



# LABORATORY SAFETY HANDBOOK

DEPARTMENT OF CIVIL ENGINEERING  
FACULTY OF ENGINEERING  
UNIVERSITI PUTRA MALAYSIA



## LAB RULES AND REGULATIONS

### A. GENERAL RULES

1. Laboratory class times are at 8.00 am - 1.00 pm and 2.00 pm - 5.00 pm (Monday–Thursday), 8.00 am – 12.15 pm and 2.45 pm – 5.00 pm (Friday).
2. Although you may be admitted into a laboratory you are NOT allowed to commence work unless authorized to do so by a supervisor/assistant engineer.
3. You **MUST wear a safety shoes and proper workshop attire** at all times in the laboratory areas. Soft contact lenses should not be worn in a laboratory where hazardous chemicals are in use.
4. Be aware of the safety equipment available, its location and method of use, i.e. fire extinguishers, fire blankets, safety shower, eyewash stands, telephone, chemical
5. Observe and obey all safety sign and warnings.
6. Familiarize yourself with the layout of the building and its fire escapes.
7. DO NOT **EAT, DRINK or SMOKE** in the laboratories and workshops.
8. Smoking is prohibited in the laboratory.
9. Keep your work space clean and tidy.
10. Use common sense and do not rush in the laboratory. Never be complacent about chemicals or chemical reactions.
11. Horseplay of any sort is absolutely prohibited in the laboratory.
12. Please fill Laboratory Safety Form and Risk Assessment Form before starting your lab.
13. Get MSDS for every chemical purchase.
14. Know the hazardous characteristics of the materials you will be using in your experiment (from MSDS).
15. Keep the sink clean. Do not throw any unwanted chemicals or hazardous waste down the drain.
16. The unwanted chemicals, chemicals waste or hazardous waste shall be stored in the chemical waste bottle/container. Refer to the assistant engineer of the laboratory.
17. Do not store any food in laboratories. Do not use food containers to store chemicals or laboratory samples.
18. Sleeping is prohibited in the laboratory.
19. No operating equipment will be left unattended or notify the staff if the experiment is to be continued or equipment is to be 'ON' after office hours. A status signboard must be displayed prominently near the experiment/equipment if it is still running.
20. Do not overload the trench cover.
21. Report all accident/spillages to the assistant engineer/supervisor.
22. Unauthorized persons are not allowed to enter the laboratory. If it happens, the safety is at your own risk.

## B. LABORATORY PROCEDURE

1. All students must inform the assistant engineer when they are about to commence work. No work can commence without permission from the laboratory assistant engineer.
2. No materials/equipment/laboratory property may be removed/stored from/in the laboratory without permission from the head of laboratory or assistant engineer.
3. Replace tools in their original place after use.
4. Concrete waste should be disposed off properly to appropriate container/bin.
5. Always ensure the laboratory is clean and tidy both during and after use.
6. Advice and assistance must be sought by student before operate machine which they are not familiar.
7. Alert with all safety signage in the laboratory.
8. Please always ensure all electrical tools are switch off before leaving the laboratory i.e. fan, etc.

## C. PERSONNAL PROTECTIVE EQUIPMENT (PPE)

1. PPE is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses.
2. Personal protective equipment may include items such as gloves, safety glasses and shoes, earplugs or muffs, hard hats, respirators, or coveralls, vests and full body suits.
3. Use the right PPE for the job.



Personnal Protective Equipment

#### **D. WHAT SHOULD YOU DO WITH LABORATORY'S TOOL**

1. Any damage to equipment or tools must be reported immediately to the laboratory assistant engineer.
2. No materials or equipment in the laboratory are to be used without permission from the laboratory assistant engineer.
3. Miscellaneous items i.e. hammer, spatula, spirit level, etc. can be signed out on the day of use and to be returned on the same day.



#### **E. SPECIFIC RULES AT RESPECTIVE LABORATORY**

##### **I. CONSTRUCTION MATERIALS & STRUCTURE LABORATORY**

###### **CONCRETE MIXING RULES**

1. All activities must only be carried out in laboratory between 8 am and 5pm.
2. Students are not allowed to work in the laboratory after office hours without the approval from the department. Students with approval to work after office hours will be held responsible for the overall safety and security of the laboratory.
3. All students must inform the laboratory assistant engineer when they are about to commence work. No work can commence without permission from the assistant engineer.
4. Approval for working space, casting and storage of test specimens should be obtained from the laboratory assistant engineer.
5. Only staff is allowed to operate the overhead crane.
6. No materials or equipment in the laboratory are to be used without permission from the laboratory assistant engineer. Miscellaneous items i.e. hammer, spatula, spirit level, etc. can be signed out on the day of use and to be returned on the same day.
7. New or potential student of the laboratory should obtain appropriate training from the assistant engineer before carrying out a task using machine i.e. concrete mixer, formwork preparation, etc. \*\*\* Advice and assistance must be sought by student before operate machine which they are not familiar.
8. Exercise extreme care when handling sharp-pointed or sharp-edged tools.
9. Concrete waste should be disposed off properly to appropriate container/bin. Please check with the laboratory assistant engineer on the waste disposal procedure. Students are to arrange for disposal of their tested specimens after their test as soon as possible.
10. Clean up the work area i.e. casting area, concrete mixer and all concreting tools after use. Replace tools in their original place after use.
11. All students must be aware of these general rules and other safety procedures i.e. safety shoes must be worn at all times at the laboratory, etc.

## **II. PUBLIC HEALTH LABORATORY**

1. Ensure that electrical equipment used, have in-date PAT stickers and appear to be in good working order. If in doubt consult an assistant engineer.
2. Ensure that hands are dry when handling electrical equipment and that all sources of moisture are kept away from plugs and sockets.
3. As a precaution against splashing, protective gloves, safety goggles, fastened lab coat are used when preparing reagents. Any spillages are cleaned up immediately with water. Pre-prepared dilute standards should be kept in properly labelled bottles indicating they are non-hazardous.
4. Wear nitrile gloves and lab coat while washing if there is any personal risk of skin sensitisation due to contact with acid. Remaining acid are flushed down into a sink with plenty of running water and the vials rinsed immediately to dilute out any remaining acid.
5. When using Total Organic Carbon machine, check the gas reading is at acceptable limit on the software after switch on the gas supplied.
6. Acid must be always added to water and not the other way around to avoid the expulsion of acid.
7. The fume cupboard needs to be checked prior to the experiment.
8. Any spills concentrate acid should be cleaned immediately with neutralising substance (i.e. sodium bicarbonate). Lab's assistant engineer must be informed.
9. Acid digestion test must be conducted in fume cupboard and within the office hour.
10. Laboratory user are prohibited from disposing any solvents, chemicals, chemical waste or hazardous waste down to any UPM's drain/sink.
11. The unwated solvents, chemicals, chemical waste or hazardous waste shall be put in the chemical waste bottle/container with properly labelled. Refer to the assistant engineer of the laboratory.
12. Avoid storing chemical wastes on the floor to reduce risk of spills.

## **III. HYDRAULICS LABORATORY**

1. Floor should be kept dry at all times.
2. Water on the floor must be swept away immediately
3. Water level inside the flume/water related equipment must not rise beyond the safe level.
4. Users to look out at all times in case water hose falls off or water overflows from flume/water related equipment.
5. All extension cords must be secured above ground level or avoid from in contact of water.

6. On-site safety rules

When working on site, everyone must observe site location safety rules especially with regards to:

- Traffic safety rules and regulations
- Weather – do not work when there is lightning, thunder or rain
- Wear safety gears when working outdoors e.g.: life jacket while working on boat
- Bring First-aid kit

**IV. GEOMECHANICS LABORATORY**

1. Students are advised to adhere to the following safety rules when working in the Geomechanics Laboratory and Workshop at all times.
2. Always observe all safety measures when operating any equipment, e.g. wearing of goggles, gloves, safety boots, ear plugs, etc.
3. Slippers, sandals and open-ended shoes are prohibited in the laboratory.
4. When operating moving or turning machines, students with long hair must tie them up.
5. It is very important to inform the lab's assistant engineer when using any high-risk equipment.
6. Keep the working space tidy and avoid having any loose or unwanted items lying around.
7. Students should never work alone or when no one is around. Always make sure that someone knows where or what you are doing in the laboratory/workshop.
8. If there are strong reasons for the students to carry out their projects after office hours, approval must be obtained from the supervisor and staff-in-charge (SIC).
9. Laboratory user are prohibited from disposing any solvents, chemicals, chemical waste or hazardous waste down to any UPM's drain/sink.
10. The unwated solvents, chemicals, chemical waste or hazardous waste shall be put in the chemical waste bottle/container with properly labelled. Refer to the assistant engineer of the laboratory.
11. Avoid storing chemical wastes on the floor to reduce risk of spills.
12. Special attention should be paid when using the following potentially dangerous facilities:
  - Rock sample cutting and preparation apparatus
  - High temperature ovens and furnace
  - Hydraulic & motorized sample extruders
  - Automatic compactors
  - Grinder & mixer
  - High air pressure systems
  - Rock testing equipment
  - Load reaction frame, 100 KN

## F. PENALTY OF LAB RULES VIOLATION

Students fail to abide to lab rules will be penalized according to the following procedures.

**First offence:** verbal warning from Head of Laboratory

**Second offence:** written warning from Head of Department

**Third offence:** Suspend from lab until further notice. Need to appeal by writing to Head of Department

## G. WORKING OUTSIDE OFFICE HOURS

1. No students are permitted to work outside office hours in the lab without the permission of the Supervisor, Department Safety Officer and Head of Department.
2. Please fill in all the necessary forms for working out of office hours and GET **APPROVAL FIRST BEFORE START DOING WORK.**
3. Students are no longer allowed to hold lab keys.
4. You are responsible for your own safety and please take extra precautions in lab.
5. If permission is given, you must not work alone unless accompanied by a member of staff/postgraduate student from Faculty of Engineering. The safety is at your own risk.
6. Fill in log book at lab for time in and out.

## H. ACCIDENTS

- I. **Report all accidents**, no matter how trivial, on the day of occurrence to a supervisor and assistant engineer.
- II. First Aid Kit is available in each laboratory. Familiarize yourself with the kit.
- III. Fire.
  - a) Familiarize yourself with the location of fire extinguishers/fire hydrants.
  - b) Personal safety is most important. If a person's clothing catches on fire, he/she needs help. Prevent him/her from running. If he/she is close enough, put him/her under the safety shower because it is more effective than a blanket. If not, make him/her lie down and smother the flames by rolling, wrapping with lab coats, blankets, towels, etc. Never turn a carbon dioxide extinguisher on a person.
  - c) If a fire breaks out, turn off all burners and remove solvents if time allows. There are carbon dioxide extinguishers in the laboratory and the positions and operation of these should be known. Point the extinguisher at the base of the flames. Very small fires can be put out with a damp towel by smothering. Only after the safety of all is assured should the matter of extinguishing the fire be considered.



- d) When the fire alarm sounds, leave the building immediately. Do not stop to collect personal belongings. Do not use the lifts. Shut doors behind you. Go to the assembly point and don't return to the building until you are told that it is safe for you to do so.

#### IV. Chemicals

- a) If corrosive chemicals are spilled on the clothing, immediate showering (with clothing on) is the best remedy. Safety showers are located in each laboratory. If chemicals are spilled on the skin, wash them off with large volumes of water.
- b) If corrosive chemicals are spilled on the desk, dilute them with a large volume of water and then neutralize with sodium bicarbonate if an acid, or dilute acetic acid if a base.
- c) For all chemicals, please refer to MSDS (Material Safety Data Sheets) for specific safety procedure of the particular chemicals.



#### I. CONTACT PERSONS

If you require advice, assistance or have a complaint concerning safety matters, first contact one or more of the following people: -

1. Your academic supervisor or research co-workers.
2. The Head of the Laboratory and Assistant Engineer in charge of that area.

Laboratory	Head of Laboratory	Assistant Engineer
Structural	Dr. Farah Nora Aznieta Abd Aziz 03-8946 4406	Mr. Mohammad Haffis Hamid 03-89471583/010-2633423 Mr. Muhammad Mustaqim Dali 03-89471583/012-7547410
Construction Materials	Dr. Noor Azline Mohd Nasir 03-8946 4402	Mr. Mohd Fairus Ismail 03-89446467/012-3534275
Public Health	Dr. Syazwani Idrus 03-8946 4400	Mr. Aminuddin Amdam 03-8946466/013-9577009
Hydraulic	Dr. Badronnisa Yusuf 03-8946 6374	Mr. Nik Muhd. Faiz Nik Yahaya 03-89471587/014-2226908
Geomechanics	Dr. Haslinda Nahazanan 03-8946 4465	Mr. Mohd Razali Abd Rahman 03-89471586/017-3829848
Geological Engineering	Dr. Zainuddin Md. Yusuff 03-8946 6385	Mr. Suhkeri Hadafi Abu Bakar 03-89471586/012-6462544
Highway	Prof. Dr. Ratnasamy Muniady 03-8946 6373	Mr. Azry Tamber 03-89471584/012-2345549
Traffic	Assoc.Prof.Dr. Hussain Hamid 03-8946 6375	
Geomatics	Assoc.Prof.Dr. Helmi Zulhaidi Mohd Shafri 03-8946 6453	Mr. Wan Zakaria Wan Yusof 03-89471585/012-9657476

Civil Engineering Design Lab	Assoc.Prof.Dr. Biswajeet Pradhan 03-8946 6383	
---------------------------------	--	--

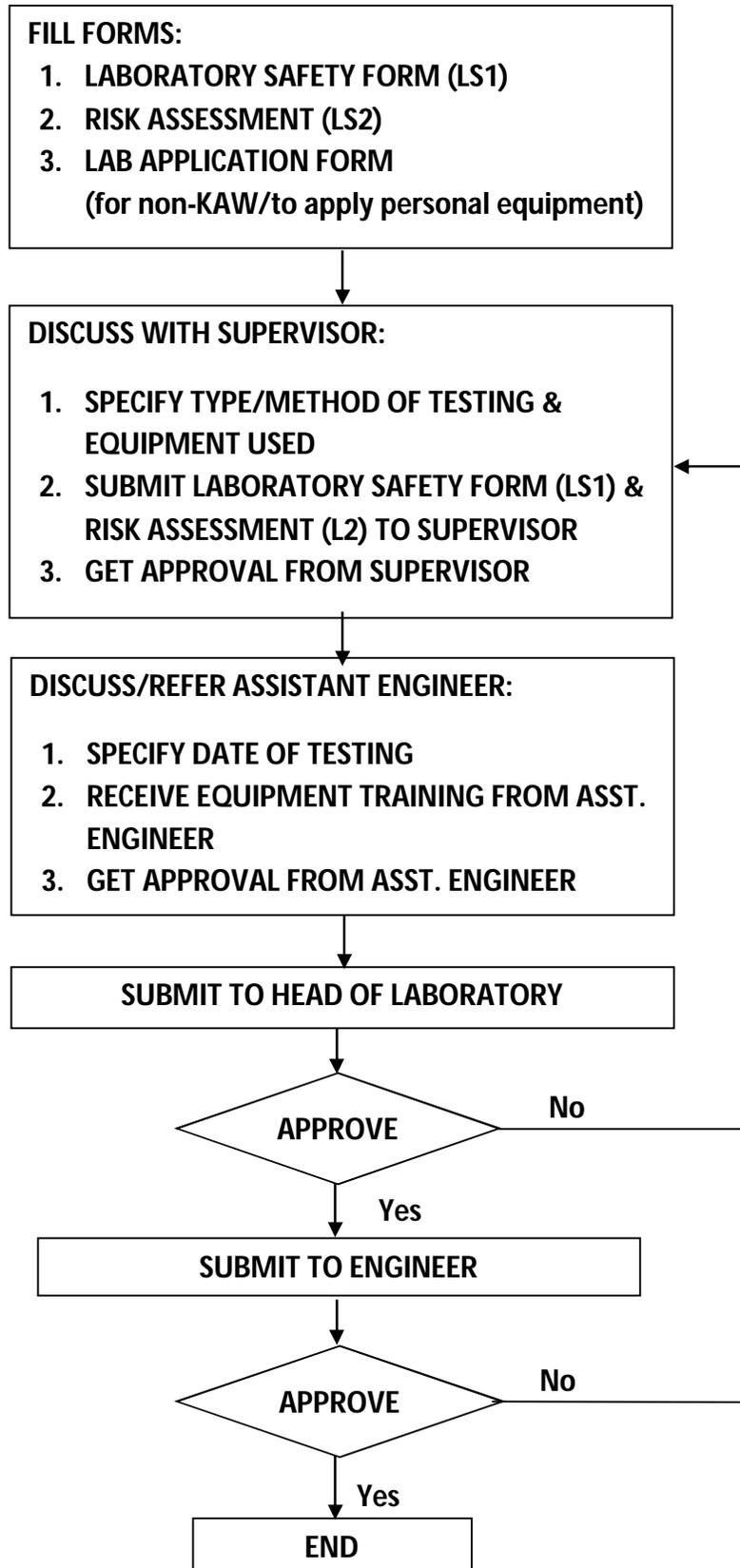
3. If you cannot reach any of the above or are not satisfied with their response then contact: -

- a) Engineer, Pn. Azzlia Mohd Unaini (03-8946 4444/012-6760160)
- b) Head of Department (03-8946 6377)

**Emergency Contact Number:**

UPM Security Control Centre (Pusat Kawalan Bahagian Keselamatan UPM )	03-89467990/03-89471999/ 03-89467470
Emergency Unit Universiti Health Centre (Unit Kecemasan Pusat Kesihatan Universiti)	03-89467332 / 7334
Serdang Hospital (Hospital Serdang)	03-89475200
Serdang Police Station (Balai Polis Serdang)	999 / 03-89482222
Seri Kembangan Fire Service (BOMBA Seri Kembangan)	999/ 03-89416281 / 03-89417635
Mr. Fahrul Asmady Yunus (Secretary of JKPP)	03-8946 6251/019-3656109

## PROCEDURE ON APPLICATION WORKING IN LABORATORY



## PROCEDURE ON WORKING OUTSIDE OFFICE HOURS

