

RG47



Parts 1 and 2 (Internal)

REGULATIONS FOR

SAFETY

AT POST OFFICE RADIO STATIONS

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RADIO
STATIONS**

**Rg. 47
Parts I and II
(Internal)**

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RADIO STATIONS: Rg. 47
Parts I and II (Internal)**

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Introduction

- 1.** The following pages set out the safety precautions which must be observed at Post Office radio stations. These precautions may also be augmented, but not superseded, by local instructions.
- 2.** Where they apply, the precautions against accidents contained in Rg. 41 and in Engineering Instructions must be observed.
- 3.** The precautions should be strictly observed not only by staff in charge of radio transmitters, receivers and power plant but by **all** staff when working at radio stations. All such staff are expected to acquaint themselves fully with these and any other instructions.
- 4.** The officer immediately supervising the work is responsible for ensuring that all necessary safety precautions are taken, whether or not they are mentioned in these or any other instructions.
- 5.** All visiting staff without exception, including contractors, are also required to conform to the safety precautions. Where the danger to be avoided is under the control of the visiting staff, the senior member of that staff is responsible for safety. Where the danger is under the control of or may affect station staff, the Engineer-in-Charge must appoint a competent Liaison Officer who will advise and co-operate with the visiting staff and the Duty Engineer in avoiding danger.
- 6.** Risks must NOT be taken merely to save time and trouble.
- 7.** THERE MUST BE TIME FOR SAFETY.
- 8.** Cards Misc. 187, giving instructions on the treatment for electrical shock, must be displayed in each sub-station and should also be provided in each room containing electrical equipment at Post Office radio stations. It is important that staff should make themselves acquainted with the instructions on these cards and other suitable instruction; practice in resuscitation from electrical shock must be arranged locally.

9. Reference is made in the regulations to various duty titles. These are defined below:—

Area Engineer (E.T.E.) Senior Executive Engineer in charge of a group of radio stations.

Engineer-in-Charge The nominated engineer on the staff of a radio station.

Duty Engineer The senior engineer on a shift at a radio station. He is responsible for the running of the radio equipment and operations generally.

Authorized Person An engineer appointed to carry out duties in connexion with the operation and maintenance of sub-stations and power distribution systems who is qualified to do so by reason of:—

(a) adequate detailed knowledge of the system upon which work is being carried out, so that he can avoid danger

(b) adequate knowledge of the technicalities of electricity

(c) adequate experience of work in connexion with electricity.

NOTE: Because of the need to centralize authority for the above work, in the interests of safety, in one person who is fully conversant with the minute-by-minute state of operations at the station as a whole, the Duty Engineer alone is normally appointed to act as “Authorized Person”.

Competent Person An engineer, over 21 years of age, appointed to work under the immediate supervision of an Authorized Person and who possesses sufficient technical knowledge and experience to secure his safety in the conditions under which he is required to work.

Liaison Officer An engineer who is appointed to collaborate with visiting staff working on the station and who is qualified to do so by reason of:—

(a) adequate detailed knowledge of the system upon which work is being carried out, so that he can avoid danger

Liaison Officer

- (b) adequate knowledge of the technicalities of electricity
- (c) adequate experience of work in connexion with electricity.

September, 1968.

REGULATIONS FOR SAFETY AT POST OFFICE RADIO STATIONS

PART I—FIRST AID AND CARE OF THE EYES

Contents

- 1. Artificial respiration**
- 2. Care of eyes**
- 3. Symptoms, rescue and treatment of persons suffering from effects of gas**

PART I
FIRST AID AND CARE OF THE EYES

1. Artificial Respiration (See Rg. 41)

To revive persons whose breathing has stopped for any reason such as electric shock, inhalation of gas or foul air, or drowning.

1.1 Start operations IMMEDIATELY IT IS SAFE TO DO SO. SECONDS COUNT.

1.2 If already trained in artificial respiration, use the appropriate method, otherwise proceed as illustrated in Rg. 41, but commit this to memory now:

HOLD THE VICTIM'S HEAD WELL BACK, BREATHE INTO HIS MOUTH OR NOSE,

SHOUT FOR OR SEND SOMEBODY FOR HELP.

Any attempt at resuscitation is better than none.

1.3 Send for a doctor.

1.4 Do not use a stimulant or even water.

1.5 Mechanical Resuscitators

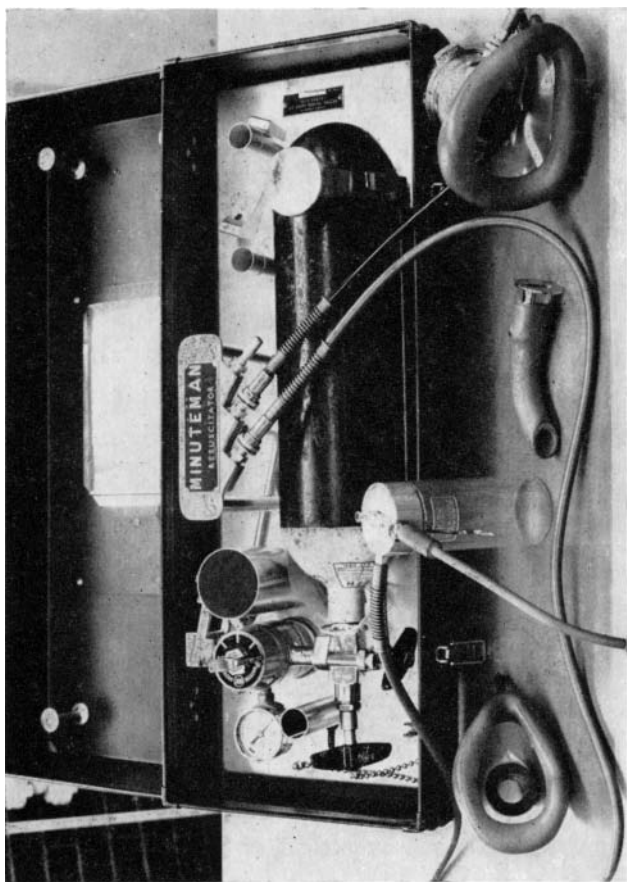
"Minuteman" resuscitators or "Porton" type resuscitators are held at key points at certain radio stations. With the aid of the "Minuteman" (automatic) and the "Porton" (manually operated), artificial respiration can be applied when natural breathing is weak or has ceased. However, it cannot be over emphasized that in resuscitation, treatment should start immediately. Delay in bringing a mechanical device will jeopardize the prospects of successful treatment. Bridge the gap by artificial respiration using ordinary First Aid means.

2. Care of the Eyes

**YOU HAVE ONLY ONE PAIR OF EYES
TAKE CARE OF THESE
FOR PRECAUTIONS TO BE TAKEN SEE Rg. 41**

3. Symptoms, Rescue and Treatment of Persons Suffering from Effects of Gas

**GAS IS LETHAL.
YOUR COLLEAGUE'S LIFE MIGHT DEPEND ON YOU.
EQUIP YOURSELF TO DEAL.
SEE Rg. 41.**



“Minuteman Resuscitator”

PART II—INTERNAL SAFETY REGULATIONS

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- 35. Mains Voltage 200–250V Mains-driven Portable Electric Tools and Equipment**
- 36. Handlamps**

- 37.** CO₂ Fire Extinguishing Equipment
- 38.** Carbon Tetrachloride Fire Extinguishers
- 39.** Cleaning fluids
- 40.** PTFE (Polytetrafluoroethylene) (E.I., GENERAL, General, S 2010)
- 41.** Cleanliness

PART II—INTERNAL SAFETY REGULATIONS

NOTE: The following definitions are used throughout:—

Low Voltage (L.V.), not exceeding 250v, d.c. or r.m.s. a.c.

Medium Voltage (M.V.), above 250v, but not exceeding 650v d.c. or r.m.s. a.c.

High Voltage (H.V.), above 650v d.c. or r.m.s. a.c.

(Subject to variations permitted by the Electricity Supply Regulations).

Dangerous Voltage is any voltage above 100v r.m.s. a.c. or 150v d.c., unless safe by virtue of current limitation. Any voltage, however low, capable of delivering heavy current is dangerous.

1. General Precautions when working on Electrical Equipment

1.1 Always assume that every conductor, whether insulated or not, which is designed to carry current at dangerous voltages, at any time is live and, therefore, **DANGEROUS**, Do not work, on such a conductor until it has been:—

- (a) disconnected from all sources of supply
- (b) proved dead
- (c) connected to earth.

DISCONNEXION ALONE IS NOT SUFFICIENT

1.2 Don't forget there can be danger from adjacent cables.

1.3 Don't forget that even an earthed conductor can carry a live induced voltage—Earth the cable on both sides of the point at which you are going to work.

NEVER WORK ON A HIGH VOLTAGE DISTRIBUTION SYSTEM UNTIL A PERMIT TO WORK FORM HAS BEEN RECEIVED

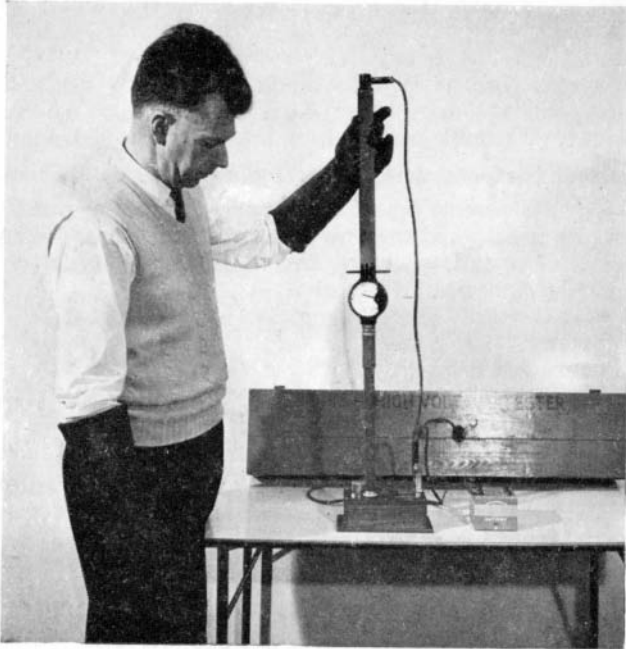
2. Disconnecting Supplies

2.1 Where possible, disconnect from each pole of the supply at two points. **FIRST** at the circuit breaker and **THEN** at the isolator. [Vice versa on reconnexion.]

DO NOT RELY SOLELY ON A CIRCUIT BREAKER OR CONTACTOR FOR ISOLATION WHEN WORKING ON EQUIPMENT.

3. Proving Conductors Dead

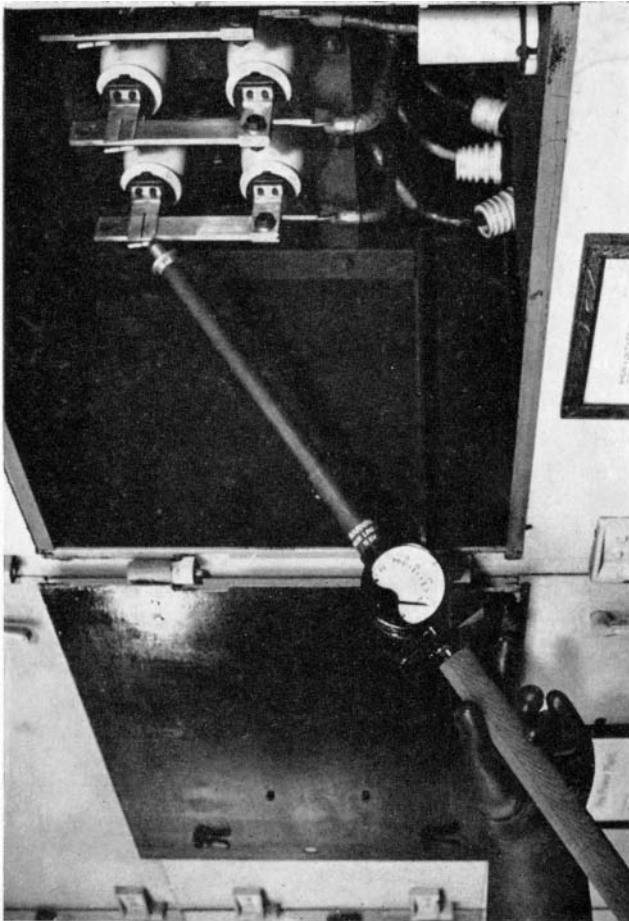
NOTE: ALWAYS CHECK THE TEST INSTRUMENT IMMEDIATELY BEFORE AND AFTER USE, WITH THE PROVING UNIT IN THE CASE OF THE H.V. DETECTOR AND ON A LIVE SUPPLY IN THE CASE OF THE M.V. VOLTMETER.



“Make sure to check the Detector first”

3.1 Use the special detector on H.V. circuits and a suitable voltmeter on M.V. circuits in order to prove the conductor is dead because:—

- (a) the wrong switch may have been operated
- (b) the blades of the switch may have parted from the handle and remained in the “ON” position
- (c) the switch insulation may have broken down
- (d) contactors may have stuck in the “ON” position.



“Make sure the voltage is not there before you earth it”

4. Earthing of Conductors

4.1 Earthing is necessary on both sides of the point of work because a conductor may:—

- (a) retain a charge
- (b) be connected to a charged capacitor
- (c) carry a high induced voltage, even though earthed elsewhere.

5. Contactors

5.1 Do not operate contactors by hand without first disconnecting ALL supplies.

6. Isolators

NOTE: This paragraph refers to a properly designed manually-operated air-break link type of isolator. The term “isolating” means operating such an isolator so that each of the poles is interrupted completely and up to the limit of the designed movement. **ISOLATORS MUST NOT BE USED TO MAKE OR BREAK A LOAD.**

6.1 Operate an isolator only by means proper to that isolator, e.g. hand wheel, lever or pole with insulated hook.

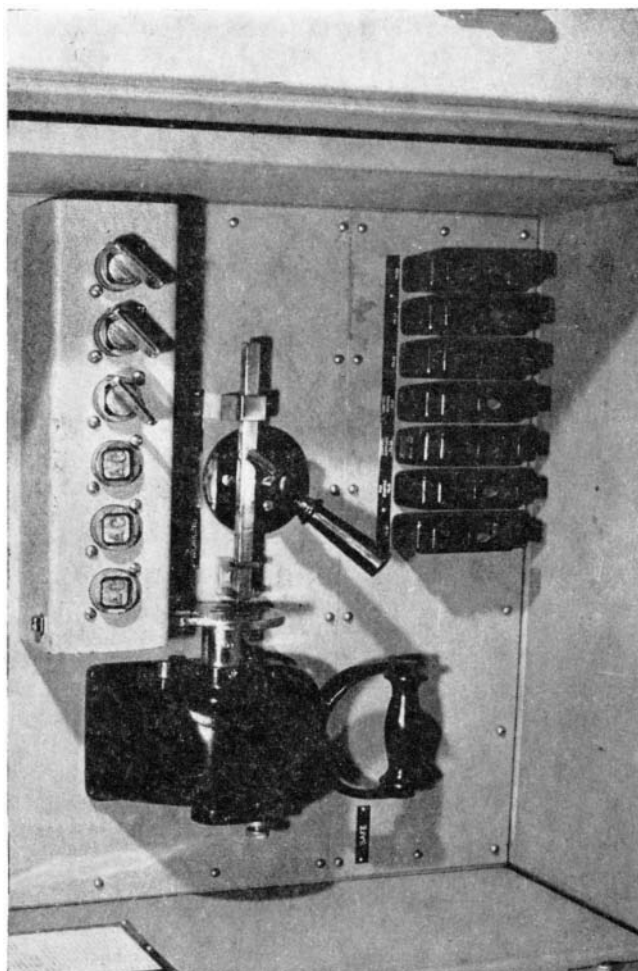
6.2 If the isolator is of the pole-operated type with independent links, open all links to their half-way positions and prove them dead before earthing any of them.

6.3 Lock the isolator open, or lock the isolator compartment or cubicle immediately after the isolator has been operated. Keep any free key in your pocket until the work is completed.

7. Interlocks

7.1 If a mechanical interlock key is released when a switch or isolator is “OFF” or a gate or door is “OPEN”, keep any free key in your pocket until the work is completed.

7.2 Do not rely solely on interlocks. ALWAYS take the precautions stated in paragraph 1.



“The key will help to protect you”

8. Capacitors

8.1 Capacitors may hold a charge for a considerable time after the power supply has been switched off. The terminal voltage charge can rise again after a momentary short circuit. Capacitors must, therefore, always be earthed and, at the same time, short-circuited by means of an earthing stick before being touched, even if automatic means of earthing and short circuiting are provided (see also pars. 15.5, 15.6 and 15.7).



“Short them all out”

8.2 Where a bank of capacitors is concerned ALL terminals must be bonded together and earthed. It is not sufficient merely to short circuit and earth the outer terminals.

8.3 Capacitors likely to develop a dangerous charge should be short circuited during storage.

9. Transformers

9.1 The procedure to be followed before working on a transformer in a high voltage sub-station is laid down in E.I. POWER, General, J 1001 and is reproduced partly in pars. 18.12 and 20.6.

9.2 Before working on other transformers and associated circuits, switch off and isolate all sources of supply. Test each winding in turn, earth by means of an earthing stick, connect the winding by a suitable length of copper cable of not less than 0.0225 sq. in. cross-sectional area to earth and leave it thus until work is completed.

10. Enclosed or Dangerous Equipment

10.1 Do not work on mains-operated rack or cabinet-mounted telecommunications equipment with live terminals, components or wiring exposed unless it is absolutely necessary and with the authority of the Duty Engineer (or the maintenance Asst. Exec. Engr. where appropriate). Be sure you are fully conversant with the equipment concerned. If you have to work on live equipment of this type, observe the following precautions:—

- (a) Use insulated tools and test prods and ensure, by regular periodic test, that the insulation is not defective. Remember a pencil is a conductor.
- (b) Stand on an insulated mat. Avoid contact between the body and all metal-work. Whenever possible, work one handed and keep the other hand behind your back or in your pocket.
- (c) Whenever practicable, mask with suitable insulating material any parts connected to dangerous voltages which are adjacent to the locations of the work and treat any nearby earthed metal-work in a similar way.
- (d) Never use a mains voltage soldering iron or one which is earthed.
- (e) Do not extend a dangerous voltage over test cords fitted with exposed tags or pins.

(E.I. PROTECTION, General, J 1005)



“Keep one hand behind your back and stand on a rubber mat”

11. Locks and Keys

11.1 All locks and keys to equipment enclosures or cubicles should be stamped with corresponding numbers or letters. Keys which are not part of a mechanical interlock system must be kept in a locked cupboard in the charge of the Duty Engineer.

11.2 Duplicate or master keys of mechanical interlock systems must be kept in a safe and only issued on the personal authority of the Engineer-in-Charge.

11.3 Keep all enclosures and cubicles locked except when access is required for maintenance.

12. Work Near Live Equipment

12.1 Do not carry out work involving the handling of wire or lengths of conducting material on galleries above live equipment or in the immediate vicinity of live equipment in perforated-metal or gated enclosures, unless authorized to do so by the Duty Engineer.

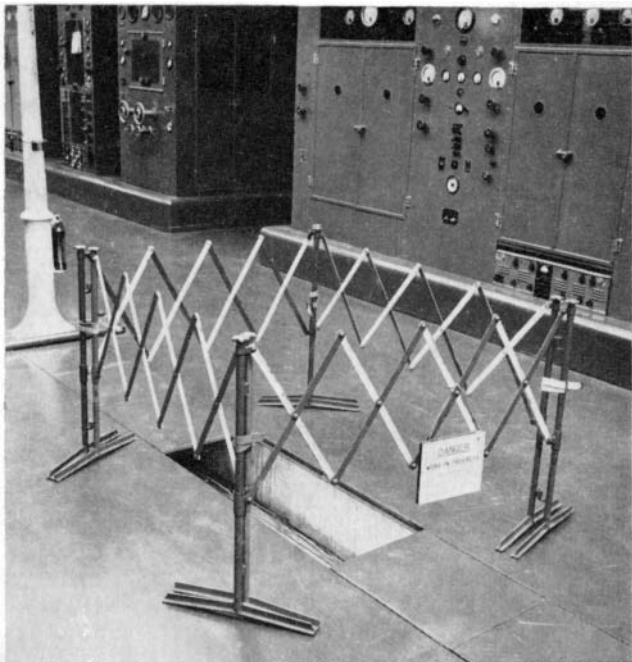
12.2 The Duty Engineer should not authorize such work unless he is first satisfied that the work cannot be deferred until the equipment can be switched off. He must then ensure that the live equipment is adequately screened to prevent accidental contact with, or damage from, any tools or material.

12.3 On the conclusion of any work on galleries, the equipment underneath should be inspected to ensure that no switch, isolator or interlock is adversely affected by cuttings of wire, or other material. In addition an actual test that the safety gear operates correctly should be made as soon as traffic conditions permit.

13 Work in Cable Trenches

13.1 Use expanding guards to guard the area, and display warning notices before removing covers from trenches which are situated in a general working area (i.e. not within an enclosure or cubicle).

13.2 Replace covers in their correct positions as soon as possible. They must not be lodged temporarily across the trench.



“Cable Trench Guard and Warning Notice—keep others out of it”

14. Standard Danger Notice

**DANGER
WORK IN PROGRESS**

The Duty Engineer alone can authorise the placing or removal of this notice which is part of the safety precautions procedure.

*Safety of Life
depends upon its correct use*

The notice must be locked on to equipment and the key held by the Duty Engineer.

**DISREGARD OF DANGER NOTICES CAN JEOPARDISE
LIFE AND WILL RESULT IN DISCIPLINARY ACTION
AGAINST THE OFFENDER.**



“Standard Danger Notice—always respect it”

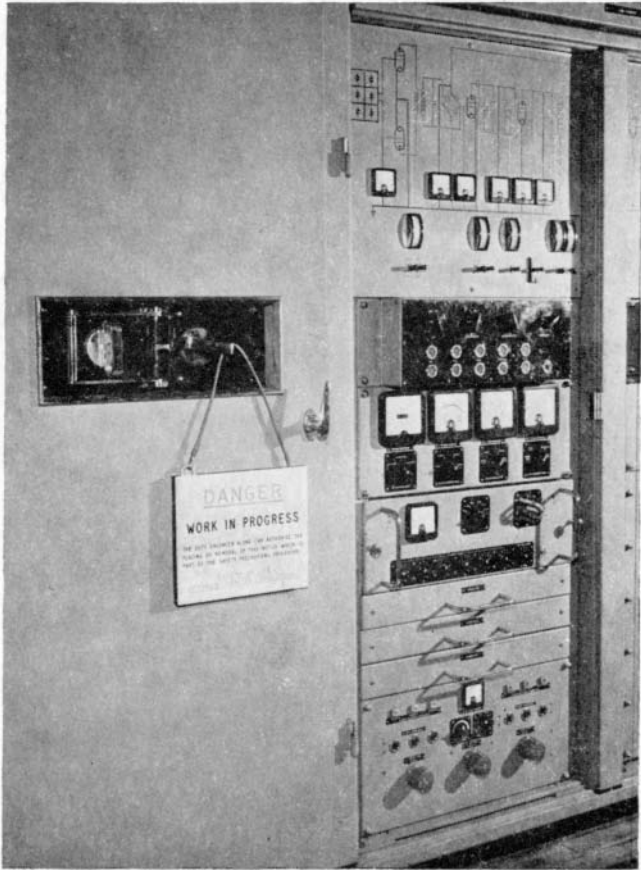
14.1 Danger notices are an integral part of the engineering safety system; only approved notices having the wording “DANGER—WORK IN PROGRESS” will be used. The Duty Engineer alone can authorize the placing or removal of danger notices.

14.2 Where the danger to be avoided is under the control of station staff:—

- (a) attach the standard danger notice securely to any switch, isolator, transmission-line source of power or remote control which has been disconnected in order to allow work to proceed safely.
- (b) withdraw the notice as soon as all work has been completed and the necessary permission obtained from the Duty Engineer.

14.3 When the Telecomm H.Q. is engaged in installing, modifying or testing equipment at E.T.E. stations and the danger to be avoided is under their control, the following procedure applies:—

- (a) attach standard danger notices as in par. **14.2.**
- (b) Details of the transmitter released, showing transmitter number, time, date, a brief description of work and the location



“The Danger Notice is there to warn everybody”

of the warning notices must be entered in the log of the Duty Engineer. The entry will be signed by the Telecomms. H.Q. engineer and also by the station Duty Engineer.

- (c) On completion of the work, the date and time of handing back the transmitter will be recorded in the log and signed by both the Telecomms. H.Q. engineer and the station Duty Engineer.

15. Transmitter Operation

15.1 Do not operate or interfere with equipment or any associated switch, isolator, earthing lead or stick, transmission line, aerial switch or aerial lead out, on which a "danger" notice is displayed. (See par.14.)

15.2 Do not energize a transmitter with:—

- (a) anyone inside any enclosure or cubicle
- (b) any door, gate or shutter open
- (c) any interlock inoperative
- (d) any protective screen or panel missing or improperly secured.

15.3 Report any faulty safety device or other source of danger to the Duty Engineer immediately.

15.4 Before entering or working in any transmitter for the purpose of frequency changes or adjustments whilst the transmitter is scheduled to carry a service:—

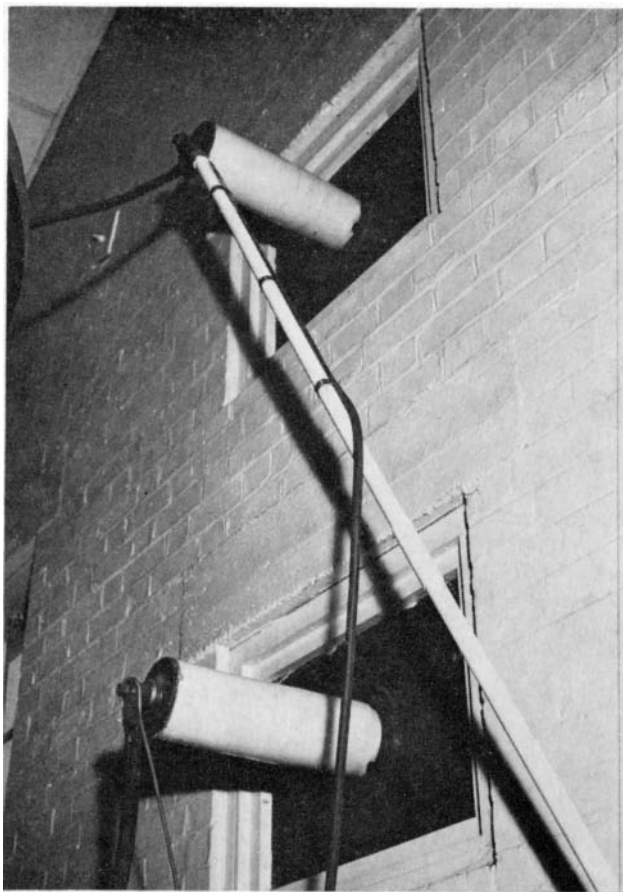
- (a) advise a colleague. If the frequency change entails travelling to an unattended remote station, two men must attend.
- (b) ensure that all supplies are disconnected and/or isolated.

The transmitter should NOT be entered for any other purpose without taking the additional steps given in par. 16.

- (c) on long and medium-wave transmitters, earth the aerial. Remember that dangerous R.F. voltage can be induced in aerials and tuning inductors by adjacent transmitters. NEVER leave a long or medium-wave aerial disconnected and not earthed.

On short-wave transmitters, earth transmitters' output, disconnect and earth associated internal line or coaxial feeder.

- (d) if an external H.T. earthing switch is provided, turn it to the EARTH position.
- (e) ensure that there is no drive into the stage;
- (f) retain in your possession any mechanically interlocked keys released.



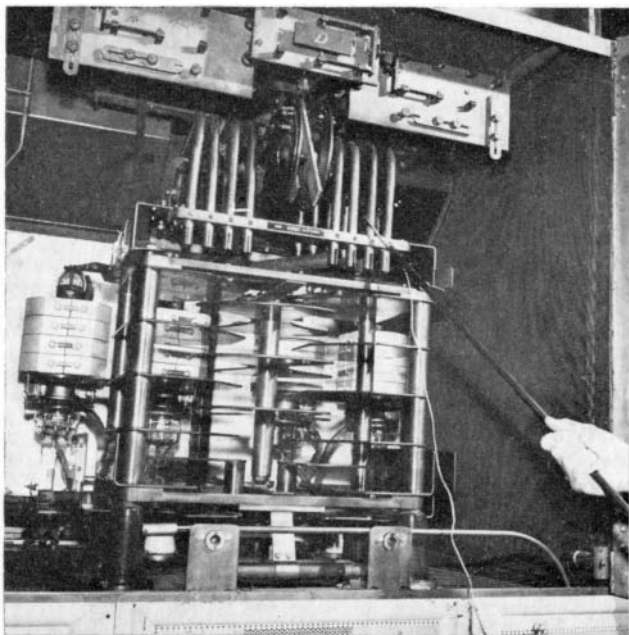
“Earth it—the pick-up is DANGEROUS”

15.5 IMMEDIATELY ON ENTERING and before touching anything in a transmitter stage or enclosure, short circuit and, at the same time, earth any smoothing capacitors by means of the earthing stick and switch, where the latter is provided, and leave them in this condition until the work is completed.

15.6 If there are no smoothing capacitors, apply the above precaution to the incoming H.T. lead.

15.7 Apply the earthing stick to any conductor, coil or component before touching it, in order to drain off any residual charge, and momentarily short circuit and earth capacitors other than smoothing capacitors.

15.8 Earth the transmitter output circuit and leave it in that condition until work is completed.



“The earthing stick is your SAFETY WAND”

15.9 When Leaving an Enclosure

- (a) ensure that all tools, test equipment and materials have been removed from the enclosure
- (b) remove temporary earths and hang earth sticks on the hooks provided
- (c) ensure no one is left in the enclosure
- (d) close all doors and gates
- (e) restore any mechanical interlock key in your possession to its normal position
- (f) notify that the wave change or adjustment has been completed.

16. Transmitter Maintenance and Cleaning

16.1 BEFORE ENTERING or working in any transmitter stage or enclosure:—

- (a) advise the Duty Engineer and, with his agreement, securely fix the danger notice on associated isolators, switches, aerial commutator switches or transmission line sockets and,
- (b) observe ALL rules laid down in par. **15**.
- (c) on completion of the work notify the Duty Engineer and obtain his authority for the removal of the danger notices.

17. High Voltage Sub-stations—General

E.I. POWER, General, J 1001 is of general application to all the Departments' high voltage sub-stations and should be read in conjunction with the detailed instructions concerning the particular type of equipment installed.

For the radio station purposes, a sub-station is defined as that part of any building in which electrical energy is transformed or converted to, or from, high voltage or in which high voltage switching is performed except for the purpose of working solely one radio transmitter or receiver.

18. High Voltage Sub-stations—Authorized Persons Procedure

18.1 A sub-station will at all times be directly in the charge of an authorized power-plant attendant, who will be responsible for the safety of the staff and apparatus, and no H.V. switch may be operated without his consent. He must be an Authorized Person within the meaning of Regulation 28* of the Electricity (Factories Act) Special Regs. 1908 and 1944.

18.2 H.V. switching operations may only be carried out by an Authorized Person or a Competent Person acting under his immediate supervision in accordance with Regulation No. 28.

18.3 The Authorized Person is authorized as such only for works on sub-stations, switchboards and distribution systems which are the property of the Post Office or are operated by the Post Office on behalf of the Administration owning the radio station.

18.4 Authorization to work or operate plant which is the property of an Electricity Board can only be given by that Body. Such plant should be clearly labelled so as to identify it as the property of that body.

18.5 Where a contractor is employed and the danger to be avoided is under his control, the contractor, to comply with Regulations 28, shall appoint the Authorized Person.

18.6 At radio stations, Authorized Persons will be appointed by the Engineer-in-Charge and they will be formally notified on form ETE 196. A copy will be filed by the Engineer-in-Charge.

***Regulation 28**

No person except an authorised person or a competent person acting under his immediate supervision shall undertake any work where technical knowledge or experience is required in order adequately to avoid danger; and no person shall work alone in any case in which the Secretary of State directs that he shall not. No person except an authorised person, or a competent person over 21 years of age acting under his immediate supervision shall undertake any repair, alteration, extension, cleaning, or such work where technical knowledge of experience is required in order to avoid danger, and no one shall do such work unaccompanied.

Where a contractor is employed, and the danger to be avoided is under his control, the contractor shall appoint the authorised person, but if the danger to be avoided is under the control of the occupier, the occupier shall appoint the authorised person.

18.7 The Duty Engineer is normally the proper person to perform the duties of Authorized Person and form ETE 196 is only valid while the holder is the Duty Engineer, except as detailed in (a):—

- (a) The Authorized Person authority for specific work at any station may be transferred from the Duty Engineer, using form ETE 200, to the Maintenance Assistant Executive Engineer if the latter has also been nominated as an Authorized Person.

18.8 A list of Authorized Persons should be permanently exhibited on the station and kept up to date.

18.9 The Authorized Person must keep the following records:—

- (a) H.V. switching performed and the time of each operation.
- (b) Names of Competent Persons acting under his immediate supervision and authorized to carry out H.V. switching operations.

18.10 The custody of all keys of switch and cubicle locks in H.V. sub-stations is vested in the Authorized Person and no one may use or remove them without his authority. Keys issued to any officer must not be passed to another person without the consent of the Authorized Person.

18.11 The Authorized Person is responsible for seeing that no cleaning or other work is performed on H.V. plant in the sub-station until he has personally complied in all respects, with the safety requirements in the presence of any Competent Person whom he may instruct to carry out the work required.

18.12 While working on transformers or circuits connected thereto, the Authorized Person must take special care that both sides—H.V. and M.V. or L.V.—are isolated on each phase.

18.13 Work on H.V. cables or plant may only be undertaken on the written instructions of an Authorized Person on form ETE 198, after he has personally satisfied himself that every precaution has been taken to ensure the safety of the men who are to do the work, and that the relevant regulations have been complied with.

18.14 All telephone calls associated with isolation certificates (form ETE 199) must be repeated back by the recipient in the presence of a witness. The certificate must be completed at the first opportunity and all the operations must be entered in the record of switching operations immediately after each operation, each entry being supported by the name of the witness.

18.15 Apparatus which is to be worked upon must be discharged to earth in the presence of the Authorized Person and Competent Persons concerned, before any work is commenced.

18.16 On completion of work, the plant must only be made alive on the written instructions of the Authorized Person in charge of the work who first must satisfy himself by a personal check that everything is in order. Similar precautions must be taken with new work or additions to the system before they are made live and brought into use.

19. High Voltage Sub-stations—Competent Persons Procedure

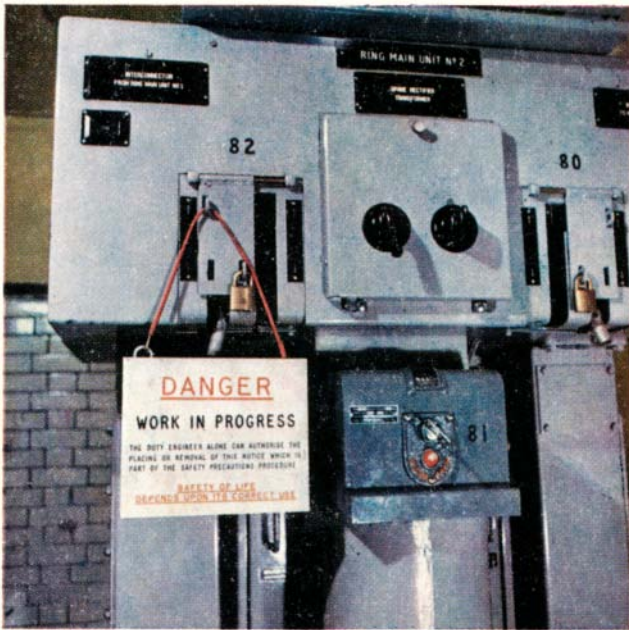
19.1 The procedure for appointing Competent Persons is similar to that for Authorized Persons, form ETE 197 being used for notification.

19.2 A list of Competent Persons should be permanently exhibited on the station and kept up to date.

20. High Voltage Sub-stations—Testing and Earthing of Conductors

20.1 Every conductor, whether insulated or not, which is designed to carry current at any time must be assumed to be live and, therefore, dangerous until it has been connected to earth. The fact that it has been disconnected from all sources of supply is not alone sufficient to make it safe.

20.2 Before any work is commenced, the switching operations necessary to disconnect the plant in question should be carried out and a danger notice should be attached to each of the controlling switches.



“The Danger Notice is there to warn you and others”

20.3 Any accessible conductor should then be tested to ensure that it has been disconnected from all supplies and should be connected to earth to discharge it. Similar treatment should be applied to any conductor not previously accessible when it becomes accessible during the work, unless it has been previously discharged at some other point.

20.4 Testing and discharging should be carried out as follows:

Stage (a) Connect to earth the earthing leads of the high-voltage detector (see 21.1a) and the earthing stick or sticks, if two are necessary—see par. 20.6.

Stage (b) Rubber gauntlets must be worn until testing and earthing have been completed.

Stage (c) Test the H.V. detector by means of the proving unit.

Stage (d) Stand on a rubber mat, especially kept for the purpose, clear of all metalwork and use the H.V. detector to test the conductor on which work is to be done.

Stage (e) If stage (d) indicates that the conductor is not energized, retest the H.V. detector on the proving unit to ensure that it is still working.

Stage (f) If stage (d) indicates that the conductor is not energized and (e) shows that the H.V. detector is still satisfactory, discharge the conductor with the earthing stick and then connect it to earth with a cable—see paragraph 21.1(c).

The earth connexion should be made as near as is practicable to the point at which work is to be done and should not be removed until the work is completed and the plant is ready to be energized.

20.5 When a component, such as a draw-out switch, has, in the act of removing it to permit access, been completely disconnected from the remainder of the gear and no possibility exists of any part of the withdrawn component being connected to a supply, it is sufficient to discharge it without prior testing with the H.V. detector.

20.6 When a transformer circuit (including any circuit to which a potential transformer is connected) is to be discharged, one terminal should be earthed with an earthing stick and each other terminal of the same winding tested in turn with an H.V. detector and then earthed with a second earthing stick if the conductor is found to be not energized. The process should be repeated for each winding.

21. High Voltage Sub-stations—Apparatus required for Testing and Earthing

21.1 At each sub-station as many of the following items should be held as are required for carrying out the operations specified in pars. 20.4 and 20.6:—

- (a) H.V. detector with proving unit.
- (b) Earthing stick fitted with earthing lead of not less than 0.0225 sq. in. H.V. flexible cable.
- (c) Earthing cable—suitable length of copper cable of not less than 0.0225 sq. in. cross-sectional area.
- (d) Rubber gauntlets—“Gauntlets I.R.”
- (e) Rubber mats—“Mats I.R.”

21.2 Rubber Mats and Gauntlets ARE NOT TO BE REGARDED AS AFFORDING PROTECTION AGAINST HIGH VOLTAGE AND THEIR USE IN ACCORDANCE WITH THE FOREGOING PROCEDURE IS FOR SECONDARY PROTECTION ONLY.

22. Medium Voltage Switchboards and Busbars

22.1 Before commencing work:—

- (a) switch off and isolate all supplies at the remote end of the feeders
- (b) disconnect supplies to all auxiliary circuits, control circuits and metering leads from other cubicles
- (c) display danger notices on the switches
- (d) prove the feeders dead with a voltmeter. [Note: Check the voltmeter immediately before and after use.]
- (e) discharge all feeders to earth.

22.2 When work is to be restricted to one cubicle of the board it will suffice to isolate and earth all feeders into that cubicle provided that the isolating links are in a separate compartment or in compartments which are closed, locked and on which danger notices are displayed.

23. Power Plant—General

23.1 Obtain the permission of the Duty Engineer before working on a machine.

23.2 Wear a boiler suit when working on rotating machinery.

Do *NOT* wear a dust coat. Remove or fasten loose garments such as ties, belts.

Do *NOT* carry tools or hardware in breast pockets.

(E.I. POWER, Machines and Switchboards, A 3010 refers.)

24. Power Plant—Motors and Starters

24.1 If a starter isolator is in the “OFF” position, do not operate the isolator or attempt to start the machine concerned until you have checked that all is in order and that no work is proceeding on the machine. This applies especially to remotely controlled machines.

24.2 Before working on a machine, isolate the starter and fix a danger notice to the starter handle. In addition, isolate at the switchboard, if possible.

24.3 Do not rely on the starter isolating switch only, if you are going to work on the starter, as the incoming contacts will still be alive. The supply must be disconnected at the switchboard and a danger notice fixed to the switch handle.

24.4 Padlock isolators if facilities are provided.

25. Power Plant—Generators

25.1 Disconnect the field circuit of a generator before running it for the purpose of cleaning the commutator.

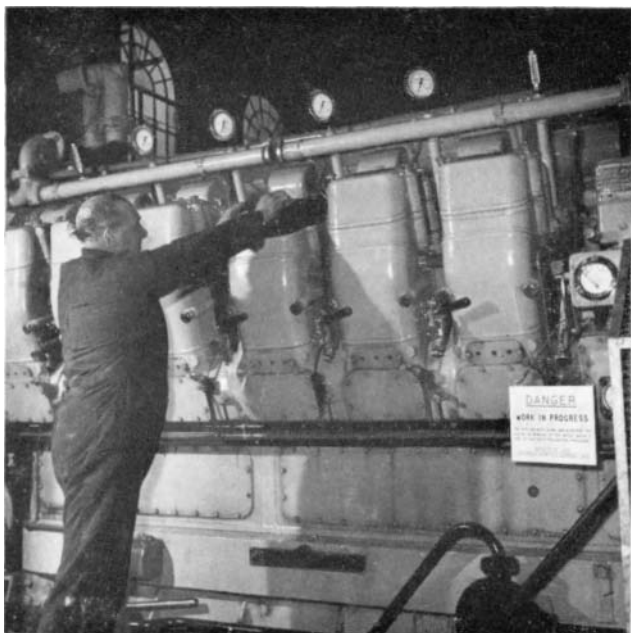
25.2 When cleaning a running commutator, use a proper holder for the glass paper.

26. Power Plant—Engines

26.1 Do not work on an engine until you have taken precautions against someone else starting it by:—

- (a) removing starter battery lead
- (b) padlocking and chaining air starting and charging valves
- (c) fixing danger notices on starting controls
- (d) leaving decompressor valves open.

26.2 *Diesel Engines.* When testing a fuel injector it must be directed away from the operator. On no account must the hands be brought into contact with the spray, which has great penetrating force.



“Keep off the starting handle—man working”

27. Compressed-Air Equipment

No repair or maintenance work may be started on compressed-air equipment until the valves controlling the supply of air to the equipment have been closed, and air has been released from the receivers and associated pipework, which must then be left open to atmosphere.

WARNING: IT IS VERY DANGEROUS TO DIRECT A STREAM OF COMPRESSED AIR AT ANY PERSON.

28. Electrical Storms

Do not work on aerial lead-in systems of any type when there is an electric storm in the vicinity.

29. Aerial Commutators

Commutator systems vary so much between stations that comprehensive guidance cannot be given. Reference must, therefore, be made in each case to local instructions. However, general precautions are set out below.

29.1 Before working on a switch unit ensure that:—

- (a) the associated transmitters are shut down
- (b) inner conductors of coaxial feeders are earthed as they become accessible and remain thus until the work is completed.

29.2 When working on coaxial feeder patch field:—

- (a) wear rubber gauntlets and stand on a rubber mat to disconnect and earth
- (b) close the ends of the feeder tubes with the caps provided when a patching length has been removed.



“Earthing the coaxial inner to prevent dangerous pick-up”

30. Internal Transmission Lines

30.1 Check that aerial leads and internal transmission lines are not connected to a transmitter before handling them.

30.2 Wear rubber gauntlets when handling open wire transmission lines and aerial leads unless they are earthed on each side of, and close to, the working points.

31. Electro-magnetic Radiation

Staff are warned that injury can arise from exposure to intense electro-magnetic radiation at any radio frequency capable of being absorbed by the body.

Generally, at frequencies below about 300 MHz the body temperature rises during exposure and, should this occur, staff should leave the area and report the matter immediately.

Particular care should be exercised when dealing with frequencies above 300 MHz as an increase in bodily temperature may not occur. As these frequencies are usually carried in waveguides keep well away from the open ends of waveguides or launcher units.

Staff who have bone fractures repaired by metal or plastic implants must take particular care to avoid exposure to radiation at any frequency.

If an exposure risk is suspected a medical examination should be carried out and a full description of the circumstances given to the medical authority.

32. Unattended Stations

Staff working in normally unattended or semi-attended stations should be conversant with all regulations governing the work in hand and must be aware of local arrangements for reporting their findings and actions. Supervising officers should ensure that staff are not employed on this work unless they are aware of the nature of the equipment and are fully competent to carry out the work. When there is a risk of contact with conductors that are live or might in any circumstances become alive above 250V a second officer should be in attendance.

33. Trainee Technician (Apprentices)

Apprentices must not enter or operate any transmitter or enter any enclosure except under direct supervision.

34. Labourers

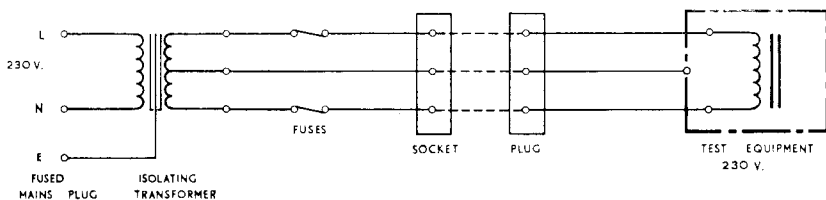
Labourers must not enter any transmitter or equipment enclosure unless specifically instructed.

35. Mains Voltage 200–250V Portable Electric Tools and Equipment

35.1 Portable tools and appliances should be of the all insulated or double insulated type and conform to BS 2769 or BS 3456B. Appliances included in these categories are portable drills and hammers up to $\frac{1}{2}$ in. capacity and cleaning tools.

35.2 All other tools should be 110V rating fed from mains via a 240/110V all-insulated isolating transformer (BS 3535) or from a portable generator. The frame connexion of the tool will be connected to the centre point of the earth-free secondary winding of a transformer or to the centre point of the alternator winding of a generator.

35.3 For mains driven portable testing equipment, a 1/1 ratio isolating transformer should be used. The core of the transformer should be connected to the mains earth, and the centre tap connexion of the “earth free” secondary winding to the case or chassis of the testing equipment. At installations having more than one outlet socket or test position the 1/1 ratio isolating transformer must be used with current operated earth leakage protection. In this instance, the centre tap of the secondary winding and the case or chassis of the testing equipment should be connected to the mains earth.



35.4 Mains voltage tools appliances or isolating transformers should be connected to the mains circuit through fused plugs. The rating of the fuse should be as low as possible consistent with the current rating of the equipment.

35.5 The condition of flexible cords attached to portable tools and appliances should in all instances be checked by the user before commencing the work. Particular attention should be given to plug-socket arrangement for extending leads to ensure that connexions are correct and good contact is made by the pins in their associated sockets. For the renewal of cords see E.I. POWER, General, C 5901.

36. Handlamps

Only electric handlamps with rough service lamps should be used except in damp situations where low voltage lamps with a 25V supply should be used.

37. CO₂ Fire Extinguishing Equipment

37.1 Operate the safety lock before working in an enclosure fitted with CO₂ fire extinguishing equipment and leave access doors open.

37.2 Restore the safety lock to normal as soon as work is completed.

37.3 Except when wearing breathing apparatus, or for rescue under the conditions of Part I, Section 3, do not enter an enclosure, in which CO₂ has been discharged, until it has been fully ventilated for at least ten minutes.



“Put the pin in for safety”

38. Carbon Tetrachloride Fire Extinguishers

Carbon tetrachloride is used in some fire extinguishers and its vapour is harmful. Also, when directed on a fire there is the serious danger that toxic gas could be generated (see par. 39); avoid the fumes as far as possible in fire-fighting and thoroughly ventilate a room so affected before it is used again. (E.I. ACCOMMODATION, General, G 2501.)

39. Cleaning Fluids

Do not use ether or other highly inflammable or toxic solvents. Certain chemicals such as carbon tetrachloride and trichloroethylene themselves are not only toxic but form highly poisonous phosgene gas when heated, therefore, never smoke or carry out soldering, welding or similar operations when these vapours are present.

40. PTFE (Polytetrafluoroethylene) (E.I. GENERAL, General, S 2010)

This plastic material is normally harmless but if heated to about 300°C gives off toxic fumes. It is essential that where PTFE dust or chippings could contaminate tobacco there must be a ban on smoking and careful attention to personal cleanliness with particular reference to washing hands and frequent shaking of working clothes.

41. Cleanliness

Before handling copper bronze or jute insulated wire, lead cables or battery materials, resins, or any other toxic materials, rub an approved barrier cream thoroughly into the hands. After handling, use an approved removing cream and wash thoroughly with soap in warm water without delay. If epoxy resins or resin putty is being used, disposable polythene gloves must be worn (E.I. GENERAL, General, S 2020).

**P.O. Radio Stations
Aerial Work Permit**

- A. *The Engineer-in-Charge/Duty Engineer,
The undermentioned work is to be carried out:—

.....
Please arrange for the following transmission lines or lead outs and power lines to be disconnected and earthed within the building in my presence, and danger notices displayed to my satisfaction. (Included are lines known to be a source of danger through induction or contact. Rg. 48 refers.)
.....

.....External Senior Technician

.....Date and Time

- B. Mr. (Senior Technician)
The following action has been taken and witnessed by you. (NOTE: These precautions do not replace local earthing at the working point. Rg. 48 refers.)
.....

.....*The Engineer-in-Charge/Duty Engineer

Noted.Senior Technician

- C. *The Engineer-in-Charge/Duty Engineer,
The above mentioned aerials and transmission lines are now clear and ready for service.

.....Senior Technician

.....Date and Time

- D. Filing Duty,
For filing please.

.....*The Engineer-in-Charge/Duty Engineer

.....Date

*Delete whichever is inapplicable.

NOTE: A copy of this form is included because it is necessary to ensure close co-operation between the external working party and the Engineer-in-Charge or Duty Engineer.

Serial No.

Sub-stations and High Voltage Switching

Mr. rank
of Radio Station, being a person who is compe-
tent for the purpose of the regulation in which the term is used from this date
..... until is appointed as an "Authorized Person"
to carry out duties incidental to the generation, transformation, distribution
or use of electrical energy:

- (a) throughout the radio station; or
- (b) within the following restricted area or limits

.....

THIS AUTHORITY IS VALID ONLY WHILE THE HOLDER IS
PERFORMING THE DUTIES OF DUTY ENGINEER OR WHILE
PERFORMING THE DUTIES OF MAINTENANCE ASSISTANT
ENGINEER AND CARRYING OUT WORK WITH THE WRITTEN
AGREEMENT ON FORM ETE 200 OF THE DUTY ENGINEER.

(Signed).....
Engineer-in-Charge

Date

Appointment noted by recipient,

.....

Date.....

Reference: pars. 18.6 and 18.7.

Serial No.....

**Sub-stations and High Voltage Switching
Competent Person**

Mr. ofRadio Station, being over 21 years of age and competent for the purpose of the regulation in which the term is used is permitted, when instructed to do so by and while **UNDER THE IMMEDIATE SUPERVISION OF AN AUTHORIZED PERSON**

to work at on High Voltage Sub-station equipment where, as decided by the authorized person, technical knowledge or experience is required in order to avoid danger.

(Signed).....
Engineer-in-Charge

.....19.....

Reference: par. 19.1.

Serial No.

PERMIT TO WORK

ISSUE. To in charge of work.

I hereby declare that it is safe to work on the following HV apparatus, which is dead, isolated from all live conductors and is connected to earth

.....
The apparatus is efficiently connected to earth at the following points

.....
ALL OTHER APPARATUS IS DANGEROUS.

Danger notices are posted at.....

No. of keys issued

The apparatus mentioned hereon will not be made live again until the Clearance certificate has been completed by the person in charge of the work and returned.

Signed by, being an Authorized Person possessing authority to issue a permit for the work specified above.

Time..... Date.....

RECEIPT. I hereby declare that I accept responsibility for carrying out the work on the apparatus detailed on this permit, and that no attempt will be made by me, nor will I permit the men under my control to carry out work on any other apparatus.

Signed..... Time..... Date.....

CLEARANCE. I hereby declare that the work for which this permit was issued is now suspended/completed and that all men under my charge have been withdrawn and warned that it is no longer safe to work on the apparatus specified on this permit, and that gear, tools and temporary earthing and short circuit connections are all clear and that all screens, partitions, etc., have been replaced.

Signed..... Time..... Date.....

NOTE. As soon as the work has been completed the permit to work must be returned to the Duty Engineer.

CANCELLATION. This permit to work is hereby cancelled and all earths, keys and danger notices referred to above have been withdrawn.

Signed being an Authorized Person possessing authority to issue a permit to work.

Time..... Date.....

Reference: par. 18.13.

Serial No.

INTER BUILDING ISOLATION CERTIFICATE

(To be used where an Authorized Person is on duty at each building)

The Duty Engineer, Building Radio.

I request that the following circuits/plant be isolated

.....
and earthed at

for the purpose

Signed, being an Authorized Person.

Location..... Time..... Date.....

(If telephoned) The above message was telephoned by me to

and repeated back in the presence of Mr. and has been
entered in the log of switching operations.

Signed.....

The Duty Engineer, Building.

The following circuits/plant have been isolated as requested

..... and earthed at

Signed being an Authorized Person.

Location..... Time..... Date.....

(If telephoned) The above message was telephoned by

to and repeated back in the presence of Mr.
and has been entered in the log of switching operations.

Signed.....

The Duty Engineer, Building.

The work for which this isolation certificate was issued is now completed.
All staff have been withdrawn and warned. All earths under my responsibility
have been removed. The circuits/plant may now be restored.

Signed, being an Authorized Person.

Location..... Time..... Date.....

(If telephoned) The above message was telephoned by

to and repeated back in the presence of Mr.
and has been entered in the log of switching operations.

Signed.....

This isolation certificate is hereby cancelled.

Signed.....

Location..... Time..... Date.....

Reference: par. 18.14.

Serial No.

**Transfer of Authority from Duty Engineer
to, Maintenance Assistant Executive Engineer**

The Duty Engineer,

The following work is proposed to commence at
on

.....
and involves the following switching/isolating/earthing of High Voltage
Supplies/equipment.

.....
for which I assume responsibility as Authorized Person, with your agreement.

.....,
..... Radio
..... 19

Mr.

Agreed

.....(Duty Engineer)

.....19.....

The Duty Engineer,

The work is now completed. The plant has been left in the following
condition:—

.....
(Signed)
.....19.....

Noted and cancelled.

.....(Duty Engineer)

.....19.....

Reference: par. 18.7(a)

(1). This book is the property of the Postmaster General and must be handed in when the holder leaves Post Office Employment. The Regulations in this booklet should be read as soon as possible.

(2). This book is issued by agreement between the Official and Staff Side of the Engineering, Factories and Supplies Departmental Whitley Council of the Post Office.

(3). The distribution of this book should be adequate to cover all men employed on internal work at any radio station, all supervisors at any radio station, and any other supervising officers with responsibilities for radio station work.

This supersedes all previous editions.