



**RHODES UNIVERSITY**  
*Where leaders learn*

Rhodes University

# Laboratory and field safety - Geology Department

Rhodes University

Rhodes  
Feb 2017

## Contents

Laboratory and fieldwork safety in the geology department.....	1
Laboratory Safety.....	1
Fire Safety .....	2
Safety during field work.....	3
Safe use of chemicals.....	4
Response to a chemical spill .....	5
Response to an acid/base spill.....	5
Response to a gas leak.....	6
Disposal of chemicals.....	6
Storage of dangerous and flammable chemicals.....	6
Accident reporting .....	6
Accident involving a student.....	6
Accident involving a staff member .....	6
Use of departmental facilities.....	7
Department equipment .....	7
Departmental Vehicles.....	7
Workshop equipment .....	7
Crushing Room 5.....	8

## Laboratory and fieldwork safety in the geology department

### Laboratory Safety

- Closed shoes must be worn in the laboratories and crusher room at all times.
- Wear a lab coat when working in the geochem lab along with Safety glasses, latex gloves and dust masks where necessary, according to MSDS guidelines of chemicals used.
- Wear eye protection, safety glasses, dust mask and a lab coat when cutting rocks with the diamond saw.
- Laboratory coats must be laundered (washed) regularly.
- Protective gloves must be used when handling liquid nitrogen.
- The wearing of large objects around the neck in the labs is a potential hazard, e.g. flash drives and keys dangling from a cord can get caught up in equipment and cause an accident or become contaminated with hazardous chemicals.
- Always wash hands when leaving the lab or crushing room before eating and after handling rocks and hazardous materials/chemicals.

- Eating and drinking is not allowed in the geochem lab, weighing room and crushing room. No containers of food or drink must be brought into these areas where hazardous materials are kept and dust is created.
- When crushing rock always put the air extraction system on.
- The building is a no-smoking zone.
- Fingers should not be inserted into the mouth or eyes when working with chemicals or hazardous materials.
- Broken glass must be cleaned up immediately and disposed of in the correct container.
- Bunsen burners should be used with care and switched off when not in use. Do not leave a Bunsen burner unattended.
- The furnaces must be handled with care using heat resistant gloves and must be switched off when not in use. The chief technical officer must also be informed when the furnaces are in use, especially when left on overnight.
- In the event of a chemical splash the eyes must be washed out very well with distilled water (in crusher room) or with an eyewash product (in geochem lab).
- In the event of an extensive chemical splash onto clothes and body the clothing must be removed immediately and the affected areas washed down well with water.
- All containers used to store chemicals must be clearly labelled.
- The surface of the workbenches should be kept clean and any spills must be cleaned up immediately. Paper towel is provided.
- Flammable substances like ether, chloroform and acetone must be kept away from an open flame and heat.
- Lab equipment may only be used if adequate training has been received by the operator.
- Lab equipment may only be repaired by persons who are qualified and authorised to do so. All faulty equipment must be reported to the chief technical officer.
- Electrical faults must be reported to the chief technical officer.
- Establish the location of the fire extinguishers closest to the lab/room you are using.
- Spills of water and liquid on lab and passage floors must be mopped up immediately and marked with a notice which can be obtained from a cleaner.
- First Aid kits are kept with the chief technical officer on the ground floor.
- Make sure to read the MSDS sheets beforehand for the chemicals you will be using.
- Solvent waste must be disposed of correctly in the proper container. Ask the Chief Technical officer for one and for the proper procedure for disposal.

### Fire Safety

- All fire escapes and passages must be kept clean of objects that may form an obstacle to easy evacuation during a fire. This includes rock samples.
- No large objects may be placed in front of fire extinguishers.

- It is an offense to remove a fire extinguisher from its designated position until when done to extinguish a fire. It is also an offense to use a fire hose for a purpose other than to extinguish a fire.
- Used fire extinguishers must be reported to the chief technical officer immediately.
- Do not use water to extinguish an electrical fire.
- Heaters should not be left on in offices after hours or unattended.
- Be sure to familiarise yourself with the fire evacuation instructions and directions posted on the walls on each floor.

### Safety during field work

- Before proceeding into the field make sure someone knows where you are going, when you are leaving and when you plan to return.
- Take a fully charged cell phone with you, ensure that someone in the dept. has this number even if there may not always be reception where you are.
- If possible, try not to proceed into the field alone, especially females. Rather take someone with you.
- When in the field do not wear expensive looking jewellery and keep cell phones and wallets hidden.
- Do not leave possessions in view in the dept. vehicles. Try to carry all valuables with you out of sight or hide them in the vehicle.
- Do not pick up hitchhikers, vehicle insurance does not cover this, apart from the safety aspect.
- Make a point of stepping onto large rocks rather than over them in case a snake is lying underneath the rock.
- Carry enough drinking water with you when in the field along with sunscreen and a sunhat to prevent sunburn and sunglasses to protect your eyes.
- Do not walk off into an area on your own without telling someone where you are going.
- Avoid bee/wasp swarms and areas where you hear bees or wasps swarming (making a loud buzzing noise), like trees and rock enclosures.
- Do not drink water from still pools of water or sluggish rivers, rather only from clean fast flowing clear river streams that are uphill of human habitation.
- Use eye protection when hitting rocks with a rock hammer to obtain a sample or remove yourself from the vicinity of someone hitting rocks if you do not have eye protection.
- When collecting loose rocks be on the lookout for poisonous spiders and insects that may be under the rocks.
- Do not climb up a steep slope or cliff face to obtain a sample or reading unless absolutely safe to do so. You may get injured somewhere far away from emergency services and have to be carried down from a mountain side.

- Wear sturdy closed walking shoes when working in the field, no flip-flops or high heels.
- Do not carry a heavy or overloaded backpack, you may be carrying your backpack for 8 hours or longer and want to avoid a back injury.

### Safe use of chemicals

- All chemicals should be regarded as poisonous.
- The potential dangers of chemicals are indicated on the label or on the MSDS sheet located in room 6 the rock store. Always read before handling and use extra protective equipment when necessary.
- Never touch a chemical with your bare hands, use a spatula.
- Do not pour water into acid, always add acid to water.
- Always use funnels when pouring liquids, especially concentrated acids or alkalis.
- Do not pour hot solutions into reagent bottles, allow to cool first.
- Label all reagent bottles properly including date when made.
- Dispose of waste acids in the correct hazardous waste containers.
- Never use chemicals from unlabelled bottles.
- Heavy bottles must be stored on lower shelves.
- Bottles containing acids and alkalis must be carried with both hands with one hand placed underneath the bottle to support it, never hold it by the lid or the neck. Use a special bottle carrier provided by chemistry dept. when transporting bottles over long distances. Never carry more than 2 'Winchester bottles' at any given time.
- Liquid nitrogen must be transported in a specially designed container called a Dewar flask and must be placed on a trolley.
- Procedures involving carcinogenic chemicals and concentrated acids should be carried out in an efficient fume cupboard, e.g. bromides, phenol, methanol, acrylamide. Room 6A has a fume hood.
- Chemicals that emit toxic or noxious fumes or toxic gases and volatile flammable liquids must be handled in a fume cupboard.
- Latex or nitrile gloves and safety glasses must be worn when handling carcinogens, acids, alkalis and other irritants.
- Corrosive chemicals like sulphuric acid and nitric acid and sodium hydroxide must be stored in cool, well-ventilated areas.
- Pipetting by mouth is prohibited, mechanical pipettes must be used.
- Acids and alkalis must not be stored in the same place.
- Flammable liquids (ether, acetone, and ethanol) must not be stored in the same place as oxidising chemicals (performic acid, hydrogen peroxide).
- Chlorates must not be stored with acids or combustible materials.
- Solvents, acids, alkalis and flammables must be stored in fire resistant cupboards.
- Always work in a fume cupboard with materials that emit sulphide gas.

- Make sure you know where the fire-fighting equipment is and don't block access to this equipment.
- Be especially careful when using hydrofluoric acid, it is especially toxic and corrosive. Be very careful not to let it come into contact with skin or eyes, in case of spill wash off immediately and seek medical attention. Use full PPE when using hydrofluoric acid, including a plastic apron, face plate and nitrile gloves.

#### Response to a chemical spill

1. Alert people in the immediate area of the spill
2. Wear protective clothing including safety goggles, mask, gloves and lab coat.
3. If spilled material is flammable turn off Bunsen burners or any naked flame (if in room 6B)
4. Avoid breathing vapours from the spill by using a mask (contact chief technical officer for one).
5. Apply absorbent material like paper towel around the periphery/edge of the spill and then onto the centre of the spill. A spill kit is available in room 6 for larger spills.
6. Sweep up the absorbent material and place in a sealed, lead-proof bag or container.
7. Dispose of all materials used in the cleaning up of the spill into the sealed container.
8. Label all bags or containers, indicating the identity of the hazardous chemical and alert the chief technical officer to ensure of its safe disposal.

#### Response to an acid/base spill

##### *For a spill not directly onto human skin*

- Neutralise acids with sodium bicarbonate/ baking soda or bases with vinegar/5% acetic acid solution.
- Avoid breathing in vapours
- Spread material from the spill kit on spills to absorb the neutralised chemical.

##### *For a spill directly onto human skin*

- Flush area with copious amounts of cold water from faucet/tap for at least 5 minutes.
- If spill is on clothing first remove clothing from skin and soak the area with water as soon as possible.
- Arrange treatment by medical personnel. Any member of staff can assist you with this. The Chief Technical officer and one of the technicians does have First Aid training. The details for the first aid personnel are available on notice boards around the building.

### Response to a gas leak

- If there is a strong smell of gas extinguish all Bunsen burners (in room 6B).
- Contact the technical officer who will investigate and resolve the problem.

### Disposal of chemicals

- Toxic liquid waste must never be disposed of by pouring it down the sink.
- If you use chemicals during your research, you must find out how these must be disposed of.
- All chemicals for disposal must be in a clearly, accurately labelled container.
- Contact the chief technical officer for the disposal of waste chemicals.

### Storage of dangerous and flammable chemicals

- Flammable chemicals should be stored in a *fireproof cabinet (currently stored in equipment store room)*. Small volumes of flammable chemicals should only be stored on bottom shelves, never higher up shelves.
- Dangerous chemicals (corrosive and toxic) should be stored on low shelves, never high up.

### Accident reporting

#### Accident involving a student

- In the case of a medical emergency following an accident involving a student, a member of staff must be notified immediately.
- The staff member will take responsibility for immediately contacting the dept. First Aid officers, who must proceed to the scene of the accident.
- The staff member must remain at the scene of the accident until the First Aid officer arrives, and be prepared to assist.
- The First Aid officer will administer whatever assistance is appropriate or possible at the scene of the accident.
- If necessary the injured party will be transported to the local hospital, doctor or clinic for further treatment.

#### Accident involving a staff member

- The accident must be reported to the Manager.
- The Manager must complete a Supervisor's Report of Injury on Duty form, giving full details of the incident.
- The Manager must keep a copy of this form in the file of the staff member.
- The injured staff member must take the form to Human Resources where a second form will be given to them to take to the casualty section of Settlers Hospital.
- The hospital must provide a medical certificate indicating the treatment administered and the number of day's sick leave recommended.

- The medical certificate must be returned to Human Resources who will send a copy to the Manager.

## Use of departmental facilities

### Department equipment

- Academic staff should be able to inform students as to what equipment is available and whether it can be taken into the field.
- Anyone needing equipment should contact the Chief Technical Officer in office 1C on the bottom floor.
- No equipment must be removed from the undergraduate laboratories or the Masters Exploration laboratory.
- Any piece of equipment that has a container or a dust cover must be used when equipment is not in use.
- Report any breakages to the Chief Technical Officer.

### Departmental Vehicles

- Vehicles must be booked out from the Chief Technical Officer and the names of all the drivers must be given when booking out the vehicles.
- Drivers must be at least 21 years of age and have a clean drivers licence.
- Vehicles are not for private use but for teaching and research purposes.
- The interior of the vehicle should be cleaned and emptied after use.
- When leaving the vehicle unattended use the gear lock (for the vehicle that has one) and arm the car alarm using the immobiliser.
- Vehicles may not be driven by anyone who has consumed even a small amount of alcohol.
- Immediately report any faults and breakages to the Chief Technical Officer. If you are in an accident report this immediately to the Chief Technical Officer.
- Drivers are responsible for traffic fines.

### Workshop equipment

- Ask the Chief Technical Officer or assistants (if not available) before using equipment in the workshop.
- If not properly trained to use equipment ask for training before using the equipment.
- Report any faults or breakages to the Chief Technical Officer immediately.
- Use the appropriate PPE when using equipment (safety goggles, ear protection, dust mask etc.) in workshop and sample preparation laboratory.
- Wear ear protection, safety goggles and dust mask when using diamond saw to cut rocks, along with closed shoes and a lab coat.
- There must be a technician or a technical officer present when students are using the rock saw or other equipment in the workshop and sample preparation laboratory.



### Crushing Room 5

- Students must receive training on the proper use of the crushing equipment before using the equipment.
- Closed shoes and lab coats must be worn in the crushing room.
- The extraction fan must be put on when you are working in the crushing room. Dust masks must be worn if excessive dust is generated during the crushing process.
- Safety goggles must be worn when using the vice to break up rock or when using a rock hammer.
- The crushing room must be left clean and tidy when you have completed your rock crushing.