University of Glasgow | School of Engineering

**Soils Labs**

**Rooms 501A and 502, Rankine Building**

# CODE OF PRACTICE

The adoption and practice of good safety procedures is of paramount importance for both the health and safety of fellow workers, and for the integrity of the fabric of the Soils Laboratories.

## 1. Lab Safety Management Responsibilities

1) **Everyone** has a role in protecting the health and safety of both other lab users and themselves, and thus should be familiar with the **School's Safety Manual**.
2) **Academic Supervisors** take full responsibility for the health and safety of the activities of their research students and research staff and for the activities of their MSc/MEng/BEng project students, and consequently must ensure their staff and students are familiar with the content of both this **Code of Practice** and the **School's Safety Manual** and apply the requirements of both these documents**.**
3) **Academic Staff** in charge of undergraduate laboratory classes are responsible for the health and safety of the activities within those classes, and consequently must ensure that GTAs and students are briefed on safety aspects relevant to the class and are familiar with the relevant contents of both this **Code of Practice** and the **School's Safety Manual** and apply the requirements of both these documents.
4) No research activities or MSc/MEng/BEng student project activities shall be carried out in the Soils Labs, Rooms 501A and 502, Rankine Building, without the prior permission of the **Lab Guardian**. The role of the Lab Guardian for the Soils Labs is specified in **Appendix A,** in accordance with the **School's Safety Manual**.
5) No research work or MSc/MEng/BEng student project work shall be carried out until a **Risk Assessment** has been conducted by the research staff member, research student or MSc/MEng/BEng project student, **approved by their Supervisor** and the **Director of Safety,** and acknowledged by the **Lab Guardian**.
6) An **electronic copy** of the approved Risk Assessment shall be sent to the Lab Guardian to be kept as record (note that this can be done using the online risk assessment system). A hard copy of the approved risk assessment shall be displayed next to the relevant equipment for inspection. The procedures for the preparation of a Risk Assessment are summarised in **Appendix B**.
7) **All lab users** should make themselves aware of the **general safety procedures** highlighted in the School's Safety Manual and of the location of safety equipment in the lab.

   These are:

   In case of emergency, dial telephone number: **4444 (internal), 0141 330 4444 (external)**

   **Emergency exits:**

   Located in the Soils Teaching Lab (501A).

**Fire extinguishers:**

(a) In the corridor (535) outside the main entry to the Soils Teaching Lab (501A): foam, $CO_2$ and fire blanket.

(b) Adjacent to the Emergency Exit in the Soils Teaching Lab (501A): $CO_2$.

**First Aid kit:**

In the Soils Teaching Lab (501A), above the chemical cupboard.

8) Work outside normal office hours (including weekend working) requires the permission of your supervisor. This can be given by an e-mail trail for audit purposes in the event of an accident and can be for multiple or extended periods of time. If permitted, the out-of-hours working book located in the foyer of the Rankine Building must be signed and the time recorded on arrival and the time of departure. Potentially dangerous operations (including heavy lifting, working with compressed air or high voltage power supplies (other than monitoring of ongoing experiments) or use of hazardous chemicals **must never** be undertaken out-with normal hours. During normal working hours, such activities should not normally be undertaken while alone in a laboratory.

## 2. Practice of General Activities

1) The experimental area must be **kept tidy and clean**. This is **NOT** the responsibility of the cleaners. Any spillages of water or soil should be cleaned up immediately. Good housekeeping must be maintained by the lab users and be monitored by the Academic Supervisors.

2) Personal belongings such as bags and coats should be stored outside the labs if possible, and if not they should be stored on the coat-hooks in the Soils Teaching Lab or under a bench, not left on the open floor. Books and paper in the labs should be kept to a minimum.

3) **Food and drink are not permitted in the lab.**

4) The sections of the floor leading to the fire exit and to other entry and exit routes from the labs must remain clear at all times. Under no circumstances should lab equipment be stored in the route from your place of work to the fire exit or to any other entry or exit route. If things are possibly impeding your exit then you should either move them, contact the person who placed them there, or inform both the Lab Guardian and your supervisor.

5) Access to switch boxes and valves must remain clear and must not be blocked by equipment.

6) Dedicated storage cupboards and areas must be used. Windowsills should not be used as storage areas.

7) **Laboratory doors should remain shut** at all times to ensure security and fire safety. The Soils Research Lab (Room 502) is a temperature-controlled room. The door to this room should be shut immediately after entry or exit and unnecessary entries and exits should be avoided.

8) Equipment must be placed in appropriate locations to safe-guard its integrity, minimise potential damage and to allow other researchers access to it.

9) Once experimental work has been completed and the experimental setup is no longer required, the **experimental area must be cleared** in preparation for other experiments and researchers.

10) If it is necessary to remove equipment from the lab, permission must be given by your supervisor and the Lab Guardian. If necessary, seek assistance with moving heavy items.

11) If equipment breaks down or is not working, report the fault to your supervisor immediately.

12) A fault with the fabric of the room, such as a lighting failure, should be reported through the Maintenance Request portal found on the Estates and Commercial Services webpage, http://www.gla.ac.uk/services/estates/.

13) In the event of an **accident or mishap**, inform appropriate individuals immediately and your supervisor as soon as possible. Complete a written accident report form and submit to your supervisor.

## 3. Covid-19 measures

1) Guidance from the HSE, UK Government and Scottish Government to manage the risk related to Covid-19 pandemic must be applied to the Soils Labs. These include physical distancing, frequent hand washing and hygiene measures, cough etiquettes and face covering in enclosed public spaces. Considerations for codes of practice and risk assessment for the James Watt School of Engineering can be found here (https://www.gla.ac.uk/media/Media_724009_smxx.pdf).

2) Physical distancing within the Soils Labs means a maximum capacity of (2) people working over the two labs (501A and 502), together with a maximum of (1) additional person from the Environmental Labs (531, 532 and 534) using the passageway section of the Soils Teaching Lab (501A) for access to the freezers.

3) Demand to use the lab will be managed by the Lab Guardian in collaboration with the School's Safety Coordinator. Collaboration will be required between lab users, supervisors and the Lab Guardian to establish a rota where necessary. Impact on the overall capacity of the Rankine Building will be reviewed by the Technical Services Manager.

4) Lab users must wash their hands regularly and wipe workstation surfaces, materials, and equipment at the start of their work and before leaving.

5) Emergency support (First Aiders and Fire Area Officer) might be constrained due to Covid-19 restrictions on building capacity. Task risk assessments need to be reviewed to include the above measures and to review with personnel through the risk assessment, which work can be safely undertaken with reduced access to emergency support. A Covid-19 risk assessment template can be found here (https://www.gla.ac.uk/media/Media_723618_smxx.docx).

6) Staff and students working in the Environmental Labs (531, 532 and 534) will require access to the freezers in the Soil Teaching Lab (501A). Access to the freezers will be restricted to three 30 minute periods each day. No more than 1 person from the Environmental Labs should be in Room 501A at any given time. Lab users working in the Soils Labs should not use the passageway section of 501A as a work area and should keep clear of this area other than when entering and exiting the labs. Users of the Soils Labs and the Environmental Labs should be vigilant when passing through the passageway section of 501A to maintain the required physical distancing with other lab users.

## 4. Practice of Hazardous Activities

1) All **electrical equipment** should be PAT tested and used in a safe an appropriate fashion. **Electrical connections** between different devices or equipment should be safe. If in doubt, contact the Electronics Technical Support Team and inform your supervisor

2) To minimise **trip hazards**, extension cables should be plugged into the closest socket and avoid crossing pathways. If crossing a pathway is totally unavoidable then, only as a temporary measure, the cable must be secured to the floor and covered with a suitable (commercially supplied) floor cable cover, cable protector, floor cable tidy to prevent tripping hazards.

   i. Once equipment is not in use, it must be turned off and any extension cables used should be tidied to a suitable location.

   ii. Leads and plugs should ONLY be used on the allocated item of equipment and should NOT be switched between equipment.

   iii. All equipment plugged into university outlets must be PAT tested (contact the Electronics Technical Support Team for testing).

3) Tubing and connectors on **pressurized water lines** should be appropriately designed and used. Check regularly for leaks. Layout of equipment should avoid risks of any water leaks coming into contact with electrical equipment. Any water leaks or spillages should be cleaned up immediately.

4) Appropriate precautions must be used when using the **compressed air line** (supplied from a central compressor) to provide a pressure source. Bear in mind that there is a large amount of energy stored per unit volume of a high pressure gas, whereas this is not true for a high pressure liquid. Significant volumes of compressed air should therefore be avoided and pressure supplies to equipment should use a thick rubber ‘balloon’ based air-water interface, which shuts off the compressed air supply in the event of a pressure leak, to convert air pressure to water pressure. If this is not possible, equipment and procedures should be appropriately designed and explicit permission should be obtained from your supervisor and the Lab Guardian. Ensure that no equipment is employed in a situation where it could be intentionally or unintentionally subjected to a pressure higher than its pressure rating. Ensure that equipment is isolated from the compressed air line and vented before removing any connection or attempting to dismantle the equipment. Avoid directing any compressed air line towards yourself or another individual, even if the compressed air is switched off. Contact a member of the Mechanical Technical Support Team if there is any problem with the compressed air line, such as low pressure, pressure fluctuations or moisture in the line.

5) If a **compressed air cylinder** is used to provide a pressure source, the same requirements apply as when using the compressed air line. The compressed air cylinder should be secured to prevent falling.

6) **Gas cylinders** other than compressed air are not allowed in the Soils Labs without specific permission from your supervisor and the Lab Guardian. A risk assessment will be required.

7) When using the computer-controlled equipment in the Soils Research Lab (501A), set appropriate **Alarm triggers** in the control software to avoid equipment being over-ranged.

8) Take care when lifting and stacking **weights** on any equipment employing a dead-weight system of load application (such as the oedometers). Do not exceed the load capacity of the equipment. Stack weights in a stable arrangement. This means avoiding placing weights of larger size above substantial numbers of weights of smaller size on the load hanger (this may mean removing smaller weights to add a larger one, and may require a procedure to be devised to ensure that the soil sample is not unloaded and reloaded in the process). It also means that the orientation of slots in the weights should be alternated, to avoid the risk of a stack of weights falling off the hanger.

9) Use the **ovens** with care. They will normally be set at a temperature of 105-110℃, but be aware that they can go to higher temperatures. Place samples in an oven in an appropriate container, which is marked with a number or other mark. When removing a sample from an oven, check carefully to ensure that you are not removing a sample belonging to someone else by mistake. Samples left unclaimed in an oven for excessive lengths of time will be thrown away.

10) Use **hotplates** with care. Be aware that a hotplate that is switched off may still be hot from previous use. Do not leave anything on a hotplate unattended, and be careful to avoid boiling anything dry on a hotplate. Switch off the hotplate as soon as you have finished with it.

11) The **refrigerator** in the Soils Teaching Lab (501A) is for general use for soil samples, etc. Do not place anything hazardous in the refrigerator. No food or drink is to be stored in the refrigerator. Ensure that anything that you place in the refrigerator is labelled with your name. Items without labels will be thrown away if they are left for excessive periods of time.

12) The large **freezers** in the Soils Teaching Lab (501A) are associated with the Environmental Engineering Labs and are not for general use. Anyone wishing to use a freezer should speak to the Lab Guardian of the Environmental Engineering Labs.

13) The **chemical cupboard** (coloured yellow) in the Soils Teaching Lab (501A) is not for general access. Use of any items from the chemical cupboard requires permission from Linda Pollock (or the Lab Guardian), and either a risk assessment form should be prepared or an existing one should be signed. The appropriate risk assessment documentation should then be read before using any chemical. A specific risk assessment about the use of any chemicals taking into account their COSHH documentation should be used (or prepared if one is not already available).

14) Fire hazards:

    i. Any **flammable materials** (gases, liquid and solids) should be stored and handled in accordance to the School's Safety Manual and relevant SEPS guidelines.

    ii. Any equipment or experimental rigs using flammable materials should be certified and have adequate measures for preventing fire hazards.

15) If you are unsure how to correctly use an item of equipment, seek assistance from your supervisor, the Lab Guardian or an appropriate member of technical staff.

## Appendix A duties of the Lab Guardian of the Soils Labs (Rankine 501A and 502)

According to the School's Safety Manual, the **Lab Guardian is responsible for implementing safety policies in the Soils Labs on a day-day basis**.

1. The specific duties of the Lab Guardian are:
    1) to maintain the Code of Practice (CoP);
    2) to ensure, through liaison with academic supervisors, that lab users keep their area tidy and clean;
    3) to ensure each activity (experimental rig/equipment) has a Risk Assessment before work commences;
    4) to coordinate actions according to reports or instructions from the School's Director of Safety following inspections.
2. The appointment of the Lab Guardian
    1) The Head of the I&E Research Division, in consultation with the academics supervising activities in the labs, appoints the Lab Guardian of the Soils Labs.
    2) The Lab Guardian of the Soils Labs reports to the Head of the I&E Research Division.
3. The current Lab Guardian is:

    Prof. Simon Wheeler

    Room 732 Rankine Building

    Simon.Wheeler@glasgow.ac.uk

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## Appendix B: Procedures of the preparation of a Risk Assessment

1. PDRAs and PG/UG students are responsible for formulating Risk Assessments on a day-day basis. For potentially hazardous activities, in addition to assessing the risks, the risk assessment form should include a standard operating procedure/method statement (and/or instrument manual) as an appended document.

2. Whilst the preference is for the persons undertaking the practical work to make their own risk assessments, it is permissible to use the on-line multi-user risk assessment forms for activities that will be undertaken by groups of people. However, in this case, each person involved in the practical work must sign the multi-user form online and a strict regime of user training should be in place that encompasses both the risks associated with the work as well as the practicalities of undertaking it.

3. Academic supervisors should assist the PDRAs and PG/UG students in preparing the risk assessment (this would typically be the case for less experienced PDRAs and PG/UG students). They should **ensure** foreseeable risks have been identified and adequate mitigation measures have been provided to reduce them as far as possible.

4. The academic supervisors should then approve the risk assessment form online (or ask for further information to be added); the Lab Guardian should also acknowledge (on-line) that the risk assessment has been completed, to indicate that as far as they can see, this activity does not conflict (in safety terms) with other activities in the lab. The Lab Guardian can also ask for further clarifications/additions concerning the procedures involved to be made, if necessary.

5. After the risk assessment has been approved/acknowledged by the supervisor and Lab Guardian, the School's Director of Safety approves, seeks further clarifications, or (exceptionally) rejects the risk assessment if there are clearly hazards that cannot be sufficiently mitigated.

6. An e-copy of the **approved** Risk Assessment should be sent to the Lab Guardian by the PDRA or PG/UG student that originated the assessment (n.b. pdf's of the online form can be made by using the Print to PDF option available in most browsers)

7. A hard copy of the approved Risk Assessment and standard operating procedure should be kept or displayed next to the relevant experimental rig or equipment.

8. The Lab Guardian approves the start of activity after receiving the **approved** Risk Assessment.

9. If there is any substantial change to the people or research activity as stated in the Risk Assessment, it MUST be revised accordingly, and pass procedures 1-7 as above.