

## **GAS IN MINES**

### **1. INTRODUCTION**

Gas is a notorious danger in coal mines and mines in shale strata but, for metalliferous and slate mines, it is usually rare to encounter gas in sufficient quantities to constitute a threat. Despite this, however, anyone exploring abandoned mines should constantly be on their guard. It is vital that you know the types of gas that could occur and what the effects are. The prime rule is - if you suspect gas turn back at once.

### **2. EFFECTS**

There are three main effects from the gases found in mines:

- a) Poisoning – where the gas actively interferes with the body's respiration through a chemical reaction.
- b) Suffocation – where the gas itself is not poisonous but the concentrations cause the percentage of oxygen to decrease to levels that will no longer support life. On the surface, oxygen normally represents 21% of the air. Although the body can survive in concentrations slightly less than this, reduction of the percentage of oxygen will eventually result in death, i.e.
  - 21% normal atmosphere
  - 19% minimum for normal activities
  - 16% breathing difficulties
  - 14% unconsciousness
- c) Explosion – where an inflammable gas reaches sufficient concentrations to explode where there is a spark or flame.

### **3. OCCURRENCE**

Mine gas can occur for several reasons:

- a) Where it is released from the strata itself, e.g. methane from shale, carbon dioxide from limestone or sulphur dioxide from oxidisation of sulphide materials.
- b) From rotting organic material, e.g. hydrogen sulphide from rotting timber or dead carcasses.
- c) As a result of combustion, e.g. carbon monoxide from burning material underground.

### **4. TYPES OF GASSES**

There are typically 5 gasses we need to concern ourselves with as mine explorers:

1. Carbon Dioxide, aka Choke Damp. Replaces oxygen in air to give difficulty breathing and eventually unconsciousness and death. Test for with a candle flame or gas metre.
2. Carbon Monoxide, aka White Damp. Bonds to the red blood cells in a cumulative effect and removes the body's ability to absorb oxygen. Test for with a gas metre.
3. Hydrogen Sulphide, aka Stink Damp. As concentrations rise we lose our ability to smell the gas. Poisons and suffocates. Test for initially by smell and candle flame or using gas metre.
4. Methane, aka Fire Damp. Methane is released from coal and shale strata and is explosive. Do not enter disused coal mines. Mine levels cut through shale should be explored carefully but there is little likelihood of encountering Methane. Do not test for with a candle flame.
5. Radon. Please refer to the specific document on this gas.



## **5. VENTILATION**

Mine gas should not present a particular threat if there is good ventilation in the mine workings and it is thus recommended that only mines with more than one entrance and a good through draught are used. Problems can still be found:

- a) Where a previously sealed off area of the mine has been recently dug open.
- b) Where a level or shaft is “blind” and the lack of ventilation causes a build-up of gas. Especially in areas below entrance levels or in low points.
- c) Where the miners directed ventilation to certain parts of the workings via doors or blocked off levels. In such cases, it is possible to step from a well ventilated main level to side workings with poor or nil ventilation.