  
Lab Type: Demo  
Lab Used: W. R. McQuade Heavy Structures & IKO Construction Materials Testing Facility  
Lab Supervisor: Chad Klowak  
Lab Demonstrator: Course Instructor  
Safety Documentation Reference: N/A  
Safety Instruction Method: Lab Supervisor  
Is Lab Safety Tested: Yes |
| CIVL 2790     | Fluid Mechanics                       | Number of Labs: 5  
Lab Type: Hands-On  
Lab Used: Hydraulics Research Testing Facility  
Lab Supervisor: Alexander Wall  
Lab Supervisor: Teaching Assistants  
Safety Documentation Reference: N/A  
Safety Instruction Method: Teaching Assistants  
Is Lab Safety Tested: Yes |
| CIVL 2840     | Civil Engineering Geomatics           | Number of Labs: 11  
Lab Type: Hands-On  
Lab Used: Geotechnical Laboratory  
Lab Supervisor: Kerry Lynch  
Lab Supervisor: Teaching Assistants  
Safety Documentation Reference: Appendix A1  
Safety Instruction Method: Lab Supervisor  
Is Lab Safety Tested: Yes |
| CIVL 3690     | Environmental Analysis                | Number of Labs: 4  
Lab Type: Hands-On  
Lab Used: Environmental Engineering Laboratory  
Lab Supervisor: Victor Wei  
Lab Demonstrator: Course Instructor and Lab Supervisor  
Safety Documentation Reference: N/A  
Safety Instruction Method: Lab Supervisor and Online Tutorial  
Is Lab Safety Tested: Yes |
| CIVL 3730     | Geotechnical Materials and Analysis   | Number of Labs: 6  
Lab Type: Hands-On Outside Class Time  
Lab Used: Geotechnical Laboratory  
Lab Supervisor: Kerry Lynch  
Lab Demonstrator: Lab Supervisor and Teaching Assistants  
Safety Documentation Reference: N/A  
Safety Instruction Method: Lab Supervisor  
Is Lab Safety Tested: No |
| CIVL 3740     | Hydraulics                            | Number of Labs: 4  
Lab Type: Hands-On Outside Class Time (4)  
Lab Used: Hydraulics Research Testing Facility  
Lab Supervisor: Alexander Wall  
Lab Demonstrator: Teaching Assistants  
Safety Documentation Reference: N/A  
Safety Instruction Method: Not Taught  
Is Lab Safety Tested: No |
| CIVL 3750     | Hydrology                             | Number of Labs: 5  
Lab Type: Hands-On Outside Class Time (3), Simulation (2)  
Lab Used: Hydraulics Research Testing Facility  
Lab Demonstrator: Course Instructor  
Safety Documentation Reference: Appendix A2  
Safety Instruction Method: Lab Supervisor  
Is Lab Safety Tested: No |
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Number of Labs</th>
<th>Lab Type</th>
<th>Lab Used</th>
<th>Lab Supervisor</th>
<th>Lab Demonstrator</th>
<th>Safety Documentation Reference</th>
<th>Safety Instruction Method</th>
<th>Is Lab Safety Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVL 3760</td>
<td>Structural Analysis</td>
<td>3</td>
<td>Hands-On Outside Class Time</td>
<td>Engineering Mechanics Laboratory</td>
<td>Alexander Wall</td>
<td>Teaching Assistants</td>
<td>N/A</td>
<td>Not Taught</td>
<td>No</td>
</tr>
<tr>
<td>CIVL 3770</td>
<td>Structural Design 1</td>
<td>2</td>
<td>Hands-On</td>
<td>W. R. McQuade Heavy Structures &amp; IKO Construction Materials Testing Facility</td>
<td>Teaching Assistants</td>
<td>Lab Supervisor</td>
<td>N/A</td>
<td>Course Instructor</td>
<td>No</td>
</tr>
<tr>
<td>CIVL 4020</td>
<td>Masonry Design and Construction</td>
<td>2</td>
<td>Hands-On</td>
<td>W. R. McQuade Heavy Structures &amp; IKO Construction Materials Testing Facility, and Red River College Masonry Shop</td>
<td>Chad Klowak</td>
<td>Lab Supervisor</td>
<td>N/A</td>
<td>Lab Technician</td>
<td>No</td>
</tr>
<tr>
<td>CIVL 4022</td>
<td>Properties and Design of Concrete Mixtures</td>
<td>4</td>
<td>Demo</td>
<td>W. R. McQuade Heavy Structures &amp; IKO Construction Materials Testing Facility</td>
<td>Lab Technician</td>
<td>Course Instructor</td>
<td>N/A</td>
<td>Lab Supervisor</td>
<td>No</td>
</tr>
<tr>
<td>CIVL 4250</td>
<td>Groundwater Hydrology</td>
<td>2</td>
<td>Hands-On</td>
<td>Yes</td>
<td>Kerry Lynch</td>
<td>Lab Supervisor</td>
<td>N/A</td>
<td>Course Instructor</td>
<td>Yes</td>
</tr>
<tr>
<td>CIVL 4400</td>
<td>Transportation Engineering 2</td>
<td>6</td>
<td>Hands-On (4), Project (2)</td>
<td>N/A</td>
<td>Course Instructor and Teaching Assistants</td>
<td>Appendix A4</td>
<td>Not Taught</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>CIVL 4410</td>
<td>Transportation Systems</td>
<td>6</td>
<td>Hands-On (2), Project (2), Guest Lectures (2)</td>
<td>N/A</td>
<td>Course Instructor and Teaching Assistants</td>
<td>Appendix A5</td>
<td>Not Taught</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>CIVL 4470</td>
<td>Watershed Processes</td>
<td>6</td>
<td>Simulation (3), Problem (3)</td>
<td>Hydraulics Research Testing Facility</td>
<td>Alexander Wall</td>
<td>Course Instructor</td>
<td>Appendix A6</td>
<td>Lab Supervisor</td>
<td>No</td>
</tr>
</tbody>
</table>
2. Undergraduate Teaching Laboratories

The second section of the manual identifies the undergraduate teaching laboratories used by undergraduate civil engineering students in 2017-2018 and the safety-related information shared with them in those laboratories.

<table>
<thead>
<tr>
<th>Room #/ Address</th>
<th>Lab Name</th>
<th>Lab Supervisor</th>
<th>Other Lab Technicians</th>
<th>Safety-Related Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1-225 (EITC)</td>
<td>Environmental Engineering Laboratory</td>
<td>Victor Wei</td>
<td>N/A</td>
<td>Appendix B1</td>
</tr>
<tr>
<td>E2-393 (EITC)</td>
<td>Engineering Mechanics Laboratory</td>
<td>Scott Sparrow</td>
<td>N/A</td>
<td>Appendix B2</td>
</tr>
<tr>
<td>E3-230 (EITC)</td>
<td>Hydraulics Research Testing Facility</td>
<td>Alexander Wall</td>
<td>N/A</td>
<td>Appendix B3</td>
</tr>
<tr>
<td>H110, A130, A135, A142, A145 (Agriculture Engineering Building)</td>
<td>W. R. McQuade Heavy Structures &amp; IKO Construction Materials Testing Facility</td>
<td>Chad Klowak</td>
<td>Grant Whiteside, Samuel Abraha</td>
<td>Appendix B4</td>
</tr>
<tr>
<td>E1-317 (EITC)</td>
<td>Geotechnical Laboratory</td>
<td>Kerry Lynch</td>
<td>N/A</td>
<td>Appendix B5</td>
</tr>
<tr>
<td>E2-365, E2-368 (EITC)</td>
<td>Civil Engineering/ Mechanical Engineering Computer Laboratory</td>
<td>Virgil Sumaling, Trevor Mazak</td>
<td>N/A</td>
<td>Appendix B6</td>
</tr>
</tbody>
</table>
Appendix A: Undergraduate Course-Related Safety Information

Appendix A1: CIVL 2840: Civil Engineering Geomatics
A number of course lectures involved discussing specific safety issues relevant to the topic (e.g. working near active traffic, working in remote areas.). All students were required to dress properly and wear a high visibility vest for all outdoor labs. The instructor held a safety moment at the start of each lab to discuss potential hazards present in each lab activity and students filled out the tailgate hazard assessment form in two of the labs. The goal was to build on the culture of recognizing safety as the first step in any field work and to go through the process typical of what would be done in practice.

This appendix also shows for CIVL 2840:
1- A document outlining clothing required for outdoor labs, and
2- A tailgate hazard assessment form.
## Clothing Required for Outdoor Labs

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Vest" /></td>
<td>High Visibility Personal Protective Vest</td>
</tr>
<tr>
<td><img src="image" alt="Jeans" /></td>
<td>Long Pants</td>
</tr>
<tr>
<td><img src="image" alt="T-Shirt" /></td>
<td>Minimum T-Shirt</td>
</tr>
<tr>
<td><img src="image" alt="Shoes" /></td>
<td>Closed Toe Shoes</td>
</tr>
</tbody>
</table>
This FIELD LEVEL HAZARD ASSESSMENT is a reassessment of hazards on a daily basis as outlined in the requirements set out in the Project Safety Plan for the above noted location.

It is important that all hazards have control strategies to eliminate/control them. These controls must be in place BEFORE the job starts.

All surveyors must review and sign the FLHA.

Attach the Project Safety Plan.

List any hazards that are present that are not outlined in the Baseline Hazard Assessment of the Project Safety Plan. These hazards may arise from changing conditions, or new/different tasks required to complete the task. Use the Hazard Classification Matrix on the back of this sheet to rank the hazard as low, medium or high by taking into account the Severity of the Hazard, Probability that the Hazard will happen, and the amount of Exposure to the Hazard.

<table>
<thead>
<tr>
<th>HAZARDS of WORK/TASK</th>
<th>HAZARD RANK</th>
<th>PPE REQUIREMENTS, ACTIONS, CONTROLS, AVOID BY…</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
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</tr>
</tbody>
</table>

If there are no hazards listed, you acknowledge that you have covered the Baseline Hazard Assessment attached to the Project Safety Plan and the no other hazards exist.

Performed by: ___________________________  Date: ___________________________
## Hazard Classification Matrix

<table>
<thead>
<tr>
<th>Severity</th>
<th>Almost Certain</th>
<th>Likely</th>
<th>Possible</th>
<th>Rare</th>
<th>Unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme</td>
<td>5</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>(death, environmental disaster, extensive damage, prolonged downtime for project, company or site, extreme cost)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>4</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>(serious injury, severe environmental damages, major cost)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>(medical treatment required, contained environmental impact, high cost)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>2</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>(first aid required, some environmental/financial impact)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insignificant</td>
<td>1</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>(no injuries, low environmental/financial impact)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Probability: How likely is it to happen?
- Almost Certain: Likely to occur often during the course of work
- Likely: Likely to occur infrequently during the work activity
- Possible: Possibility of incident occurring sometime during the work activity
- Rare: Incident will rarely occur during the work activity
- Unlikely: Incident will probably not occur during the work activity

### Exposure: Is it normal for the activity?
- Normal: No modification to hazard classification
- Above Normal: Add 1 to hazard classification value
- Extreme: Add 2 to hazard classification value

## PROJECT SAFETY CONTACTS

<table>
<thead>
<tr>
<th>Emergency Phone Numbers</th>
<th>Review Date: Sept 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poison Control:</td>
<td>1-855-7POISON (1-855-776-4766) – 24hrs</td>
</tr>
<tr>
<td>Water Utility:</td>
<td>204-986-3322</td>
</tr>
<tr>
<td>Electrical/Gas Utility:</td>
<td>1 888 624 9376 or 204 480-1212</td>
</tr>
<tr>
<td>Cable Utility:</td>
<td>204-480-3476 or 1-866-344-7429</td>
</tr>
</tbody>
</table>

### EMERGENCY HOSPITAL LOCATIONS

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concordia Hospital 1095</td>
<td>Concordia Ave, Winnipeg, MB R2K 3S8</td>
</tr>
<tr>
<td>Grace Hospital</td>
<td>300 Booth Dr, Winnipeg, MB R3J 3M7</td>
</tr>
<tr>
<td>Health Sciences Centre</td>
<td>820 Sherbrook St, Winnipeg, MB R3A 1R9</td>
</tr>
<tr>
<td>Misericordia Urgent Care Centre</td>
<td>99 Cornish Ave, Winnipeg, MB R3C 1A2</td>
</tr>
<tr>
<td>Seven Oaks General Hospital</td>
<td>2300 McPhillips St, Winnipeg, MB R2V 3M3</td>
</tr>
<tr>
<td>St. Boniface Hospital</td>
<td>409 Tache Ave, Winnipeg, MB R2H 2A6</td>
</tr>
<tr>
<td>Victoria General Hospital</td>
<td>2340 Pembina Hwy, Winnipeg, MB R3T 2E8</td>
</tr>
</tbody>
</table>

**THESE NUMBERS ARE ONLY TO BE USED FOR EMERGENCY**
Appendix A2: CIVL 3750: Hydrology
This appendix shows for CIVL 3750 a field trip release form that every student in the course needs to sign to go on an optional trip.
RELEASE AND INDEMNIFICATION

WHEREAS I wish to participate in a field trip to Seven Sisters generating station as part of the CIVL 3750 - Hydrology course on October 28, 2017, as well as any activities offered therein (hereinafter, collectively all activities referred to as the “Field Trip”);

IN CONSIDERATION of the University of Manitoba (the “University”) arranging for me to have the opportunity to participate in the Field Trip in a location off campus from the University and beyond the control of the University, more specifically at the generating station (the “Destination”):

1. I ACKNOWLEDGE that I am responsible for arranging transportation to and from the Destination.

2. I FURTHER ACKNOWLEDGE that there are potential risks associated with participating in the Field Trip, including, but not limited to:

   (a) *Vehicular and travel-related risks* due to vehicle roll-over or collision with animals or other vehicles and other miscellaneous accidents or incidents that may occur while traveling;
   (b) *Plant and animal allergens* such as pollen, poison ivy, stinging nettle, fungal spores, mosquitoes and ticks;
   (c) *Weather-related risks* such as tornadoes, lightning strikes, sunstroke, sunburn and hypothermia;
   (d) *Water-related risks* such as drowning or otherwise suffering harm while in, by or near water;
   (e) *Food-related risks* such as reactions, illnesses or infections arising from the consumption of food and water, choking and allergic reactions to food ingredients;
   (f) *Falling risks* from stairs or from any other elevated, raised, steep, slippery or uneven terrain;
   (g) *Viral and bacterial diseases* such as West Nile Virus, Hantavirus Pulmonary Syndrome or Lyme Disease that are conveyed by rodents and insects occurring in the vicinity of the Destination;
   (h) *Bodily-injury risks* such as fracturing or breaking limbs or other external or internal bodily injuries;
   (i) *Personal safety risks* such as being mugged, robbed or sexually assaulted;
   (j) *Miscellaneous risks* such as:
      (i) Errant gunfire from hunting activities, especially during approved hunting periods; and,
      (ii) Wildfire, especially during the spring, late autumn and dry periods;

3. (a) I AGREE TO PARTICIPATE in the Field Trip notwithstanding the above-stated risks

   (b) I FURTHER AGREE TO ASSUME ALL RELATED HEALTH RISKS of participating in the said Field Trip.

4. I, my heirs, executors, administrators and assigns RELEASE the University, its respective servants, agents or employees from any claims for personal injury (including death), damages, losses or other proceedings while I am engaged in the Field Trip or thereafter.

5. I FURTHER AGREE TO INDEMNIFY the University, its servants, agents or employees from any damages which may result or claims or demands which may be made against the University arising out of or in consequence of the Field Trip and/or my actions.

6. I FURTHER STATE that I am of lawful age and legally competent to sign this release, or that I have acquired the written consent of my parent or guardian.
In signing this Release, I am not relying upon any oral or written representations or statements made by the University other than what is set forth in this Release.

I HAVE READ AND UNDERSTOOD THIS RELEASE AND I AM AWARE THAT BY SIGNING THIS RELEASE I AM WAIVING CERTAIN LEGAL RIGHTS WHICH I OR MY HEIRS, NEXT OF KIN, EXECUTORS, ADMINISTRATORS AND ASSIGNS MAY HAVE AGAINST THE UNIVERSITY.

IN WITNESS WHEREOF I have set my hand on the date set out below.

__________________________________________  __________________________________________
Witness                                          Signature

Date:___________    Please print your name here:__________________________________________
Appendix A3: CIVL 4020: Masonry Design and Construction
This appendix shows for CIVL 4020 safety requirements when attending testing in the W. R. McQuade Heavy Structures & IKO Construction Materials Testing Facility.
CIVL 4020-safety during testing
Safety requirements while attending testing in the structures laboratory

• The Structures lab is a testing facility with many ongoing projects using heavy machinery and equipment.

• The testing area is located within a yellow boundaries of the structures floor.

• Once in the testing area, you are required to wear: hardhat, steel-toed boots, safety glasses.

• Other PPE that may be needed depending on the testing can be gloves, and earplugs.

• Once you enter the lab, be aware of your surroundings.

• There may be tripping hazards, watch where you step.

• There may be objects that with protruding parts that you will need to avoid, keep your hardhat on at all times!

• In case of emergency, call security by dialing 555 from any UofM phone, and contact Health and Safety office:

  Fort Garry Campus
  191 Frank Kennedy Center
  • 474-6633 Tel
  • 474-7629 Fax
Appendix A4: CIVL 4400: Transportation Engineering 2
This appendix shows for CIVL 4400 a field trip release form that every student in the course needs to sign when completing assignments or projects that require field work. In this course, “field work” only refers to how students would normally use a roadway environment as a pedestrian, cyclist, transit rider, or motorist. Students are advised to not enter the roadway right-of-way.
RELEASE AND INDEMNIFICATION

WHEREAS I wish to participate in a field trip to one or more roadway site(s) as part of the CIVL 4400 – Transportation Engineering 2 course on various dates (as needed) in September, October, November and December, 2017, as well as any activities offered therein (hereinafter, collectively all activities referred to as the “Field Trip”);

IN CONSIDERATION of the University of Manitoba (the “University”) arranging for me to have the opportunity to participate in the Field Trip in a location off campus from the University and beyond the control of the University, more specifically at the roadway site(s) (the “Destination”):

1. I ACKNOWLEDGE that I am responsible for arranging transportation to and from the Destination.

2. I FURTHER ACKNOWLEDGE that there are potential risks associated with participating in the Field Trip, including, but not limited to:

   (k) Vehicular and travel-related risks due to vehicle roll-over or collision with animals or other vehicles and other miscellaneous accidents or incidents that may occur while traveling;
   (l) Plant and animal allergens such as pollen, poison ivy, stinging nettle, fungal spores, mosquitoes and ticks;
   (m) Weather-related risks such as tornadoes, lightning strikes, sunstroke, sunburn and hypothermia;
   (n) Water-related risks such as drowning or otherwise suffering harm while in, by or near water;
   (o) Food-related risks such as reactions, illnesses or infections arising from the consumption of food and water, choking and allergic reactions to food ingredients;
   (p) Falling risks from stairs or from any other elevated, raised, steep, slippery or uneven terrain;
   (q) Viral and bacterial diseases such as West Nile Virus, Hantavirus Pulmonary Syndrome or Lyme Disease that are conveyed by rodents and insects occurring in the vicinity of the Destination;
   (r) Bodily-injury risks such as fracturing or breaking limbs or other external or internal bodily injuries;
   (s) Personal safety risks such as being mugged, robbed or sexually assaulted;
   (t) Miscellaneous risks such as:
      (iii) Errant gunfire from hunting activities, especially during approved hunting periods; and,
      (iv) Wildfire, especially during the spring, late autumn and dry periods;

3. (a) I AGREE TO PARTICIPATE in the Field Trip notwithstanding the above-stated risks
   (c) I FURTHER AGREE TO ASSUME ALL RELATED HEALTH RISKS of participating in the said Field Trip.

4. I, my heirs, executors, administrators and assigns RELEASE the University, its respective servants, agents or employees from any claims for personal injury (including death), damages, losses or other proceedings while I am engaged in the Field Trip or thereafter.

5. I FURTHER AGREE TO INDEMNIFY the University, its servants, agents or employees from any damages which may result or claims or demands which may be made against the University arising out of or in consequence of the Field Trip and/or my actions.

6. I FURTHER STATE that I am of lawful age and legally competent to sign this release, or that I have acquired the written consent of my parent or guardian.
In signing this Release, I am not relying upon any oral or written representations or statements made by the University other than what is set forth in this Release.

I HAVE READ AND UNDERSTOOD THIS RELEASE AND I AM AWARE THAT BY SIGNING THIS RELEASE I AM WAIVING CERTAIN LEGAL RIGHTS WHICH I OR MY HEIRS, NEXT OF KIN, EXECUTORS, ADMINISTRATORS AND ASSIGNS MAY HAVE AGAINST THE UNIVERSITY.

IN WITNESS WHEREOF I have set my hand on the date set out below.

_____________________________________________  _______________________________________
Witness                                                                                     Signature

Date:___________                                                                           Please print your name here:______________________________

H:\Legal\LEGAL OFFICE\Precedents\Website Documents\Field Trip Release - 2008.doc
Appendix A5: CIVL 4410: Transportation Systems

This appendix shows for CIVL 4410 a field trip release form that every student in the course needs to sign when completing assignments or projects that require field work. In this course, “field work” only refers to how students would normally use a roadway environment as a pedestrian, cyclist, transit rider, or motorist. Students are advised to not enter the roadway right-of-way.
RELEASE AND INDEMNIFICATION

WHEREAS I wish to participate in a field trip to one or more roadway site(s) in Winnipeg as part of the CIVL 4410 - Transportation Systems course on various dates (as needed) in March and April, 2018, as well as any activities offered therein (hereinafter, collectively all activities referred to as the “Field Trip”);

IN CONSIDERATION of the University of Manitoba (the “University”) arranging for me to have the opportunity to participate in the Field Trip in a location off campus from the University and beyond the control of the University, more specifically at the roadway site(s) (the "Destination”):

1. I ACKNOWLEDGE that I am responsible for arranging transportation to and from the Destination.

2. I FURTHER ACKNOWLEDGE that there are potential risks associated with participating in the Field Trip, including, but not limited to:

   (u) Vehicular and travel-related risks due to vehicle roll-over or collision with animals or other vehicles and other miscellaneous accidents or incidents that may occur while traveling;

   (v) Plant and animal allergens such as pollen, poison ivy, stinging nettle, fungal spores, mosquitoes and ticks;

   (w) Weather-related risks such as tornadoes, lightning strikes, sunstroke, sunburn and hypothermia;

   (x) Water-related risks such as drowning or otherwise suffering harm while in, by or near water;

   (y) Food-related risks such as reactions, illnesses or infections arising from the consumption of food and water, choking and allergic reactions to food ingredients;

   (z) Falling risks from stairs or from any other elevated, raised, steep, slippery or uneven terrain;

   (aa) Viral and bacterial diseases such as West Nile Virus, Hantavirus Pulmonary Syndrome or Lyme Disease that are conveyed by rodents and insects occurring in the vicinity of the Destination;

   (bb) Bodily-injury risks such as fracturing or breaking limbs or other external or internal bodily injuries;

   (cc) Personal safety risks such as being mugged, robbed or sexually assaulted;

   (dd) Miscellaneous risks such as:

       (v) Errant gunfire from hunting activities, especially during approved hunting periods; and,

       (vi) Wildfire, especially during the spring, late autumn and dry periods;

3. (a) I AGREE TO PARTICIPATE in the Field Trip notwithstanding the above-stated risks 

       (d) I FURTHER AGREE TO ASSUME ALL RELATED HEALTH RISKS of participating in the said Field Trip.

4. I, my heirs, executors, administrators and assigns RELEASE the University, its respective servants, agents or employees from any claims for personal injury (including death), damages, losses or other proceedings while I am engaged in the Field Trip or thereafter.

5. I FURTHER AGREE TO INDEMNIFY the University, its servants, agents or employees from any damages which may result or claims or demands which may be made against the University arising out of or in consequence of the Field Trip and/or my actions.

6. I FURTHER STATE that I am of lawful age and legally competent to sign this release, or that I have acquired the written consent of my parent or guardian.
In signing this Release, I am not relying upon any oral or written representations or statements made by the University other than what is set forth in this Release.

I HAVE READ AND UNDERSTOOD THIS RELEASE AND I AM AWARE THAT BY SIGNING THIS RELEASE I AM WAIVING CERTAIN LEGAL RIGHTS WHICH I OR MY HEIRS, NEXT OF KIN, EXECUTORS, ADMINISTRATORS AND ASSIGNS MAY HAVE AGAINST THE UNIVERSITY.

IN WITNESS WHEREOF I have set my hand on the date set out below.

________________________________________________________________________
Witness

________________________________________________________________________
Signature

Date: __________ Please print your name here: ________________________________
Appendix A6: CIVL 4470: Watershed Processes
This appendix shows for CIVL 4470 a field trip release form that every student in the course needs to sign to go on an optional trip.
RELEASE AND INDEMNIFICATION

WHEREAS I wish to participate in a field trip to river bank stabilization sites around the City of Winnipeg as part of the CIVL 4470 - Watershed Processes course on March 24, 2018, as well as any activities offered therein (hereinafter, collectively all activities referred to as the “Field Trip”);

IN CONSIDERATION of the University of Manitoba (the “University”) arranging for me to have the opportunity to participate in the Field Trip in a location off campus from the University and beyond the control of the University, more specifically at river bank stabilization sites (the “Destination”):

1. I ACKNOWLEDGE that I am responsible for arranging transportation to and from the Destination.

2. I FURTHER ACKNOWLEDGE that there are potential risks associated with participating in the Field Trip, including, but not limited to:

   (a) Vehicular and travel-related risks due to vehicle roll-over or collision with animals or other vehicles and other miscellaneous accidents or incidents that may occur while traveling;
   
   (b) Plant and animal allergens such as pollen, poison ivy, stinging nettle, fungal spores, mosquitoes and ticks;
   
   (c) Weather-related risks such as tornadoes, lightning strikes, sunstroke, sunburn and hypothermia;
   
   (d) Water-related risks such as drowning or otherwise suffering harm while in, by or near water;
   
   (e) Food-related risks such as reactions, illnesses or infections arising from the consumption of food and water, choking and allergic reactions to food ingredients;
   
   (f) Falling risks from stairs or from any other elevated, raised, steep, slippery or uneven terrain;
   
   (g) Viral and bacterial diseases such as West Nile Virus, Hantavirus Pulmonary Syndrome or Lyme Disease that are conveyed by rodents and insects occurring in the vicinity of the Destination;
   
   (h) Bodily-injury risks such as fracturing or breaking limbs or other external or internal bodily injuries;
   
   (i) Personal safety risks such as being mugged, robbed or sexually assaulted;
   
   (j) Miscellaneous risks such as:
       (vii) Errant gunfire from hunting activities, especially during approved hunting periods; and,
       (viii) Wildfire, especially during the spring, late autumn and dry periods;

3. (a) I AGREE TO PARTICIPATE in the Field Trip notwithstanding the above-stated risks
   
   (e) I FURTHER AGREE TO ASSUME ALL RELATED HEALTH RISKS of participating in the said Field Trip.

4. I, my heirs, executors, administrators and assigns RELEASE the University, its respective servants, agents or employees from any claims for personal injury (including death), damages, losses or other proceedings while I am engaged in the Field Trip or thereafter.

5. I FURTHER AGREE TO INDEMNIFY the University, its servants, agents or employees from any damages which may result or claims or demands which may be made against the University arising out of or in consequence of the Field Trip and/or my actions.

6. I FURTHER STATE that I am of lawful age and legally competent to sign this release, or that I have acquired the written consent of my parent or guardian.
In signing this Release, I am not relying upon any oral or written representations or statements made by the University other than what is set forth in this Release.

I HAVE READ AND UNDERSTOOD THIS RELEASE AND I AM AWARE THAT BY SIGNING THIS RELEASE I AM WAIVING CERTAIN LEGAL RIGHTS WHICH I OR MY HEIRS, NEXT OF KIN, EXECUTORS, ADMINISTRATORS AND ASSIGNS MAY HAVE AGAINST THE UNIVERSITY.

IN WITNESS WHEREOF I have set my hand on the date set out below.

_________________________________________  ________________________________
Witness                                                  Signature

Date:___________    Please print your name here:_________________________________
Appendix B: Undergraduate Teaching Laboratories Safety-Related Information

Appendix B1: Environmental Engineering Laboratory

This appendix shows for the Environmental Engineering Laboratory its:

1- Safety regulations, and
2- Safe work procedures for undergraduate students using the lab.
The University of Manitoba and departmental safety policies represent a Student's Right to Know about any potentially hazardous situation when performing an experiment. The lab instructor and teaching assistant (TA) will go over any safety precautions prior to start of each lab. All safety procedures will also be documented in writing, either as a part of the laboratory procedure, or as a handout. They may also be discussed in the lecture part of the course. Once properly instructed, it is the students’ responsibility to follow all safety procedures.

The experiments in these laboratories have been chosen or modified to use relatively safe chemicals and procedures for minimizing the safety risks. As part of the pre-lab for each experiment, the students are expected to review and note the safety precautions and procedures for that experiment. If any student experiences unusual irritation, itching, or burning of the skin, respiratory tract, or eyes, stop the experiment and report the situation to the TA. Anyone with any relevant physical or medical condition (e.g., pregnancy, epilepsy, history of severe allergies, etc.) that might pose difficulties with laboratory operations must report these conditions to the laboratory and course instructor.

1. **Lab safety facilities**
   1. Lab Safety Information Center in the main teaching lab E1-225, including WHMIS label pictograms, SDS/MSDS binder, waste disposal chart, chemical inventory, first aid kits, spare safety googles, masks and respirators, as shown in the following figure.

   ![Lab E1-225](image)

   2. Lab Safety Information Center in the main instrumental lab E1-236, including WHMIS label pictograms, SDS/MSDS binder, waste disposal chart, chemical inventory, first aid kits, as shown in the following figure.
3. Eyewash sinks and safety showers in both E1-225 and E1-236
4. Safety phones in both E1-225 and E1-236

4. Benchtop acid cabinet
2. Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS) and Safety Data Sheets (SDS)

WHMIS represents Workplace Hazardous Materials Information System. It is a comprehensive plan for providing information on the safe use of hazardous materials used in Canadian workplaces. Information is provided by means of product labels, MSDS or SDS and worker education programs.

In an effort to simplify the transition to the Global Harmonized System (GHS), Environmental Health and Safety has combined the WHMIS 1988 and 2015 online training. The new online training presentation and testing will provide an easy to follow comparison between WHMIS 1988 and 2015. Online WHMIS (1988 and 2015) training at the University of Manitoba are accessed and completed through UMLearn.

Follow the instructions below to access online WHMIS training:

1. Login to UMLearn using your UMNet ID and password.
   a. For personnel who do not have a UMNet ID, please fill out this form and submit to ehso@umanitoba.ca
2. In the top right-hand corner, click on “Support” > “Self Registration”
3. Click on “WHMIS Training”
4. A course description will appear. Click “Register”
5. Enter registration information as required. Click “Submit”.
6. Click “finish” on the Step3: Confirmation window
7. A registration Summary should appear with the option to “Go To course offering WHMIS Training” as an option. Click on this to begin your training.
8. To complete your WHMIS training, an online test with a score of 80% or higher is required. Upon successful completion of the online WHMIS test, a certificate will be generated that you can print. You can submit the certificate to your Departmental WHMIS Coordinator for record keeping.

9. If you would like to review your final grade: Assessments > Grades and User Progress. Scroll to the Quizzes section and you can view your overall score. This final score will be recorded in our database within a week of completion.

All students are required by the University of Manitoba to take this online training and obtain the WHMIS certificate as shown in the following example in accordance with Part 35 of the Workplace Safety and Health regulations.

The information covered in the MSDS/SDS includes:

- Chemical Products and Company Identification
- Composition/Information on Ingredients
- Hazards Identification
- First Aid Measures
- Fire Fighting Measures
- Accidental Release Measures
- Handling and Storage
- Exposure Controls/Personal Protection
- Physical and Chemical Properties
- Stability and Reactivity
The students should understand the following terms:

- **AVOID CONTACT**: A general rule for all chemicals, even if they are considered non-hazardous.
- **CARCINOGEN**: Substances which are suspected or known to cause cancer. Some have threshold limits of exposure. *The use of these chemicals is avoided in the general chemistry laboratories.*
- **CORROSIVE**: Living tissue as well as equipment is destroyed on contact with these chemicals. **PRECAUTIONS**: Do not breathe vapors and avoid contact with skin, eyes, and clothing.
- **DANGER**: Substances that have known harmful effects or which may have harmful effects, but have no available literature citing such effects. **PRECAUTIONS**: Treat as if these are the most dangerous chemicals that exist. There may or may not be serious hazards associated with these chemicals.
- **EXPLOSIVE**: Substances known to explode under some conditions. **PRECAUTIONS**: Avoid shock (dropping), friction, sparks, and heat. Isolate from other chemicals which become hazardous when spilled.
- **FLAMMABLE**: Substances which give off vapors that readily ignite under usual working conditions. **PRECAUTIONS**: Keep away from heat, sparks, or open flame. Use in hood or other well ventilated area whenever possible.
- **IRRITANT**: Substances that have an irritant effect on skin, eyes, respiratory tract, etc. **PRECAUTIONS**: Do not breathe vapors and avoid contact with skin and eyes.
- **LACHRYMATOR**: Substances that have an irritant or burning effect on skin, eyes, or respiratory tract. These are dangerous in very small quantities (opening the cap has an immediate effect on eyes). **PRECAUTIONS**: Only open in hood! Do not breathe vapors. Avoid contact with skin, eyes. Avoid heating.
- **MUTAGEN**: Chemical or physical agents that cause genetic alterations. **PRECAUTIONS**: Handle with extreme care! Do not breathe vapors and avoid contact with skin, eyes, or clothing.
- **PEROXIDE FORMER**: Substances which form peroxides or hydroperoxides upon standing or when in contact with air. **PRECAUTIONS**: Many peroxides are explosive! Do not open the bottle if a residue is present on the outside of the cap or inside the bottle.
- **POISON**: Substances that have very serious and often irreversible effects on the body. Hazardous when breathed, swallowed, or in contact with the skin, and in sufficient quantity lead to death. **PRECAUTIONS**: Avoid all contact with the body. When handling use suitable protective equipment.
- **STENCH**: Substances which have or generate bad smelling odors. **PRECAUTIONS**: Open only in the hood!
- **TERATOGEN**: Substances that cause the production of physical defects in a developing fetus or embryo. **PRECAUTIONS**: Handle with extreme care! Do not breathe vapors and avoid contact with skin, eyes, and clothing. Use suitable protective equipment when handling.
- **TOXIC**: Substances which are hazardous to health when breathed, swallowed or are in contact with the skin. There is danger of serious damage to health by short or prolonged exposure. **PRECAUTIONS**: Avoid all contact with body. When handling use suitable protective equipment.

### 3. Lab safety rules

1. All staff, TAs, and students working in laboratories share the responsibility for safety.
2. **ALL Students** must have a current WHMIS training and obtain the WHMIS certificate.
3. Safety glasses or goggles must be worn in all laboratories.
4. Protective clothing must be worn as specified.
5. Open shoes are not to be worn.
6. Long hair and loose clothing or clothing which exposes the legs must be confined by net, cap or laboratory coat.
7. Contact lenses are not allowed in laboratories.
8. Horseplay, pranks and unauthorized experiments are especially dangerous and are prohibited.
9. Eating, drinking or smoking are not permitted in any laboratory.
10. Chemicals from unlabelled containers are not to be used. The presence of such unlabelled containers shall be reported to the TAs or lab instructors.
11. All work areas shall be kept clean. Separate containers are to be used for paper and broken glassware.
12. All persons shall report accidents promptly to the TAs or lab instructors who supervise first aid and/or arrange for further medical attention. The UM Safety Officer and/or the Head of the Department must also be notified.
13. Visitors to laboratories are required to follow the same rules as staff and students.
### Safe Work Procedure

**Name of Task:**
Jar Tester

<table>
<thead>
<tr>
<th>Position/Job</th>
<th>Department/Area</th>
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<tbody>
<tr>
<td>Lab Work</td>
<td>Dept. of Civil Engineering (Environmental Engineering)</td>
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**Hazards:**
Chemical: 0.02 N H₂SO₄ and 0.02 NaOH

**Personal Protective Equipment or other required equipment or other safety considerations:**
Lab coat, safety glasses, gloves

**Education and training prerequisites:**
Familiar with MSDS/SDS and the operating procedures

**Steps to be taken to complete task safely:**
The lab instructor and TA give detailed instructions first, then demonstrate proper use steps and supervise the students during the entire lab period

**Responsibilities, Completion and Review**

> Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who enter the premises.

Completed by and Date: V.Wei 30-Aug-2006

Approved by:

Last Reviewed / Revised by and Date: Note: This task will be monitored periodically to ensure compliance and effectiveness
### Safe Work Procedure

**Name of Task:**
Glassware

**Position/Job:**
- Lab Work

**Department/Area:**
- Dept. of Civil Engineering (Environmental Engineering)

**Hazards:**
- Cuts or injuries by broken glass

**Personal Protective Equipment or other required equipment or other safety considerations:**
- Lab coat, safety glasses, gloves

**Education and training prerequisites:**
- Familiar with MSDS/SDS and the operating procedures

**Steps to be taken to complete task safely:**

The lab instructor and TA give detailed instructions first, then demonstrate proper use steps and supervise the students during the entire lab period

**Responsibilities, Completion and Review**

Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries, illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who enter the premises.

**Completed by and Date:**
- V Wei  30-Aug-2006

**Approved by:**

**Last Reviewed / Revised by and Date:**

Note: This task will be monitored periodically to ensure compliance and effectiveness
## Safe Work Procedure

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<td>Lab Work</td>
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<tr>
<td>Hazards:</td>
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<tr>
<td>Physical:</td>
<td>spinning small bladder (30 – 120 rpm)</td>
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<tr>
<td>Chemical:</td>
<td>ferric salt or aluminum salt</td>
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### Personal Protective Equipment or other required equipment or other safety considerations:
- Lab coat, safety glasses, gloves

### Education and training prerequisites:
- Familiar with the operation procedures

### Steps to be taken to complete task safely:
- The lab instructor and TA give detailed instructions first, then demonstrate proper operation steps and supervise the students during the entire lab period

### Responsibilities, Completion and Review

Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who enter the premises.

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<td>Last Reviewed / Revised by and Date:</td>
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# EEL SWP 4.0

## Safe Work Procedure

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<th>Name of Task:</th>
<th>Spectrophotometer</th>
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<td><strong>Position/Job:</strong></td>
<td>Lab Work</td>
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<tr>
<td><strong>Department/Area:</strong></td>
<td>Dept. of Civil Engineering (Environmental Engineering)</td>
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<tr>
<td><strong>Hazards:</strong></td>
<td>Chemicals in samples or standard</td>
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<tr>
<td><strong>Personal Protective Equipment or other required equipment or other safety considerations:</strong></td>
<td>Lab coat, safety glasses, gloves</td>
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<tr>
<td><strong>Education and training prerequisites:</strong></td>
<td>Familiar with MSDS/SDS and the operating procedures</td>
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### Steps to be taken to complete task safely:

- The lab instructor and TA give detailed instructions first, then demonstrate proper use steps and supervise the students during the entire lab period.

### Responsibilities, Completion and Review

*Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who enter the premises.*

| Completed by and Date: | V. Wei 30-Aug-2006 |
| Approved by: | |
| Last Reviewed / Revised by and Date: | Note: This task will be monitored periodically to ensure compliance and effectiveness |


# Safe Work Procedure

**Name of Task:**  
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<tr>
<td>Lab Work</td>
<td>Dept. of Civil Engineering (Environmental Engineering)</td>
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</table>

**Hazards:**  
Cuts or injuries by broken glass, accidental spills of acid or alkaline solutions

**Personal Protective Equipment or other required equipment or other safety considerations:**  
Lab coat, safety glasses, gloves

**Education and training prerequisites:** Familiar with MSDS/SDS and the operating procedures

**Steps to be taken to complete task safely:**

The lab instructor and TA give detailed instructions first, then demonstrate proper use steps and supervise the students during the entire lab period

**Responsibilities, Completion and Review**

Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who enter the premises.

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Appendix B2: Engineering Mechanics Laboratory
This appendix shows safety instructions for the Engineering Mechanics Laboratory.
Engineering Mechanics Laboratory safety Instructions

The Engineering Mechanics Lab does not deal with hazardous tools or equipment. Each and every apparatus in this particular lab already has a detailed manufacturer’s manual that could be referenced by staff or graduate students if needed. The lab does not use chemicals, there are no hydraulic test frames, and there are no saws, drills or any dangerous tools. There is no use of tools of any kind, and apparatus are prepared and ready so there is no setup involved by undergrad students. It is not a wet lab, nor a testing facility. There are no testing of specimens to failure where debris would be a hazard.

General Instructions before Commencing Work:

- Read the manual for the apparatus and follow instructions carefully
- Read and take note of specific warning for each apparatus
- Exercise caution when handling the weights
- Do not move equipment without consent of the technician in charge
Appendix B3: Hydraulics Research Testing Facility

This appendix shows for the Hydraulics Research Testing Facility:

1. A summary of the facility, and
2. Its safe work procedures for undergraduate students using the lab.
Summary
Lab Manager: Alexander Wall (Hydraulics Technologist)

The Hydraulics Research and Testing Facility (HRTF) is one of the largest laboratories on the University of Manitoba campus. The facility supports several research projects currently focused in river ice engineering as well as commercial testing and comprehensive field programs. Beyond its many uses for applied research and commercial testing, the HRTF is used extensively to support the educational goals of the water resources courses. These courses include CIVL 2790 Fluid Mechanics, CIVL 3740 Hydraulics, and more recently CIVL 3750 Hydrology and CIVL 4470 Watershed. Students conduct experiments for these courses in small groups and submit a small laboratory report. Occasionally, undergraduate students opting to take CIVL 4332 Civil Engineering Thesis Project will conduct novel research in the HRTF with assistance from support staff. Since the last CEAB accreditation numerous lab upgrades have occurred to develop new lab experiments and increase the teaching capacity of existing ones so labs do not have to be scheduled outside of lab time slots as much as possible.

Specifically, three new hydraulics benches (Figure 1) were purchased to support CIVL 2790 Fluid Mechanics experiments including the following apparatuses: falling ball viscometer, Pascal’s apparatus, hydrostatic quadrant, losses in bends apparatus, Bernoulli’s apparatus, and impact of jet apparatus.

An orifice experiment apparatus for the hydraulic benches was also purchased in triplicate to be used for CIVL 3740 Hydraulics. In CIVL 3740, students conduct weir laboratories (sharp and broad-crested), as well as a gradually varied flow experiment using the newly constructed 25 m long acrylic gradually varied flow flume (Figure 2).

A lab section was added to CIVL 3750 Hydrology after the addition of three hydrology benches to the HRTF (Figure 3). These benches provide a hands-on approach to understanding precipitation/inflow water balances, rainfall hydrographs, infiltration, composite storms, and groundwater concepts related to pumping unconfined aquifers. The hydrology benches have the capability of demonstrating sediment transport fundamentals which will be utilized in the near future.

Beyond the formal experiments, informal lab tours are often conducted during tutorial periods to get prospective students into the lab and view various experiments, fluid behaviour and typical experimental equipment. Outreach programs involving students of all ages are also hosted in the HRTF to demonstrate basic fundamentals of engineering and water resources through games and interactive challenges. The lab stands to be a central focus of water resources engineering teaching and research in the province. Students gain valuable skills that can be applied to many other disciplines after conducting labs and research in the HRTF.

In addition to improvements with apparatuses for teaching, lab safety procedures have been improved and continue to be improved as changes to the lab occur. Work alone polices are in place and students are trained on instrumentation and safe work procedures both in and out of the lab.
Figure 1: Hydraulics benches (Armfield F-10), a) Bernoulli’s apparatus (F1-15), b) orifice discharge apparatus (F1-17A), c) Pascal’s apparatus (F1-31), d) hydrostatic pressure quadrant (F1-12), e) impact of a jet (F1-16).

Figure 2: Gradually varied flow flume, upstream (left) to downstream (right).
Figure 3: Hydrology Bench (Armfield MkII Advanced Hydrology Study System).
| Name of Task: Undergraduate Lab Work – CIVL 2790, CIVL 3740, CIVL 3750, CIVL 4470 |
|----------------------------------|----------------------------------|
| Position/Job: Lab work in the Hydraulic Research & Testing Facility (HRTF), E3-230 | Department/Area: Dept. of Civil Engineering (Water Resources) |
| **Hazards:** Physical: Slipping, tripping, drops, pinch/compression, electric shock | **Personal Protective Equipment or other required equipment or other safety considerations:** Safety glasses (on lower level of HRTF), hearing protection, squeegee for puddles, First Aid Kit, full shoe required (no open toe or sandals), eyewash station, location of MSDS, fire extinguisher |
| Biological: Reactions to other products in lab such as silicone, motor and mineral oils | **Education and training prerequisites:** Eye wash station location, fire extinguisher, MSDS, emergency phone for campus security (555 on university phones) (#555 on Rogers and Bell MTS cell phones) (204-474-9341 all other phones) explained and shown to students by U of M staff |
| Environmental: Silica sand, crowding (restricted personal space) | **Steps to be taken to complete task safely:** |

1. **General:**
   - The HRTF can be a busy work environment so it is imperative that all staff and students pay attention to avoid tripping and slipping hazards. If such hazards are apparent, notify the teaching assistant or technician immediately. Rubber floor squeegees are provided if the floor becomes wet during a demonstration.
   - All instruments in the lab are powered through GFCI outlets and are designed to protect against electrical shock. However, this does not include laptops and other larger personal electronics that students may have. Students are forbidden to bring such devices into the lab to avoid electric shock and damage to personal property. The Department will not replace damaged electronics that have been brought in against this rule.

2. **Hydraulics Benches:**
   - These benches recirculate water through apparatuses to demonstrate principles in fluid mechanics and hydraulics. Valves should be opened slowly to avoid spraying water on floor and others. If water does spray or leak onto the floor it should be squeegeed into the grates.
   - The bench wheels should be set to the lock position during the demonstration for stability.

3. **Hydrology Benches:**
   - These benches recirculate water through a sand table to demonstrate principles in hydrology. As with the hydraulics benches, valves should be opened slowly to avoid spraying water on floor and others.
   - Squeegee water into grates as required.
   - The benches contain silica sand that can be hazardous if small particles become airborne. To ensure that this does not happen, wet sand with recirculated water prior to modifying sand tables.
   - Avoid getting silica sand in eyes as it can irritate.
   - Report any deficiencies to the teaching assistant or lab technician.

4. **Flumes:**
   - There are several larger flumes that are used to demonstrate fundamentals of fluid mechanics and hydraulics.
   - The flows that can be generated range can be 3-200 L/s so care must be taken not to obstruct the flow or turn valves on too quickly as it can cause water to spill over the flume walls.
   - The pumps can be noisy so hearing protection should be worn as necessary.
   - The flumes themselves can spray water onto the floor so caution must be taken to avoid slipping.
   - Squeegees are provided to clear water from the floor into the grates.
   - Safety glasses are required on the lower level of the HRTF as construction of physical research models may occur as well as other tasks that can generate debris.

**Responsibilities, Completion and Review:**
Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries, illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who enter the premises.

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<tr>
<th>Completed by and Date:</th>
<th>Approved by:</th>
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<tr>
<td>A. Wall  18-Sept-18</td>
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<th>Last Reviewed / Revised by and Date:</th>
<th>Note: This task will be monitored periodically to ensure compliance and effectiveness</th>
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</table>
Appendix B4: W. R. McQuade Heavy Structures & IKO Construction Materials Testing Facility
This appendix shows for the W. R. McQuade Heavy Structures & IKO Construction Materials Testing Facility the safe work procedures for undergraduate students using it.
# Safe Work Procedure

**Name of Task:**
Civil Engineering Materials Lab Testing – CIVL 2770

**Position/Job:**
Indoor Undergrad Lab Work

**Department/Area:**
Dept. of Civil Engineering (Structures)

**Hazards:**
- Physical: Slipping, tripping, drops, pinch/compression, heavy lifting, potential for flying debris such as broken concrete
- Biological: Reactions to lab environment in lab such as dust
- Environmental: Crowding (restricted personal space)

**Personal Protective Equipment or other required equipment or other safety considerations:**
First Aid Kit, Full shoe required, safety eye wear available, eye wash and shower station

**Education and training prerequisites:**
Fire safety, location of safety equipment (PPE), location of first aid kits, location of eye wash and shower station, MSDS, notice of injury procedures, and emergency phone for campus security (555) will be shown to all students by U of M staff during Laboratory No. 1 (SAFETY ORIENTATION & REVIEW OF FACILITY INFRASTRUCTURE)

**Other Notes:**

## Steps to be taken to complete task(s) safely:

<table>
<thead>
<tr>
<th>1</th>
<th><strong>General:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• The lab may be crowded at times so care must be taken to watch for slipping or trip hazards. There is no running in the lab.</td>
<td></td>
</tr>
<tr>
<td>• Movement throughout the lab should be kept to a minimum to avoid trips, drops and possible injury</td>
<td></td>
</tr>
<tr>
<td>• Only those that are required to complete specific tasks related to the lab assignment should be moving throughout the lab</td>
<td></td>
</tr>
<tr>
<td>• Students and Teaching Assistants (TAs) should notify U of M staff in charge of the lab of any allergies or conditions that could be aggravated by lab conditions prior to entering the lab</td>
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<table>
<thead>
<tr>
<th>2</th>
<th><strong>Sieve Shaker:</strong></th>
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</thead>
<tbody>
<tr>
<td>• Do not operate sieve shaker without appropriate instruction and supervision from U of M staff or TAs</td>
<td></td>
</tr>
<tr>
<td>• Hearing protection is provided may be required due to noise of Shaker. Students may use their personal discretion as noise levels are tolerable</td>
<td></td>
</tr>
<tr>
<td>• Keep clear of apparatus when running, announce to others near sieve shaker when you are starting the motor</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th><strong>Concrete Mixer:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Operation of mobile concrete mixer shall be carried out by U of M staff and trained TAs</td>
<td></td>
</tr>
<tr>
<td>• If present in concrete lab at time of mixing, appropriate PPE is required at times (i.e. Hard hat, steel toed foot wear, safety eye wear, dust mask, vinyl coated or latex gloves)</td>
<td></td>
</tr>
<tr>
<td>• If volunteers make concrete cylinders etc. appropriate PPE provided (listed in previous bullet) is required</td>
<td></td>
</tr>
<tr>
<td>• All clean-up is to be carried out by U of M staff and TAs</td>
<td></td>
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</tbody>
</table>
**Hydraulic Testing Machines:**
- Operation of hydraulic testing machines shall be carried out by U of M staff and trained TAs.
- Appropriate PPE is required when instructed by U of M staff and trained TAs (i.e. safety eye wear, dust mask, vinyl coated or latex gloves).
- All clean-up is to be carried out by U of M staff and TAs.

### Responsibilities, Completion and Review:

Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who perform similar tasks.

<table>
<thead>
<tr>
<th>Completed by and Date:</th>
<th>Approved by:</th>
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<tbody>
<tr>
<td>C. Kiowak on Sept 26, 2018</td>
<td>Note: This task will be monitored periodically to ensure compliance and effectiveness</td>
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<tr>
<td>Note: This task will be monitored periodically to ensure compliance and effectiveness</td>
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# Safe Work Procedure

**Name of Task:**
Structural Analysis Bridge Testing – CIVL 3760

<table>
<thead>
<tr>
<th>Position/Job:</th>
<th>Department/Area:</th>
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</thead>
<tbody>
<tr>
<td>Indoor Undergrad Lab Work</td>
<td>Dept. of Civil Engineering (Structures)</td>
</tr>
</tbody>
</table>

**Hazards:**
- Physical: Drops, pinch/compression, heavy lifting, potential for flying debris such as popsicle sticks
- Biological: 
- Environmental: Testing typically conducted in EITC atrium

**Personal Protective Equipment or other required equipment or other safety considerations:**
First Aid Kit, Full shoe required, safety eye wear available

**Education and training prerequisites:**

**Steps to be taken to complete task(s) safely:**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td>• The atrium may be crowded at times so care must be taken to watch for slipping or trip hazards due to cables for AV equipment. There is no running in the atrium.</td>
</tr>
<tr>
<td>4. Pneumatic Testing Machine</td>
<td>• Operation of pneumatic testing machine shall be carried out by U of M staff and trained TAs</td>
</tr>
<tr>
<td></td>
<td>• Appropriate PPE is required when instructed by U of M staff and trained TAs (i.e. safety eye wear)</td>
</tr>
<tr>
<td></td>
<td>• All clean-up is to be carried out by U of M staff and TAs</td>
</tr>
</tbody>
</table>

**Responsibilities, Completion and Review:**

*Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who perform similar tasks.*

**Completed by and Date:**
C. Klowak on Sept 27, 2018

**Approved by:**

**Last Reviewed / Revised by and Date:**

**Note:** This task will be monitored periodically to ensure compliance and effectiveness
# Safe Work Procedure

## Name of Task:
Structural Analysis Bridge Testing – CIVL 3770

<table>
<thead>
<tr>
<th>Position/Job:</th>
<th>Department/Area:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor Undergrad Lab Work</td>
<td>Dept. of Civil Engineering (Structures)</td>
</tr>
</tbody>
</table>

## Hazards:
Physical: Slipping, tripping, burns, welders flash  
Biological: Reactions to lab environment such as dust  
Environmental: Crowding (restricted personal space), observe surroundings for other test set-ups located in the laboratory

## Personal Protective Equipment or other required equipment or other safety considerations:
First Aid Kit, Full shoe required, hard hat, safety eye wear available, welders gloves available, welding jacket available, welders mask(s) available

## Education and training prerequisites:
Fire safety, location of safety equipment (PPE), location of first aid kits, location of eye wash and shower station, MSDS, notice of injury procedures, and emergency phone for campus security (555) will be shown to all students by U of M staff prior to performing bolt testing and welding demonstrations

## Other Notes:

## Steps to be taken to complete task(s) safely:

### 1 General:
- The lab may be crowded at times so care must be taken to watch for slipping or trip hazards. There is no running in the lab.  
- Movement throughout the lab should be kept to a minimum to avoid trips, drops and possible injury  
- Only those that are required to complete specific tasks related to the lab assignment should be moving throughout the lab  
- Students and Teaching Assistants (TAs) should notify U of M staff in charge of the lab of any allergies or conditions that could be aggravated by lab conditions prior to entering the lab

### 2 Bolt Tester:
- Operation of bolt tester shall be carried out by U of M staff and trained TAs  
- Appropriate PPE is required when instructed by U of M staff and trained TAs (i.e. safety eye wear, welders gloves, welders jacket, welding mask(s))  
- All clean-up is to be carried out by U of M staff and TAs

### 3 Arc Welder:
- Operation of arc welder shall be carried out by U of M staff and trained TAs  
- Students are permitted to try welding under the direct supervision of U of M staff  
- Appropriate PPE is required when instructed by U of M staff and trained TAs (i.e. safety eye wear, welders gloves, welders jacket, welding mask(s))  
- All clean-up is to be carried out by U of M staff and TAs

## Responsibilities, Completion and Review:
Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who perform similar tasks.
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# Safe Work Procedure

## Name of Task:
Masonry Design & Construction Lab Testing – CIVL 4020

<table>
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<th>Position/Job:</th>
<th>Department/Area:</th>
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<tbody>
<tr>
<td>Indoor Undergrad Lab Work</td>
<td>Dept. of Civil Engineering (Structures)</td>
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</tbody>
</table>

## Hazards:
- **Physical**: Slipping, tripping, drops, pinch/compression, heavy lifting, potential for flying debris such as broken concrete masonry block
- **Biological**: Reactions to lab environment such as dust
- **Environmental**: Crowding (restricted personal space), observe surroundings for other test set-ups located in the laboratory

## Personal Protective Equipment or other required equipment or other safety considerations:
First Aid Kit, Steel toed shoe required, hard hat, safety eye wear available, eye wash and shower station

## Education and training prerequisites:
Fire safety, location of safety equipment (PPE), location of first aid kits, location of eye wash and shower station, MSDS, notice of injury procedures, and emergency phone for campus security (555) will be shown to all students by U of M staff prior to performing static destructive test

## Other Notes:

## Steps to be taken to complete task(s) safely:

<table>
<thead>
<tr>
<th></th>
<th>General:</th>
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</table>
| 1 | - The lab may be crowded at times so care must be taken to watch for slipping or trip hazards. There is no running in the lab.  
- Movement throughout the lab should be kept to a minimum to avoid trips, drops and possible injury  
- Only those that are required to complete specific tasks related to the lab assignment should be moving throughout the lab  
- Students and Teaching Assistants (TAs) should notify U of M staff in charge of the lab of any allergies or conditions that could be aggravated by lab conditions prior to entering the lab |

<table>
<thead>
<tr>
<th>4</th>
<th>Hydraulic Testing Machine:</th>
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</table>
|   | - Operation of hydraulic testing machine shall be carried out by U of M staff and trained TAs  
- Appropriate PPE is required as instructed by U of M staff and trained TAs (i.e. Hard hats, safety eye wear, safety foot wear)  
- All clean-up is to be carried out by U of M staff and TAs |

## Responsibilities, Completion and Review:
*Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who perform similar tasks.*

### Completed by and Date:
C. Klowak on Sept 27, 2018

### Approved by:

### Last Reviewed / Revised by and Date:
*Note: This task will be monitored periodically to ensure compliance and effectiveness*
# Safe Work Procedure

**Name of Task:**  
Properties & Design of Concrete Mixtures Lab Testing – CIVL 4022

<table>
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<tr>
<th>Position/Job:</th>
<th>Department/Area:</th>
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<tbody>
<tr>
<td>Indoor Undergrad Lab Work</td>
<td>Dept. of Civil Engineering (Structures)</td>
</tr>
</tbody>
</table>

**Hazards:**
- **Physical:** Slipping, tripping, drops, pinch/compression, heavy lifting, potential for flying debris such as broken concrete, punctures from steel or brass fibers
- **Biological:** Reactions to controlled products in lab such as GU cement, silica fume, fly ash, slag, fiber glass
- **Environmental:** Crowding (restricted personal space),

**Personal Protective Equipment or other required equipment or other safety considerations:**
- First Aid Kit, Full shoe required, safety eye wear available, hearing protection, eye wash and shower station

**Education and training prerequisites:**
- Fire safety, location of safety equipment (PPE), location of first aid kits, location of eye wash and shower station, MSDS, notice of injury procedures, and emergency phone for campus security (555) will be shown to all students by U of M staff during Laboratory No. 1 (SAFETY ORIENTATION & REVIEW OF FACILITY INFRASTRUCTURE)

**Other Notes:**

**Steps to be taken to complete task(s) safely:**

1. **General:**
   - The lab may be crowded at times so care must be taken to watch for slipping or trip hazards. There is no running in the lab.
   - Movement throughout the lab should be kept to a minimum to avoid trips, drops and possible injury
   - Only those that are required to complete specific tasks related to the lab assignment should be moving throughout the lab
   - Students and Teaching Assistants (TAs) should notify U of M staff in charge of the lab of any allergies or conditions that could be aggravated by lab conditions prior to entering the lab

2. **Concrete Mixer:**
   - Operation of mobile concrete mixer shall be carried out by U of M staff and trained TAs
   - Students are permitted to gain experience with the mixer under the supervision of U of M staff and trained TAs
   - If present in concrete lab at time of mixing, appropriate PPE is required at times (i.e. Hard hat, steel toed foot wear, safety eye wear, dust mask, vinyl coated or latex gloves)
   - When student groups fabricate concrete prisms etc. appropriate PPE provided (listed in previous bullet) is required
   - All clean-up is to be carried out by student groups under the supervision of U of M staff and trained TAs

**Bulk & Surface Resistivity Equipment:**
- Students are permitted to gain experience with the resistivity under the supervision of U of M staff and trained TAs
**Ultra Sonic Pulse & Forced Resonant Frequency (Sonomter):**
- Students are permitted to gain experience with the resistivity under the supervision of U of M staff and trained TAs

**Rapid Chloride Penetration Test (RCPT):**
- Operation of RCPT testing equipment shall be carried out by U of M staff and trained TAs and a brief demonstration and explanation will be carried out by U of M staff and trained TAs

**Mercury Intrusion Porosimetry (MIP):**
- Operation of MIP testing equipment shall be carried out by U of M staff and trained TAs and a brief demonstration and explanation will be carried out by U of M staff and trained TAs

4 **Hydraulic Testing Machines:**
- Operation of hydraulic testing machines shall be carried out by U of M staff and trained TAs
- Appropriate PPE is required when instructed by U of M staff and trained TAs (i.e. safety eye wear, dust mask, vinyl coated or latex gloves)
- All clean-up is to be carried out by U of M staff and TAs

### Responsibilities, Completion and Review:

Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who perform similar tasks.

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Appendix B5: Geotechnical Laboratory
This appendix shows for the Geotechnical Laboratory the safe work procedures for undergraduate students using it.
# Geomatics SWP 1.0

## Safe Work Procedure

<table>
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<tr>
<th>Name of Task:</th>
<th>Geomatics Field Labwork – CIVL2840</th>
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<tbody>
<tr>
<td>Position/Job :</td>
<td>Outdoor Undergrad Labwork</td>
</tr>
<tr>
<td>Department/Area:</td>
<td>Dept. of Civil Engineering</td>
</tr>
</tbody>
</table>

### Hazards:
- **Physical**: Slipping, tripping, drops, falls, prolonged standing
- **Biological**: Insect bites, poison ivy, plant irritation/reactions
- **Environmental**: Sun, wind, extreme and varying temperatures, rain, pedestrian and automobile traffic, uneven ground

### Personal Protective Equipment or other required equipment or other safety considerations:
- First Aid Kit, Full shoe required, eyewear available, safety vest, bug spray, sun protection, layered clothing

### Education and training prerequisites:
- Students are required to purchase a safety vest. Students will be educated about appropriate clothing. Students will complete a hazard assessment form before attending each outdoor lab.

### Steps to be taken to complete task safely:

1. **Physical**:
   - Care must be taken to watch for slipping or trip hazards. There is no running during the lab to avoid trips, drops, possible injury, and damage to UofM equipment.
   - Closed toe shoes are required to reduce possible injury and fatigue as well as provide good traction on wet or uneven ground.

2. **Biological**:
   - Students and staff should prior to arriving at the field lab notify UofM staff in charge of the lab of any allergies or conditions that could be aggravated by lab conditions.
   - Bug sprays and clothing that covers up skin will reduce bug bites.
   - Sun protection lotion or clothing will reduce sun exposure.

3. **Environmental**:
   - Persons attending this field lab should wear appropriate clothing according to the weather conditions to avoid over exposure to the elements. Weather conditions can change so layering of clothing is recommended.
   - Common concerns in this lab are cold and wet conditions affecting head feet and hands. Proper footwear, headwear and gloves or mitts should be used if necessary.
   - Persons are required to wear a safety vest when crossing traffic en route to and from the lab. All personnel must watch for oncoming traffic at all times. The safety vest must be worn for the duration of the lab as well.
   - Some of these labs are in close proximity of a river. Students must keep clear of the riverbanks as the banks can be unstable.
   - It is good practice to not only look out for your own safety but to also look out for the safety of others.

### Responsibilities, Completion and Review

Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who perform similar tasks.

Completed by and Date: K. Lynch on Sept. 04, 2018

Approved by:

Last Reviewed / Revised by and Date: Note: This task will be monitored periodically to ensure compliance and effectiveness
# Groundwater Hydrology Field Labwork _ CIVL4250

<table>
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<tr>
<th>Name of Task: Groundwater Hydrology Field Labwork _ CIVL4250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position/Job: Outdoor Undergrad Labwork</td>
</tr>
<tr>
<td>Department/Area: Dept. of Civil Engineering</td>
</tr>
</tbody>
</table>

## Hazards:
- **Physical**: Slipping, tripping, drops, falls, electrical shock
- **Biological**: Insect bites, plant irritation/reactions
- **Environmental**: Sun, wind, extreme and varying temperatures, rain, pedestrian and automobile traffic, uneven ground

## Personal Protective Equipment or other required equipment or other safety considerations:
- First Aid Kit, Closed toe shoe required, bug spray, sun protection, layered clothing

## Education and training prerequisites:
- Students will be educated on appropriate clothing

## Steps to be taken to complete task safely:

1. **Physical:**
   - Care must be taken to watch for slipping or trip hazards. There is no running during the lab to avoid trips, drops, possible injury, and damage to UofM equipment.
   - Closed toe shoes are required to reduce possible injury as well as provide good traction on wet or uneven ground.
   - Only approved staff or students are allowed to disconnect the wire leads which connect to the pump and only after the main power to the pump has been turned off.
   - Only UofM staff or approved TA’s shall control the power to the pump.

2. **Biological:**
   - Students and staff should prior to arriving at the field lab notify UofM staff in charge of the lab of any allergies or conditions that could be aggravated by lab conditions.
   - Bug sprays and clothing that covers up skin will reduce bug bites.
   - Sun protection lotion or clothing will reduce sun exposure.

3. **Environmental:**
   - Persons attending this field lab should wear appropriate clothing according to the weather conditions to avoid over exposure to the elements. Weather conditions can change so layering of clothing is recommended.
   - Common concerns in this lab are cold and wet conditions affecting head feet and hands. Proper footwear, headwear and gloves or mitts should be used if necessary.
   - All personnel must watch for oncoming traffic at all times on the way to and from the lab.
   - It is good practice to not only look out for your own safety but to also look out for the safety of others.

## Responsibilities, Completion and Review

*Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who perform similar tasks.*

Completed by and Date: K. Lynch on Sept. 04, 2018

Note: This task will be monitored periodically to ensure compliance and effectiveness

Approved by:

Last Reviewed / Revised by and Date:
# Name of Task:
Geotechnical Materials and Analysis Labwork – CIVL3730

<table>
<thead>
<tr>
<th>Position/Job</th>
<th>Department/Area</th>
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<tbody>
<tr>
<td>Indoor Undergrad Lab Work</td>
<td>Dept. of Civil Engineering (Geotechnical)</td>
</tr>
</tbody>
</table>

## Hazards:
**Physical:** Slipping, tripping, drops, pinch/compression, heavy lifting  
**Biological:** Latex allergies, reactions to other produces in lab such as silicone, hydraulic and mineral oils  
**Environmental:** 100 psi air lines are present, Silica sand, crowding (restricted personal space)

## Personal Protective Equipment or other required equipment or other safety considerations:
First Aid Kit, Full shoe required, eyewear available, Eye wash and shower station

## Education and training prerequisites:
Location of Safety Equipment, eye wash and shower station, msds, and emergency phone for campus security (555) will be shown to all students by UofM staff.

## Steps to be taken to complete task safely:

### 1. General:
- The lab may be crowded at times so care must be taken to watch for slipping or trip hazards. There is no running in the lab. Movement throughout the lab should be kept to a minimum to avoid trips, drops and possible injury. Only those that are required to complete specific tasks related to the lab assignment should be moving throughout the lab.  
- Students and staff should notify UofM staff in charge of the lab of any allergies or conditions that could be aggravated by lab conditions prior to entering the lab. (ie. Latex allergy)

### 2. Direct Shear:
- avoid getting silica sand in eye’s as it is quite abrasive  
- Silica sand should not be agitated in such a way to cause smaller particles to become airborne and possibly inhaled.  
- keep clear of apparatus when the vertical or horizontal motor is running. Announce to others near that device when you are starting the motors.

### 3. Oedometer/Compression:
- weights provided for this test must remain at their designated stations and not placed higher than the middle shelf of the device. All large weights (ie. 100 newtons) much be on lower shelf when not being used.  
- keep knees bent when placing or removing weights to avoid possibly injury  
- keep feet straddled on each side of the loading arm when placing or removing weights.  
- ensure that you have space or be mindful of others space when placing or removing weights to avoid a drop and possible injury.

### 4. Triaxial:
- Wear enclosed shoes with good traction (ie. Standard walking or running shoe)  
- Watch carefully when walking to avoid slips and falls.  
- clean up or have someone clean any water spills immediately and block off area if necessary.  
- be aware of all airline hose attached to the triaxial device so as not to dislodge or pinch them. A dislodged hose can ‘whip’ around and can cause eye or other injury.  
- Only one person at a time should be placing or removing items from the oven to avoid possible drops or burns.  
- use oven mitts for removing items from the oven and allow items to cool before handling or weighing.

## Responsibilities, Completion and Review
Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures). Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who perform similar tasks.
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<th>Completed by and Date:</th>
<th>Approved by:</th>
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<td>K. Lynch on Sept 05, 2018</td>
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<th>Note: This task will be monitored periodically to ensure compliance and effectiveness</th>
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**Name of Task:**
Groundwater Hydrology Labwork – CIVL4250

<table>
<thead>
<tr>
<th>Position/Job</th>
<th>Department/Area</th>
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<tbody>
<tr>
<td>Indoor Undergrad Lab Work</td>
<td>Dept. of Civil Engineering (Geotechnical)</td>
</tr>
</tbody>
</table>

**Hazards:**
- Physical: Slipping, tripping, drops, cuts, electrical shock
- Biological: Latex allergies, reactions to other produces in lab such as silicone, hydraulic and mineral oils
- Environmental: 100 psi air lines are present, crowding (restricted personal space)

**Personal Protective Equipment or other required equipment or other safety considerations:**
- First Aid Kit, Full shoe required, eyewear available, Eye wash and shower station, ‘Slippery’ labeled mop available

**Education and training prerequisites:**
- Location of Safety Equipment, eye wash and shower station, msds, and emergency phone for campus security (555) will be shown to all students by UoM staff.

**Steps to be taken to complete task safely:**

1. **General:**
   - The lab may be crowded at times so care must be taken to watch for slipping or trip hazards.
   - There is no running in the lab. Movement throughout the lab should be kept to a minimum to avoid trips, drops and possible injury. Only those that are required to complete specific tasks related to the lab assignment should be moving throughout the lab.
   - Students and staff should notify UoM staff in charge of the lab of any allergies or conditions that could be aggravated by lab conditions prior to entering the lab. (ie. Latex allergy)

2. **Permeability Test:**
   - Possibility of water spills is high so care should be taken to avoid slips, falls and drops.
   - Glassware is used so care must be taken to avoid drops or breakage. If glassware is broken then staff must be notified to clean the area before the labwork can be continued.
   - Although the submersible pumps are safe, person’s need to careful that no water comes in contact with the power receptacle when plugging or unplugging pumps.
   - Be aware of all airline hose attached to devices in the lab so as not to dislodge or pinch them. A dislodged hose can ‘whip’ around and can cause eye or other injury.
   - Clean up or have someone clean any water spills immediately and block off area if necessary.

**Responsibilities, Completion and Review**

- Management and workers to ensure all duties performed in accordance to training, established health and safety regulations/guidelines, policies and procedures (e.g. utilizing personal, protective equipment as per safe work procedures).
- Notify Manager or designates (i.e. supervisors) of all occurrences, injuries illnesses or safety and health concerns which are likely to harm themselves, co-workers, or any others who perform similar tasks.

**Completed by and Date:**
K. Lynch on Sept 05, 2018

**Approved by:**

**Last Reviewed / Revised by and Date:**
Note: This task will be monitored periodically to ensure compliance and effectiveness
Appendix B6: Civil Engineering/ Mechanical Engineering Computer Laboratory
This appendix shows for the Civil Engineering/ Mechanical Engineering Computer Laboratory the safe work procedures for undergraduate students using it.
Name of Task:

<table>
<thead>
<tr>
<th>Position/Job</th>
<th>Department/Area</th>
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</thead>
<tbody>
<tr>
<td>Undergrad Computer Lab Work</td>
<td>Dept. of Civil and Mechanical Engineering</td>
</tr>
</tbody>
</table>

Hazards:
- Physical: Slipping, tripping
- Biological: none
- Environmental: crowding (restricted personal space)

Personal Protective Equipment or other required equipment or other safety considerations:
- First Aid Kit

Education and training prerequisites:
- Location of Safety Equipment and emergency phone for campus security (555) will be shown to all students by UofM staff.

Lab Use Instructions
- **E2-365 and E2-368**

1. **Login information:**
   - You must be registered in a Civil or Mechanical undergraduate course to use this lab.
   - Previous users: your username and password will remain the same.
   - First-time users:
     - Your username is your UMNetID
     - Your password is your 7-digit student number.
   - On first login you will be required to change your password. Your UMNetID is generally the first part of your @myumanitoba.ca email address. If you need your password reset, see the **Support** section below.
   - **Note:** First-time logins accepted only in E2-368.

2. **Lab Hours:**
   - The lab is open 24 hours, 7 days a week, but building access may differ.
   - Computers will be locked out every Monday morning from 12:15 am to 4:30 am for weekly patching.

3. **Rules:**
   - All equipment and network access are governed by University of Manitoba policy. In addition, the following rules apply:
     - No food or drink in the lab
     - No moving of equipment
     - No unplugging of equipment
     - Access lab via swipe card – propping the door will sound an alarm
     - No gaming
   - Report all problems to **Support** (see below)

   **Warning:** Breach of the lab use rules may result in deactivation of your lab account and/or disruption of access to other Engineering resources. Such incidents will be reported to your Department Head or the Dean for review.

4. **Support:**
   - For support, please send an email to engitsup@umanitoba.ca. If you are needing a password reset, please send the request from your UofM email address. Other issues, please state the room number, machine number (if applicable), the time, and a brief description of the issue you are having.
**Printing:**
Printing must be done in E2-368. Charging and use information are located near the printer. To add money to your printing account, please follow the instructions in the Civil Engineering Office located in E1-368 Engineering.

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<tr>
<th>Completed by and Date: V. Sumaling/ T. Mazak on Oct 02, 2018</th>
<th>Approved by:</th>
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<tr>
<th>Last Reviewed / Revised by and Date:</th>
<th>Note: This task will be monitored periodically to ensure compliance and effectiveness</th>
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