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Materials Testing Lab

Rooms 224, 225 & 201b Rankine Building

Lab Responsible Person: Dr Philip Harrison

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 Materials Testing Laboratory.

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 their own group's research activities, and consequently must ensure their staff and students are familiar with both the content of this **Code of Practice** and the **School's Safety Manual** and apply its requirements**.**
3) No research activities shall be carried out in the Materials Testing Lab, Room 224 Rankine Building, without the prior permission of the **Lab Responsible Person**. The role of the Lab Responsible Person for the Materials Testing Lab is specified in **Appendix A,** in accordance with the **School's Safety Manual**.
4) No work shall be carried out until a **Risk Assessment** has been conducted by the research staff/students, **approved by their Supervisor** and the **Director of Safety,** and acknowledged by the **Lab Responsible Person**.
5) An **electronic copy** of the approved Risk Assessment shall be sent to the Lab Responsible Person 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 research rig and equipment for inspection. The procedures of the preparation of Risk Assessment are summarised in **Appendix B**.
6) **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)**

   Be aware of the location of emergency exits (through the main lab door)

   Be aware of the location of fire extinguishers (One is immediately outside the lab entrance, on the right-hand side as you face the lab door. Another is in R224 near the ovens at the door beside the hazardous materials yellow cabinet).

Be aware of the location of First Aid kits (next to the sink in the lab)

Hand washing Facilities: Located inside labs (Rm 225 and Rm 201b) and in area outside Rm 225 (see Figure 1)

7) 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 **must never** be undertaken out-with normal hours **unless a second responsible person is present**. (Please read the safety regulations in the School's Safety Manual for more details.)
8) No research equipment should be used unless prior training and user certification has been approved by the Lab Responsible Person (Dr Philip Harrison)

Practice of General Activities

1) The experimental area must be **kept tidy and clean**. This is **NOT** the responsibility of the cleaners. Good housekeeping must be maintained by the lab users and be monitored by the responsible person of each area (see Appendix C).
2) **Food and drink are not permitted in the lab.**
3) The **walkways** and **marked out** sections of the floor leading to the fire exit must remain clear. Under no circumstances should lab equipment be stored in the route from your place of work to the fire 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 Responsible person and your supervisor.
4) Do not place equipment anywhere that will block access to other locations.
5) Dedicated storage cupboards and areas must be used.
6) **Laboratory doors should remain shut** at all times to ensure security and fire safety.
7) Equipment must be placed in appropriate locations to safe-guard its integrity, minimise potential damage and to allow other researchers access to it. Never place equipment on a floor where others may walk around, always place it on a platform.
8) 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.
9) If it is necessary to remove equipment from the lab, permission must be given by your supervisor and the Lab Responsible person. If necessary, seek assistance with moving heavy items.
10) If equipment breaks down or is not working, report the fault to your supervisor and the responsible person (see Appendix D) immediately.
11) 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/.

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General Lab Conditions

1) **Electrical connections** between different devices or equipment should be safe. If in doubt, speak with technicians in the Electrical Workshop (Rankine R712a).
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. However, leads crossing pathways at the top or bottom of stairways is not allowed, even as a temporary measure – they should be routed at least 2 m (i.e. two paces) away from these areas.
    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 electrical workshop for testing).
3) To minimise the risk of **falling objects**, no equipment or lab materials should be kept on top of cupboards and file cabinets.
4) Fire hazards:
    i. All **flammable materials** (gases, liquid and solids) should be stored and handled in accordance to the School's Safety Manual and relevant SEPS guidelines.
    ii. All equipment or experimental rigs using flammable materials should be certified and have adequate measures for preventing fire hazards.
    iii. All users of flammable gases should be trained.
5) Explosion hazards when using compresses gases:
    i. All gas cylinders should be secured to prevent falling.
    ii. All pressure vessels should be certified by a professional manufacturer.
    iii. All pressure vessels should have measures to preventing over-charging, such as relief valves.
    iv. You should seek support from technicians when moving gas cylinders.
    v. All users of compressed gases should be trained.
6) If you are unsure how to correctly use an item of equipment, seek assistance from an appropriate responsible person(s) (see Appendix D).

Biological / tissue work

1) If you are doing experiments in biomedical related areas then you will need to have appropriate training before starting this work.

2) All waste products must be placed in Biological Waste containers which are taken to Life Sciences periodically for safe destruction.

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 Materials Testing Lab. These include physical distancing, frequent hand washing and hygiene measures, cough etiquettes and face covering in enclosed public space. Considerations for codes of practice and risk assessment for the James Watt School of Engineering can be found here (https://www.gla.ac.uk/schools/engineering/informationforstaff/safety/)
2) Physical distancing within the Materials Testing Lab means a **maximum capacity of 2 people** working at any given time **in Rm 224 and the two adjacent rooms** (see Storage Room and Room 1 in Figure 1). If more than one person is in the lab, there should be strict protocol to limit movement within the labs and communication between lab users, as well as cleaning of common contact surfaces (e.g. door handles/push plates).
3) Lab users must **wash hands** regularly.
4) Physical distancing should be the primary safety measure. However, when safe distance cannot be respected (i.e. 2 people carrying load), **facemasks** should be worn.
5) Demand to use the lab will be managed by the MMRG online booking system (https://www.materials-glasgow.org/lab-portal.html - user account required, contact Chris Triantafyllou, c.triantafyllou.1@research.gla.ac.uk to create an account). Contact the Lab Guardian (Dr Philip Harrison, Philip.harrison@glasgow.ac.uk) or the Safety Coordinator if you have other questions. Impact on the overall capacity of the Rankine building will be reviewed by the Technical Services Manager.
6) Lab users must **wash their hands** regularly and **wipe workstation surfaces, materials, and equipment** at the start of their work and before leaving.
7) Emergency support (First Aiders and Fire Area Officer) might be constrained due to Covid-19 restriction 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).

Requirements & Responsible Persons for Specific Lab Equipment

This section gives details on equipment specific requirements, please discuss with Dr Philip Harrison before using any of this equipment, also, check the materials group website lab portal (https://www.materials-glasgow.org/lab-portal.html). If the piece of equipment is on the booking system, you will need to book time to use it. A user account is required – contact Lab Manager Chris Triantafyllou, c.triantafyllou.1@research.gla.ac.uk to create an account or fill out the form at https://www.materials-glasgow.org/lab-access.html. Items not on the system do not require specific equipment booking. Please ensure you have undergone any relevant training and assessment prior to using a given piece of equipment (check the materials group website).

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Mechanical Testing Equipment in Rm 225

Zwick 250K (250kN)
Zwick 2K (2kN)

- Safety glasses should be used when using mechanical test machines.
- Care should be taken not to place hands etc. in the path of the machine while it is turned on. Remember the machine can move unexpectedly. Be aware of the location of the Emergency Stop Button.
- Students are asked to read the machine manuals carefully before use and undertake appropriate training before operating for the first time.
- Please check the Zwick Youtube channel for appropriate training videos: https://www.youtube.com/user/ZwickRoellTV/playlists

Ovens

- When using the ovens, ensure that the relevant personal protective equipment (PPE) is worn. This is detailed in the Risk Assessment documents associated with the ovens. The PPE is provided in the lab. Eye protection, face protection, foot protection and heat resistant gloves are required.
- Never handle hot materials – furnace tongs should be used. Hold them away from yourself and others.
- Note that there are smoke detectors in the lab, if these are activated by a cloud of smoke existing the oven when the door is opened the whole Rankine building will be evacuated. When the oven is in use, always use the portable air extractor positioned near the furnaces to extract particles/fumes when the furnace door is opened.

Students are asked to read the oven manuals carefully before use and undertake appropriate training before operating for the first time.

Digital Image Correlation Software & Equipment

- Training videos are available on the company website: https://www.correlatedsolutions.com/ go to Support and follow the relevant links.

Structural Light Scanner (formerly known as DAVID SLS, now HP SLS)

- The HP website for the SLS is here: https://support.hp.com/us-en/product/hp-3d-structured-light-scanner/14169438/manuals
- User old user instructions (including Safety Instructions) are available here: https://www.dropbox.com/s/xg1t17x9nbavvo9/DAVID%20SLS%203%20User%20Guide.pdf?dl=0
- Please familiarise yourself with these instructions prior to using the equipment.

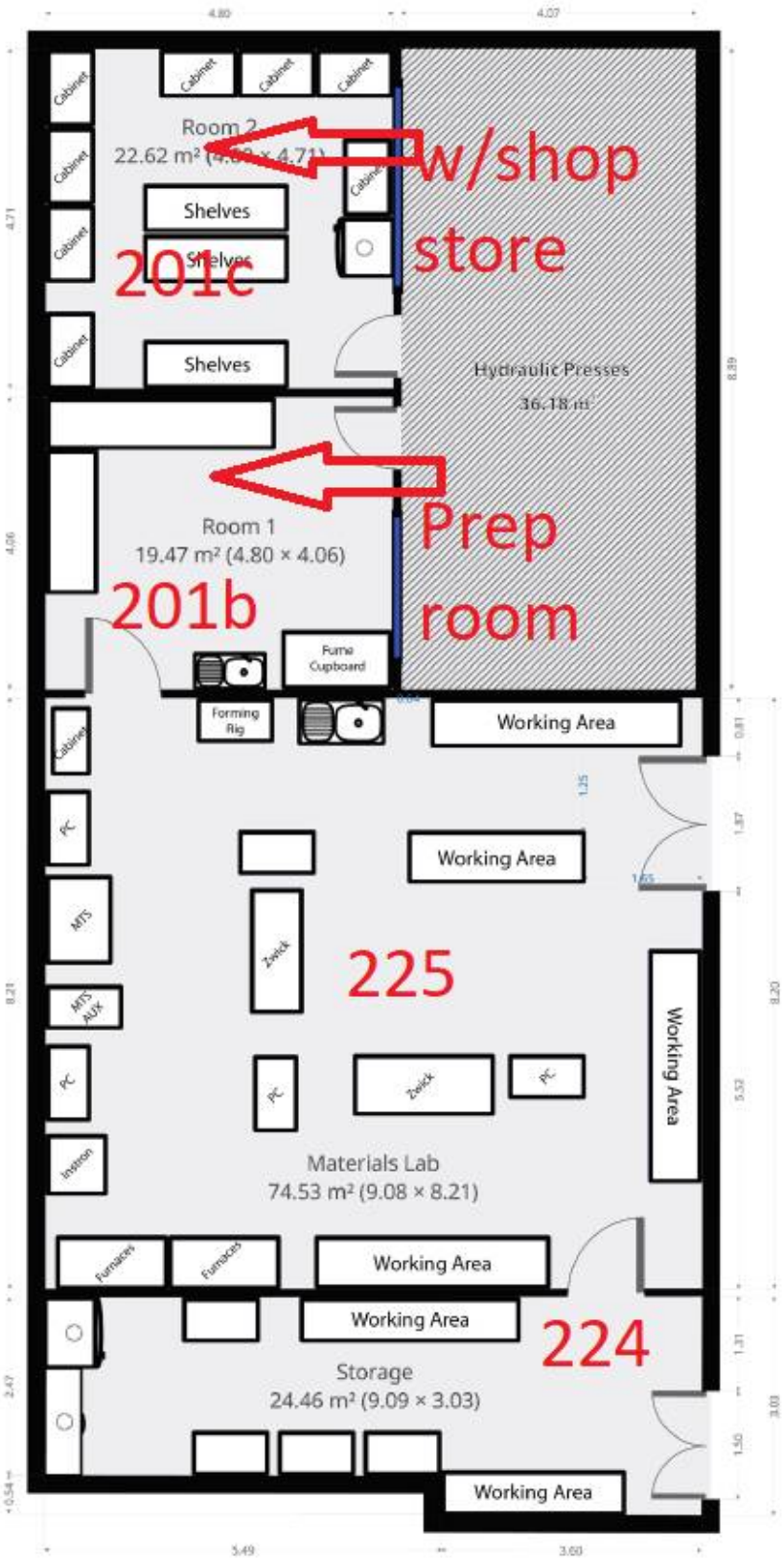

Figure 1. Rankine Lab plan drawing.

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Appendix A: Duties of the Lab Responsible of Materials Testing Lab (Rankine 224, 225, 201b)

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

1. Considering the particularity of Material Testing Lab, the specific duties of its Lab Responsible is listed as below:

    1) to maintain the Code of Practice (CoP);
    2) to ensure the lab users keep their area in tidy and clean condition;
    3) to ensure each activity (experimental rig/equipment) has a Risk Assessment before work commences;
    4) to coordinate actions according to the School's Director of Safety's report / instructions following inspections;

2. **The appointment of the Lab Responsible**

    1) The Head of SPE Research Division, in consultation with the academics of the lab, appoints the Lab Responsible of Material Testing Lab (currently Dr Philip Harrison).
    2) The Lab Responsible of Material Testing Lab reports to the Head of SPE Research Division.

Appendix B: Procedures of the preparation of the 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 Responsible 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 Responsible 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 Responsible/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 Responsible 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 Responsible 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.