



A short note on coal mining

Posted by [Heading Out](#) on January 4, 2006 - 12:23am

Topic: [Supply/Production](#)

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UPDATE Sadly the news of the miners being alive was due to failure in communication, and only one has been found alive. HO **Update [2006-1-4 0:23:58 by Prof. Goose]**:Twelve miners have been found alive. ([link](#)) This is an amazing story, and one that has been weighing on many people for these last two days.

For those watching the pictures from West Virginia there are a couple of things you might want to know. The mine itself is driven into the side of a hill, and there are a series of tunnels along the side of the coal seam which have been driven into the coal taking out the full seam section. The coal seam is roughly flat, but dips a little as it goes further away from the access. In coal mining jargon the entry to the mine is known as the portal, and it appears there are about five of these and they are just more than man high. The covered tube that leads out of one of the tunnels is a covered conveyor belt, and when the mine is operating the coal is loaded onto the belts near the production face, and carried by the belt out of the mine and up into a silo that contains the coal, until it can be loaded into a truck or rail car that will haul it away from the site.

One of the miners that were in the crew on the small vehicle (these have a variety of names depending on the region - I think they are called man-trips in that part of the country, though it is also called a tram) was, according to some reports, a belt worker. So it may be that the body that has been found might be his, since he would have responsibilities that take him away from the main working area where the coal was being extracted.

The mine is developed as a series of parallel tunnels that head into the coal. The coal itself is mined by [continuous miners](#). These are machines that have a large rotating drum at the front of the machine, which has picks inset in a pattern over its surface. As the drum rotates, the picks break out the coal and drop it to the floor where it is picked up by the apron (a metal wedge) beneath the drum, and moved by gathering arms, up onto a small chain conveyor that runs the length of the machine.

The conveyor then dumps the coal either into a shuttle car, or a mobile conveyor belt system that carries the coal then to the main transport belt that carries it out of the mine.

Incidentally the word shaft is being used wrongly by most of the reporters, since it is a vertical access passage, and all these passages are sensibly horizontal.

As the tunnels or drifts are being driven as a set of perhaps five or seven in sequence, the miners drive cross tunnels between them at fixed intervals. This allows a single machine to drive all the headings, and also allows the area to be ventilated, to carry away any gases that might come from the coal.

The pillars that are left between the main drives, and the cross-cuts are designed to be large enough to carry the weight of the overlying ground, and the rock immediately above the tunnels are held in place by bolts that the miners drive into the rock to hold it together, as they drive the tunnels forward.

By using ventilation curtains and building temporary walls (sometimes called stoppings) in the cross passages, a simple path can be made for air to be moved from the portals to the working face. Generally as the mine gets deeper the main fan at the surface can be supplemented by smaller fans inside the mine. In addition, at the face itself the air can be boosted through a large plastic duct to help maintain the condition of the air, where the coal is being broken from the face.

When an explosion occurs the ventilation paths will usually be badly damaged, so that the air cannot circulate through the normal paths. When the rescue teams go in, they must check that the roof is safe to walk under, and also they are (I gather) restoring the ventilation barriers with temporary stoppings so that air can be recirculated making it easier to work. As they go in, they have to stop at intervals to do this, and to get as much gas out of the area as they can.

In regard to the small masks that all miners carry - these are called [self-rescuers](#) and are a small box that all miners carry on their belts. When there is a blast the miner opens the box and pulls out the mask that contains a nose clip, and puts the mask into his mouth. By breathing through the mask the miner can walk through dangerous levels of carbon monoxide, since the chemical in the mask will react with the carbon monoxide. It is a one-shot device that gives you enough time to get to a safe haven, or out of the mine. If it is working it gets hot, even hot enough, so I am told, to burn the inside of your mouth. But that tells you that it is possibly saving your life.

There is some ongoing discussion about tags. When a person goes underground (visitor or worker) they are given a small metal tag. ;A record is kept of these, but depending on custom the tag can be kept by the miner in a number of places (I used to keep mine in my shirt pocket, or my pants). It allows the folk at the surface to know how many people are underground and who they are, but it is not easy always to find the tags, depending on local custom as to where you carry it.

Because the mine works an area wider than the total width of the combined tunnels and pillars, after a certain distance the tunnels will turn to work out to the edge of the permitted area. This turn may be what they are talking about as the first break. Then as the total area is worked the main tunnels may turn again. Thus there is a network of tunnels and pillars underground, and it is therefore important that the rescue teams carefully map and plot their way, since directional signs may be destroyed or moved by the accident.

Our thoughts and prayers continue for the families.



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