

Explosives

In the extractive sector

The EU Legislation for explosives

Directive 92/104/EEC on the minimum requirements for improving the safety and health protection of workers in surface and underground mineral-extracting industries

ANNEX > PART A

5. Explosives and initiating devices

- Operations involving the **storage, transport** and **use** of explosives and initiating devices must be carried out by duly authorized and competent persons
- Such operations must be organized and performed in such a way that there is no risk to workers

Blasting is a common activity that involves explosives



What are the main risks of the use of explosives?



In open-pit blasting:

- flying rocks
- vibrations
- concussion wave

In underground blasting:

- crashes and gas fumes from the explosion

In both operations firing failures may occur:

- premature or delayed shots
- unintentional ignition or detonation of explosives

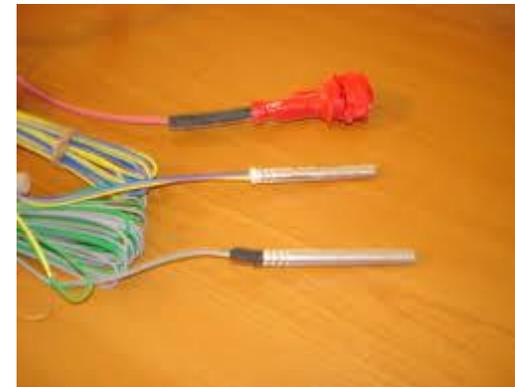
Always remember Misuse of explosives CAN KILL YOU!



A mine explosion in Pingyao, in China's northern Shanxi province killed 15 people in November, BBC 17 December 2019

Useful definitions, ILO 2001

- *Explosive material* means explosives, blasting agents and detonators
- *Explosives* means any chemical compound, mixture, or device that is made, manufactured or used to produce an explosion by sustained chemical reaction in itself, such as black powder, nitro glycerine, dynamite, etc.
- *Detonator* means any device containing a detonating charge that is used to initiate an explosive, such as non-electric blasting caps and electric blasting caps
- *Blasting agent* means a chemical substance which becomes an explosive when mixed with a hydrocarbon (e.g. ammonium nitrate)
- *Blast area* means the area in which concussion, flying material or gases from an explosion may cause injury to persons



The basics of safe use of explosives!

- **Only persons who are trained, certified and experienced in the handling and use of explosive material should direct blasting operations and related activities**



Basics information in Explosive handling

1. General requirements
2. Storage of explosives
3. Transport of explosives
4. Shot firing
5. Misfires
6. Electrical firing

General requirements

- Blasting operations should not take place after approval
- Blasting operations should **always be planned** and **specific procedures** should be drafted and **followed**
- Only explosives and detonators **approved** by the competent authority and provided by the mine operator should be used in a mine.
- No work should resume in the blast area until it is free of after-blast fumes and a post-blast examination by the person in charge has verified that there are no potential blast-related hazards

Storage of explosives (1/2)

- In a licensed storage area (magazine) according to specific requirements
- Detonators and detonating accessories should not be stored separately or in a separate approved compartment
- Every main magazine should be under the charge of a person for the safe keeping
- The manager keeps a record book with the quantities of explosives, the quantities of explosives received or issued, as well as the dates and times at which they were received or issued, and to whom
- Every magazine should be kept clean, dry and adequately ventilated and the roof and walls maintained in good and safe condition.



Storage of explosives (2/2)

- If necessary explosives should be destroyed in an approved manner according to the manufacturer's instructions.
- Excepting explosives, articles likely to cause a fire or explosion should not be taken into or permitted to remain in a magazine.
- Do NOT SMOKE or USE an open flame where explosives are stored, transported or used.
- Do NOT USE a cell phone within 6 m of any place where explosives are stored, transported or used.
- The area surrounding a magazine should be kept CLEAN: free of dry grass, bush, rubbish and other flammable material for a distance prescribed in national legislation and, where practicable, enclosed by a fence.



Be very careful in storing, transporting and using explosives.

Transport of explosives

- Explosives should be delivered to the blast site without any delay
- Closed, non-conductive containers should be used to carry explosives and detonators to and from blast sites
- For explosives and detonators, different containers must be used
- Explosive containers should be clearly marked, indicating their content



Unpacking explosives



Explosives should be opened right before their use



NOT ALL MATERIALS are suitable for unpacking explosives



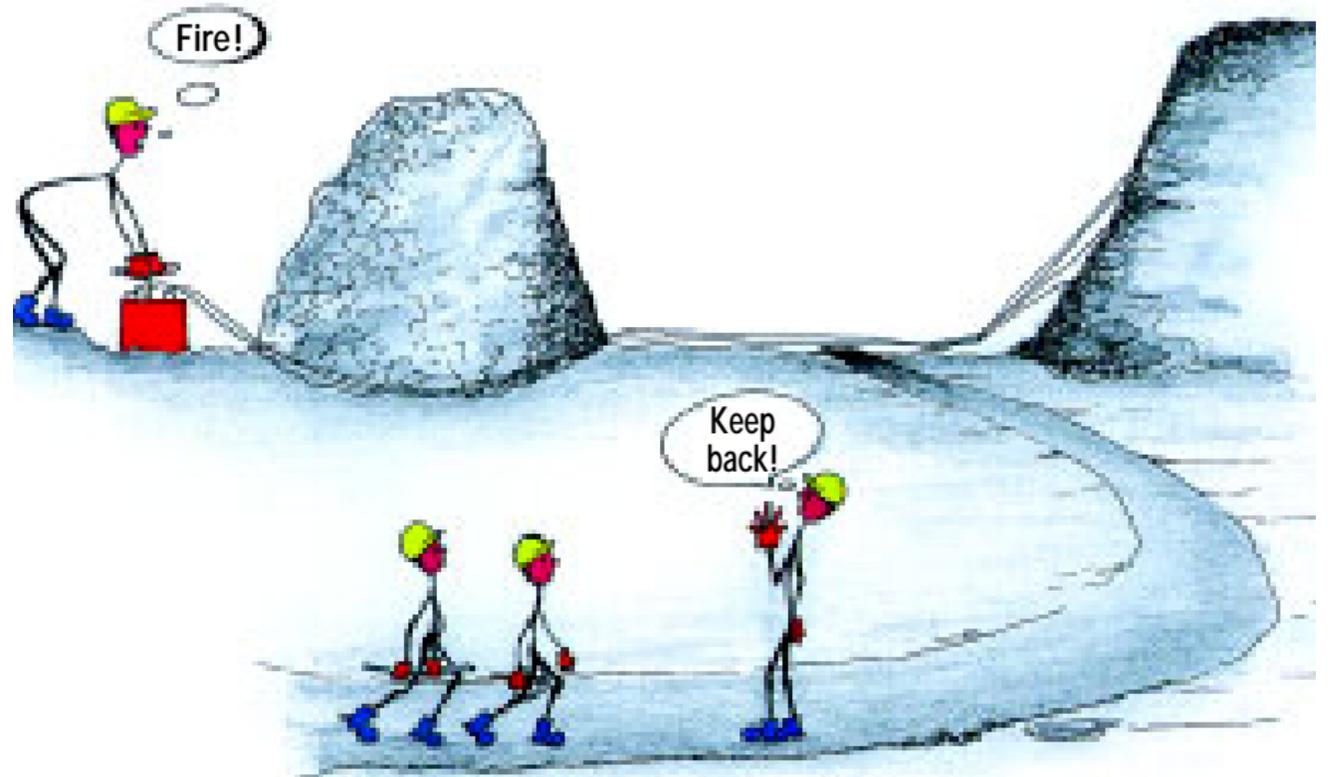
Only suitable tools appropriate for the unpacking explosives shall be used to open packages.



Explosives such as detonating cord and primers are sensitive, and packages should be open using non-metallic objects.

Shot firing

- Once charging begins, the only activity permitted within the blast site should be directly related to the blasting operation.
- Before charging, blast holes should be checked for obstructions which should, as far as possible, be cleared



Give warnings; stay well clear before blasting.

How to handle misfires

- Always consult the manager and FOLLOW the right procedure in the event of a misfire
- **NO work should be done** at the site until the shotfirer or other experienced person has inspected the site at which the misfire occurred and taken such action as may be necessary to ensure that further work may be safely continued.
- **No person should approach a misfired hole:**
when a safety fuse has been used, until at least 30 minutes have elapsed since the time of lighting the fuse; and
 - When electrical firing has been used, until the shotfiring lines have been disconnected from the source of electric power and been short-circuited, and then that at least 15 minutes after that have elapsed.
 - After the prescribed time interval the shotfirer should inspect, or where he cannot do so, instruct another competent person to inspect the bench or face and take such action as may be necessary to ensure that further work may be safely continued
 - A record of the inspection and of the action taken should be made, in a book kept at the mine for the purpose, at the end of the shift by the person making the inspection.

Electrical firing



Electric detonators of different types should not be used in the same round



All necessary testers, exploders, switches, fuses, electrical conductors and other necessary apparatus should be suitable for the conditions under which they are to be used, and should be provided by the operator or manager of the mine

How do we behave when explosives are used?

Co-operate

- FOLLOW THE SAFETY PROCEDURES
- Keep away if you are not authorised to be around a blasting area or an explosives storage area!

Train

- The signs, the non verbal communication signs etc.

Be alert

- On WARNING SIGNALS

Report any problems

- REPORT SUSPECTED MISFIRES, STRAIGHT AWAY TO YOUR SUPERVISOR
- Let your employer and any workplace representative know.



Disclaimer

This presentation intends to inform and does not replace the training you should receive for your workplace. Always consult your health and safety manager for any questions arise for occupational health and safety issues
