

Deep Mined Coal Industry Advisory
Committee
The Mining Association of the United
Kingdom

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The prevention and control of fire and explosion in mines.

INTRODUCTION

This information and guidance was prepared, in consultation with the Health and Safety Executive

(HSE), by a working group representative of all sides of the mining industry. It represents what

members of the working group consider to be good practice.

Members of the working group on the prevention and control of fire and explosion in mines

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FIRE FIGHTING

Fire-fighting measures

177. The fire risk assessment will help managers determine what type of fire-fighting equipment is appropriate and where to site it.

Selection and siting

Selection

178. In selecting fire-fighting equipment, managers will need to take account of the nature of the fire hazard. This is particularly important if the fire might involve electrical equipment and/or flammable liquids.

Siting

179. For coal mines, Part II of The Coal and Other Mines (Fire & Rescue) Regulations 1956

contain provisions relating to fire precautions and equipment, and the Model Rules on Mine Fires,

guidance on the Coal Mines (Owner's Operating Rules) Regulations 1995 gives guidance on the

provision of fire-fighting equipment both above and below ground.

180. For other mines, regulations 31 and 33 of the Miscellaneous Mines (General) Regulations

1959 require the provision of suitable and sufficient means of extinguishing fire at certain places

both above and below ground. For further guidance, owners and managers of such mines can

refer to the Model Rules on Mine Fires and select the systems and equipment appropriate to their

circumstances.

181. Where groups of people work immediately on the return side of areas or equipment giving

rise to a higher likelihood of fire, fire-fighting equipment should be grouped to form fire points on the

intake air side of the vulnerable areas or equipment. Paragraphs 29-31 of the Model Rules give

further guidance on fire points.

182. In areas of the mine where a fire would have particularly high consequence; in particular

where more than 50 people work in an area with only one intake, or where there are long single

entries, mines should consider as part of their control measures installing automatic fire suppression systems to cover machinery and equipment that might cause a significant fire.

183. In return airways to longwall faces fire-fighting equipment should be kept as close to the face

end as is practically possible.

184. In auxiliary ventilated single entries, the fire-fighting equipment within the single entry should

be on the intake side of vulnerable equipment within the single entry. Fire-fighting equipment

should also be located within the main ventilation circuit, close to the single-entry entrance on the

intake side.

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185. Fire-fighting equipment should be clearly visible and its location conspicuously indicated with a reflective sign. The Health and Safety (Safety Signs and Signals) Regulations 1996 are relevant and describe suitable signs. It is important that users are able to gain access to the equipment without exposing themselves to risk. Such equipment should not be sited beneath or on the tight side of conveyors or other equipment.

Fire extinguishers

186. Mines should site fire extinguishers:

- In conspicuous positions close to any machinery or equipment that gives rise to the fire risks. Below ground it should be sited on the intake side of the fire risk and in buildings it should be sited close to fresh air;
- On diesel-powered or electrically powered mobile plant and equipment;
- At places where flammable materials are stored;
- In other locations indicated by the outcome of the fire risk assessment.

187. Managers should ensure that fire extinguishers are suitable for the type of fire that may

occur and that they have adequate capacity to either extinguish the fire or to contain it sufficiently

long enough to allow people to escape. In deciding what is appropriate, managers will need to

consider:

- What type of fire might occur;
- What other fire fighting measures are available; for example, mains water, dust or sand;
- What backup provision needs to be made against the possibility that an extinguisher could fail to operate, particularly in safety-critical locations such as winding houses, intake airways or locations where a fire could threaten an escape route.

188. Fire extinguishers should be provided near electric motors (other than those that are part of

portable apparatus), transformers or switchgear (including electrical sub-stations, transformer

houses, motor rooms and panel trains), workshops below ground (especially those where burning

and welding take place), and battery charging and transfer stations.

189. Regulation 5(1)(b) of the Coal and Other Mines (Fire and Rescue) Regulations 1956

specifically requires managers of coal mines employing more than 30 people below ground to

provide sufficient portable fire extinguishers and a sufficient supply of dust and sand.

190. Regulation 7(b) of those Regulations requires at least one fire extinguisher, or a sufficient

supply of dust or sand, to be carried on mineral cutting equipment where there has been, or is likely

to be, and ignition of gas.

On-board fire fighting systems

191. Where diesel-powered machines are used underground, they should carry both portable fire extinguishers and should be fitted with a fixed fire-quenching system containing sufficient outlets to cover the main potential fire sources.

192. Automatic fire-quenching systems should be capable of manual operation from the operator position and, on large machines, from at least one other suitable position on the outside structure of the machine.

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Automatic fire extinguishing system fitted to a rubber-tyred, diesel vehicle for use below ground

193. Where vehicles or other equipment are fitted with a fire-quenching system that relies on the melting of a pressurised plastic tube to release the quenching agent, there is no need to provide for manual operation. The pressurised plastic tube should be carefully routed as close as practicable to the potential fire sources to ensure prompt discharge of the extinguishant. However, the use of such systems should be confined to smaller vehicles and equipment.

194. Battery-powered machines should be fitted with suitable means of extinguishing both battery fires and other types of fire.

Other fire suppression systems

195. Managers should consider installing water barriers, water curtains or other automatic fire suppression systems where the risk assessment identifies places where the response to a fire alarm may be delayed; for example, unattended equipment such as pumps and booster fans that operates in remote locations. While such barriers generally operate automatically by means of a fusible link, manual initiation from a remote point may be desirable where this provides the most effective system to suit the local conditions.

196. When barriers protecting electrical equipment operate automatically, mines should provide a circuit breaker to de-energise the equipment immediately the automatic system operates. This should be arranged to provide an indication to a manned control point that the barrier has operated.

197. Where tensioned wires with fusible links are used in automatic water barriers, a weight or spring applied tensioning system should be provided to ensure that the correct tension is maintained. The automatic valves should be sited out of the anticipated fire-zone and supply lines in the vicinity of the fire-zone should be of steel pipes with fire-resistant couplings. Hoses should

not be used.

198. Facilities should be provided to enable routine testing of the automatic fire suppression system.

Mains water fire-fighting systems

199. At places where there are unavoidably large amounts of fuel giving rise to the possibility of a significant fire, it is unlikely that portable fire extinguishers will have sufficient capacity to extinguish such a fire. Where water is suitable as a fire-fighting medium, managers will need to consider providing a fire-fighting water distribution system, with sufficient hydrants, hoses and other firefighting equipment.

200. Managers and mechanical engineering staff should ensure that the pressure in water ranges is limited to a safe value, so that it neither exceeds the pressure rating of the pipe work or gives rise to undue risks to workers opening valves. It may be necessary to install pressure-limiting devices to achieve this.

201. At coal mines employing 100 people or more, regulation 6 of The Coal and Other Mines

(Fire and Rescue) Regulations 1956 requires the provision of adequate supplies of water and the

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means of delivering it at adequate pressure and volume to places in the mine where people work or pass where a fire is liable to occur.

202. Managers of coal mines will need to ensure that the fire fighting system has sufficient capacity to meet a major fire in the coal seam itself.

203. Where water is unsuitable for fighting potentially large fires, mines should provide high capacity fixed or mobile fire fighting equipment.

Fire hoses

204. Paragraphs 29 and 30 of Section 2 of The Model Rules on Mine Fires give guidance on the requirements for fire hoses at coal mines, but its principles apply to other mines where mains water is provided for the purpose of fire fighting.

205. There should be sufficient hoses close to each hydrant on the intake side to reach from the hydrant to the potential fire sources it protects, or to the next hydrant. In long conveyor roadways there should be sufficient fire hoses to enable fire fighting to take place at any point in the roadway.

A well laid out and maintained fire point below ground in a coal mine

206. At least one suitable nozzle should be provided with each set of fire hoses.

207. Fire hoses are vulnerable to damage and therefore need storing carefully. They should be

placed in racks suspended above floor level, or in suitable containers, and positioned to reduce the likelihood of them being struck or run over by passing vehicles or their loads.

208. Hoses should be coiled 'male-end-out' so that they can be connected to the hydrant or the

previous hose and run out downstream under tension to avoid kinking.

209. Hoses should not be tied in a reel but should be free to be run out.

210. Fire hoses should not be used for purposes other than fire fighting.

Inspection, testing and maintenance of equipment

211. The inspection, testing and maintenance of fire-fighting equipment (including fire-fighting

systems on board vehicles) will fall within the requirements of both regulation 11 of The Management and Administration of Safety and Health at Mines Regulations 1993 and regulations 5

and 6 of The Provision and Use of Work Equipment Regulations 1998.

212. Fire-fighting equipment should be included within the manager's scheme for planned

preventative maintenance.

213. Regulation 9 of the Coal and Other Mines (Fire and Rescue) Regulations 1956 requires

managers of coal mines to put in place arrangements to ensure that:

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- All fire fighting equipment is inspected by a competent person at intervals not exceeding

30 days;

- Each fire extinguisher is discharged and refilled by a competent person, at intervals not

exceeding those specified by the manufacturer or supplier.

214. Paragraphs 32 and 33 of the Model Rules on Mine Fires, in The Coal Mines (Owner's

Operating Rules) Regulations 1993, give guidance to coal mine owners on the testing of fire

fighting equipment. Further relevant guidance on the testing and maintenance of fire extinguishers

can be found in the HSE/Home Departments' publication 'Fire Safety, an employer's guide'.

215. Those carrying out periodic tests should complete reports of their findings as required by

The Management and Administration of Safety and Health at Mines Regulations 1993, regulation

11(4), and at coal mines by Coal and Other Mines (Fire and Rescue) Regulations 1956, regulation

9(2).

216. Inspectors appointed under regulation 12 of The Management and Administration of Safety

and Health at Mines Regulations 1993 and assigned to a zone should ensure that fire-fighting

equipment in that zone is kept clean and free from damage, and is adequately identified by signs.

217. Where water ranges and hydrants are installed, mines should put in place arrangements to

ensure that hydrants are opened periodically to check that they remain in working order. They should also examine the physical condition of the hydrant outlet to ensure that hose connections can be freely made. Similarly they should check the connectors at each end of the fire hoses for any sign of damage that might prevent them coupling and, where possible, check the operation of the snap-locks on the female ends (in the middle of each coil) by pulling the snap-locks out and checking that they return freely.

218. They should note any defects on the report they are required to complete at the end of each shift by regulation 12(8) of The Management and Administration of Safety and Health at Mines Regulations 1993. Wherever possible, they should try to either remedy the defective equipment within their shift or ensure that it is dealt with on the next working shift.

Training

219. The Fire Protection Plan will identify the need to train or instruct mineworkers in fire fighting techniques, and managers should include the arrangements for such training within the training scheme required by regulation 25 of The Management and Administration of Safety and Health at Mines Regulations 1993. The training should be appropriate to the fire hazards identified by the Fire Risk Assessment and the fire fighting measures provided.

220. The scheme should specify who has responsibilities for fire fighting training, both on the surface and below ground. It will also include details of:

- The type of training and refresher training;
- The frequency at which to carry out particular types of training and refresher training;
- Who should receive training (see paragraphs 3 and 4 of the Model Rules on Mine Fires, which form guidance to The Coal Mines (Owner's Operating Rules) Regulations 1993);
- Who should deliver the training;

221. The training scheme should also set out arrangements for on-site instruction and practice in fire fighting.

222. Every person at a mine who may need to use fire-fighting equipment should receive refresher training annually. In addition, they should receive instruction at intervals not exceeding six months; for example, by on-site briefing (toolbox talks) given by a command supervisor who has received suitable training. Paragraphs 5-7 of the Model Rules on Mine Fires give further guidance useful to all mines.

223. The content of the training sessions should include:

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- Raising the alarm;

- When to attempt to fight a fire and when not to;
- Types of fire extinguishers and their use;
- Fire prevention measures;
- Means of egress in an emergency situation.

Surface personnel

224. At mines where there are office and canteen personnel, instruction on the action to be taken

in the event of fire needs to be given at least every twelve months. This should include as

appropriate:

- Practice in the evacuation of the premises;
- How to deal with fires;
- Use of fire hoses and attachments;
- Practice in the operation of fire extinguishers; and
- Such other provisions that are required by any fire certificate.