School of Geography, Geology and the Environment

Use of the Crushing Room

Risks and Risk Reduction

The crushing room contains a number of pieces of equipment used to reduce rock specimens to a powder. As such they pose a number of risks to health which can be reduced by following the guidelines below.

General

- Make sure that the dust extractor is switched on when using the room
- Wear a lab coat at all times
- Wear ear-defenders if necessary
- Wear a personal dust mask – these can be obtained from Ian Wilshaw.

Rock Splitter

This comprises an hydraulically-operated blade that is used to reduce a rock to smaller, $2cm^3$ pieces. The possibility of fragments of rock flying off is high. To reduce the risk of injury:

- Make sure that the blades are securely fixed in place
- Wear a face shield
- Make sure that the safety shields are in place around the work area
- Holding the rock in place, move the blade slowly until it makes contact. REMOVE your hand and stand to the side of the access port before increasing the pressure. The blades are arranged such that fragments fly to the side and hit the shields. Thus, risk to the operator is low but there is the possibility of pieces coming through the access port at the front.

Jaw Crusher

This machine, which takes fragments from the splitter, comprises a moveable jaw that operates against a fixed jaw. The gap between the two can be altered in order to adjust the size of fragments produced. The risk of injury is low if the following precautions are followed.

- Make sure you are wearing your dust mask
- Make sure that the slide in the dust extraction tube is opened
- Make sure that the safety hopper is in place – NEVER operate this machine without it.
- Feed all sample material through the “letter box” in the hopper.
- This machine produces a lot of dust so place the catching box under the dust hood on the window bench BEFORE emptying it

Ring Mills

These two machines take material from the jaw crusher and reduce it down to a fine powder. Essentially they comprise a shaking platform with a circular motion. Mounted on top of this is a ring mill which consists of a container with a series of rings between which the material to be crushed is placed. The mill is placed on top of the shaking table and spun for a predetermined time after which the powder is removed. The mills are of two types – agate and tungsten carbide. They produce a lot of fine dust and, because of their weight, pose considerable risks when being lifted and when spinning. These risks can be reduced by following these guidelines:

- Close the shutter on the extractor tube to the jaw crusher and open that attached to the dust hood on the window bench in order to maximise air flow.
- Carry out ALL filling and emptying of the mills under the dust hood.
- The tungsten carbide mill is very heavy. It is only really necessary to use this for the toughest rocks. It should be assembled in-situ on the appropriate shaking platform – DO NOT use the tungsten carbide mill on the agate shaker and vice versa.
- The agate ring mill is quite light and can easily be transported in the assembled state.
- Make sure that the mill is firmly secured on the platform
- CLOSE the security cage before operating
- Make sure that the mill has come to rest BEFORE opening the security cage
- Move the mill to the dust hood. If using the tungsten carbide mill – wait a few seconds for any dust to settle and disassemble in-situ before moving.

Ball Mill

A small tungsten carbide-lined container (100ml) in which powder is crushed by shaking with tungsten carbide balls. There is little risk as the machine won't operate if the security cover is not shut. The mill should be emptied and filled under the dust hood.

Magnetic Separator

A device for separating minerals using a strong magnetic field. There is a risk to people wearing a pacemaker. Such people should NOT use this equipment. To avoid risk to people passing the lab, a notice should be placed on the door to the effect that the equipment is in use.