

insulated from earth, but it is permissible to use the concentric system with earthed outer conductors if proper arrangements are made to reduce the danger from fire or shock to the minimum, but the neutral point of polyphase systems and the middle wire of three-wire continuous-current systems may be earthed at one point.

327. Unless fixed as far as is reasonably practicable out of reach of injury, all conductors, other than armoured cables, must be further protected by a suitable covering. Where lead-covered cable is used the lead shall be earthed and electrically continuous throughout.

The exposed ends of cables where they enter the terminals of switches, fuses, and other appliances must, as far as is reasonably practicable, be properly protected and finished off, so that moisture cannot creep along the insulating-material within the waterproof sheath, nor can the insulating-material if of an oily nature leak out of the cable.

328. All joints must be mechanically and electrically efficient, and, where reasonably practicable, must be suitably soldered. Wires, other than blasting wires or cables, must not be joined by merely twisting them together.

329. Overhead bare wires on the surface must be efficiently supported upon insulators and clear of any traffic, and provided with efficient lightning-arresters.

330. All cables used in shafts must be highly insulated and substantially fixed. Shaft cables not capable of sustaining their own weight shall be properly supported at intervals varying according to the weight of the cable. Where the cables are not completely boxed in and protected from falling material, space shall be left between them and the side of the shaft that they may yield and so lessen a blow given by falling material.

331. Where the cables in levels or main haulage-roads cannot be kept at least 1 ft. from any part of the truck or tram, they shall be specially protected. When separate cables are used they shall, if reasonably practicable, be fixed on opposite sides of the road.

The fixing with metallic fastenings of cables and wires not provided with metallic covering to walls or timbers is prohibited.

Where main or other roads are being repaired, or blasting is being carried out, suitable temporary protection must be used, so that the cables are reasonably protected from damage.

332. Trailing cables for portable machines shall be specially flexible, heavily insulated, and protected with either galvanized steel-wire armouring, extra stout braiding, hose-pipes, or other effective covering. Trailing cables shall be examined at least once in each shift by the person in charge of the machine, and any defects in them promptly repaired.

Except as hereinafter provided, at points where the flexible conductors are joined to the main cables, a fixed terminal box must be provided, and a switch shall be fixed close to or in the terminal box capable of entirely cutting off the supply from the terminal box and motor.

Suitable clips may, however, be used for the temporary connection of portable motors where the voltage does not exceed low pressure.

#### *Switches, Fuses, and Cut-outs.*

333. Fuses and automatic cut-outs shall be so constructed as effectually to interrupt the current when a short circuit occurs, or when the current through them exceeds by 200 per cent. the working-current in the case of motors, or by 100 per cent. the permissible current of the cables which the fuses protect. Fuses shall be stamped or marked, or shall have a label attached indicating the current with which they are intended to be used, or, where fuse-wire is used, each coil in use shall be so stamped or labelled. Fuses shall only be adjusted or replaced by an authorised person.

334. All switches, fuses, and cut-outs must have incombustible bases of marble, slate, or porcelain. All live parts of switches, fuses, and cut-outs not in machine-rooms, or in compartments specially arranged for the purpose must be covered. These covers must be of incombustible material, and must be either non-conducting or of rigid metal, and, as far as practicable, clear of all internal mechanism.

335. Except as provided in Regulation 332, all points at which a circuit other than those for signals has to be made or broken shall be fitted with proper switches. The use of hooks or other makeshifts is prohibited.

#### *Motors.*

336. All motors, together with their starting resistances, shall be protected by switches capable of entirely cutting off the pressure and fixed in a convenient position near the motor, and every motor of 50-horse power or over in a machine-room underground shall be provided with a suitable ammeter to indicate the load put upon the machine.

337. Where the unarmoured cables or wires pass through metal frames or into boxes or motor-casings, the holes must be substantially bushed with insulating bushes, and, where necessary, with gas-tight bushings which cannot readily become displaced.

338. Terminal boxes or portable motors must be securely attached to the machine, or be designed to form a part thereof.

339. The casing of inspection-doors of all portable motors used underground, and the casings of their switches and other appliances, shall at least once a week be opened by a competent person appointed by the manager, and the parts so disclosed shall be cleaned and examined before the coverings are replaced. In special cases requiring a motor to run continuously longer than one week, the motor shall be examined at the end of the run. A report of all such examinations shall be entered in a report-book.

340. The person in charge of a drilling-machine shall not leave the machine while it is working, and shall, before leaving the working-place, see that the current is cut off from the trailing cables. No repairs shall be made to any portable machine until the pressure has been cut off from the trailing cables.

341. If, owing to any defect, any electric sparking or arc be produced outside a portable motor or by the cables or rails, the machine shall be stopped and not be worked again until the defect is repaired, and the occurrence shall be reported to an official of the mine.