FEBRUARY 1971 Vol. 13 No 2

THE ROYAL OBSERVER CORPS

JOURNAL

The Royal Observer Corps Journal is a monthly publication produced by the Directorate of Flying Training (R.A.F.), Ministry of Defence. Applications for copies must be submitted through the normal official publications supply channels—**not** to the Editorial Office or direct to the Ministry of Defence. **This publication is produced solely for official use and must not be sold to members of the public.** Contributions and correspondence should be addressed in the first instance through the usual Corps channels to Headquarters, Royal Observer Corps.

Setting up and operating the Post Radio Installation

by Observer Lieutenant G. H. PAINE,
ROC Area Training Officer, Metropolian Area, ROC Uxbridge

Introduction

In the event of a nuclear war the task of the Royal Observer Corps would be to provide the United Kingdom Warning and Monitoring Organisation with details of all nuclear bursts and the occurrence and intensity of radioactive fallout resulting from these bursts. All this vital information originates at the many underground ROC posts which are scattered throughout the country. The information gathered at these posts must be passed on to an ROC operations room where it can be displayed, assessed and distributed to all interested customers. Good communications between the posts and the operations rooms are therefore vital if we are to perform our task at all.

Normally these communications are by way of GPO landlines but it will be obvious that these landlines, many of which are overhead, would be most vulnerable in the event of a nuclear attack. It is therefore necessary to provide some backing to these communications in the form of VHF radio.

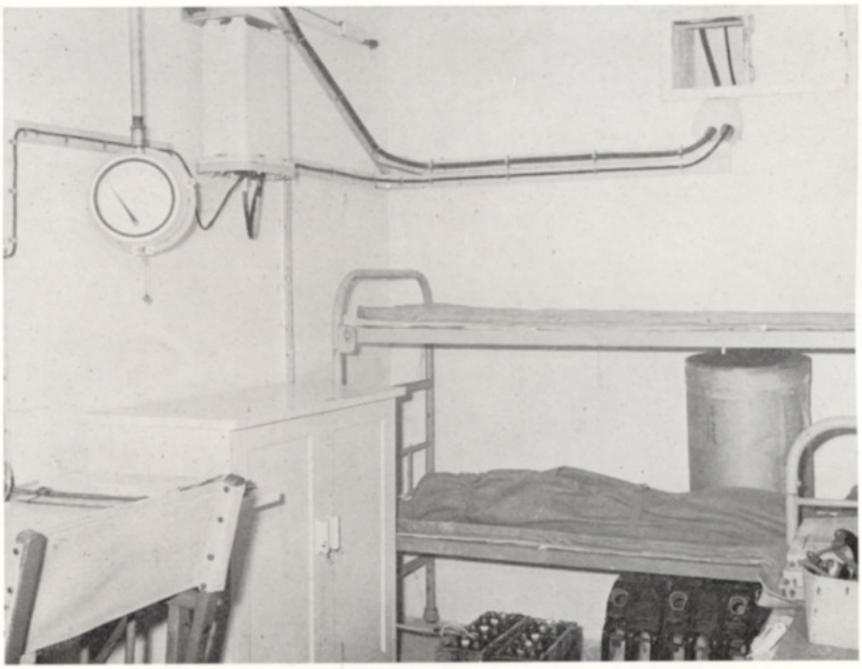
A number of Royal Observer Corps Groups are already equipped with post radio and it will eventually become standard equipment at master posts throughout the Corps.

The equipment

The post radio receiver/transmitter is a sealed transistorized box-like unit measuring 16 x 11 x 6 inches. This unit is fixed to the wall of the monitoring room in the underground post in a position to the right and slightly above the BPI dial. It operates on two pre-set frequencies (one receive and one transmit) of about 145 MHz and 155 MHz, each Group being allocated its own frequency within this range.

Power for the set is supplied by a 12 volt Nife battery of the same type as, and interchangeable with, the present post lighting battery.

The set operates in conjunction with a pneumatic telescopic aerial mast which has to be fitted into a bracket mounted on the rear ventilator outside the post. The dipole aerial is attached to the top of the mast by means of a special holder. Two connections from this mast are



Radio set mounted on wall adjacent to BPI with coaxial cable and pneumatic hose exits to ventilator shaft

taken down into the post via the ventilator shaft. One of these is the coaxial cable which connects the aerial to the radio set itself, and the other is a rubber hose connecting the pneumatic mast to a hand pump fixed to the floor of the monitoring room. Operation of this pump will extend the mast to its operating height of 32 feet.

The radio operator at the post wears a headset similar to those used by post display plotters in the operations room. The headset is plugged into a jack beneath the monitoring room table.

Function

The range of the radio is partly dictated by a visual sight from one aerial to another. This range would normally be approximately ten or fifteen miles, dependent upon the contours of the terrain between the transmitting and receiving aerials. To increase this range it is therefore necessary for all transmissions to go through a relay or repeater station. These are mainly Police repeaters already in existence.

As previously mentioned, all master posts in a given Group are on the same frequency. This does not necessarily mean that all radio posts in a Group will be able to hear one another, and to prevent more than one post transmitting at any one time, all messages from posts must be preceded by the go-ahead from control at Group Headquarters.

The receiver/transmitter at Group Headquarters is in the radio room and is remotely controlled from the Post Controller's position on the balcony of the operations room. To connect a radio post to its appropriate post display plotter the Radio Controller simply throws the relevant cluster key on the Post Controller's keyboard.

Setting up the equipment

The pneumatic mast and dipole are stored in the post monitoring room and would be removed on manning-up the post. The coils of coaxial aerial cable attached to the mast do have a tendency to foul the balance weight assembly of the post's hatch cover on the way up the entrance shaft, so it is quite a good idea to use a large plastic or hessian bag pulled down over these cables to prevent this.

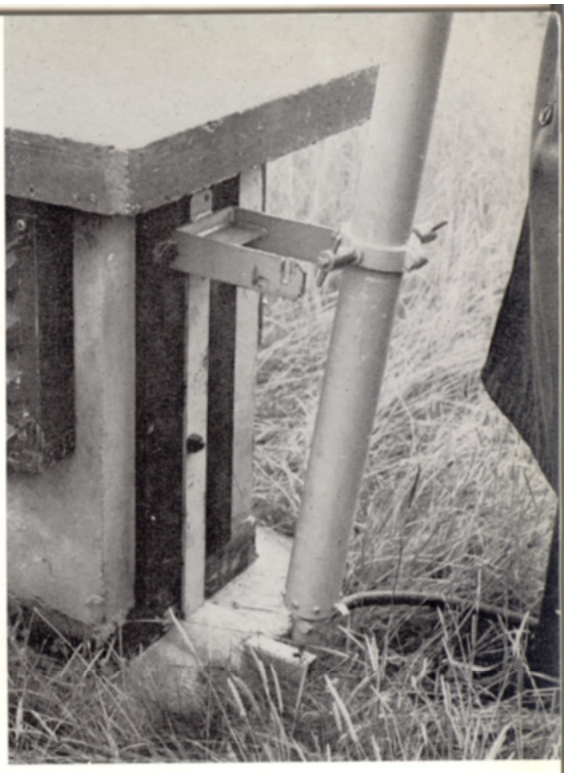
It is at this stage that the aerial dipole is attached to the mast. Some coaxial cable is first fed through the hole in the side of the dipole holder at the top of the mast, so that there is sufficient cable protruding from the end of the holder to allow for easy connection of the coaxial cable plug into the socket of the dipole. The dipole is then fed into its holder, taking care not to kink the coaxial cable in the process. The dipole must then be secured in its holder by tightening the clamp with a screwdriver.

Erection of the aerial mast

It is possible for number 3 observer to mount the mast in its bracket on his own. He does not need to be a superman since the weight of the mast is not very great, but he does need a certain amount of dexterity and practice. It is necessary for the pin at the bottom of the mast and the two bolts on either side of the mast to drop into their respective slots in the bracket simultaneously. At the same time the two keep plates must be held in such a position that they do not interfere with this action. Once the mast is mounted in its bracket the keep plates can be dropped into position underneath the top arms of the bracket and the two wing nuts screwed tight. The need for the keep plates will become clear when the extension of the mast is described.

Cable and air hose connections

The only other actions now required above ground are connection of the air hose and connection of the coaxial cable. On the reverse side of the post ventilator holding the bracket and mast there is a large metal dome cover. This cover is removed by unscrewing with the special key provided. Inside there are two sockets, one to receive the bayonet type locking plug of the air hose from the pneumatic mast, the other to receive the plug on the end of the coaxial cable from the dipole.

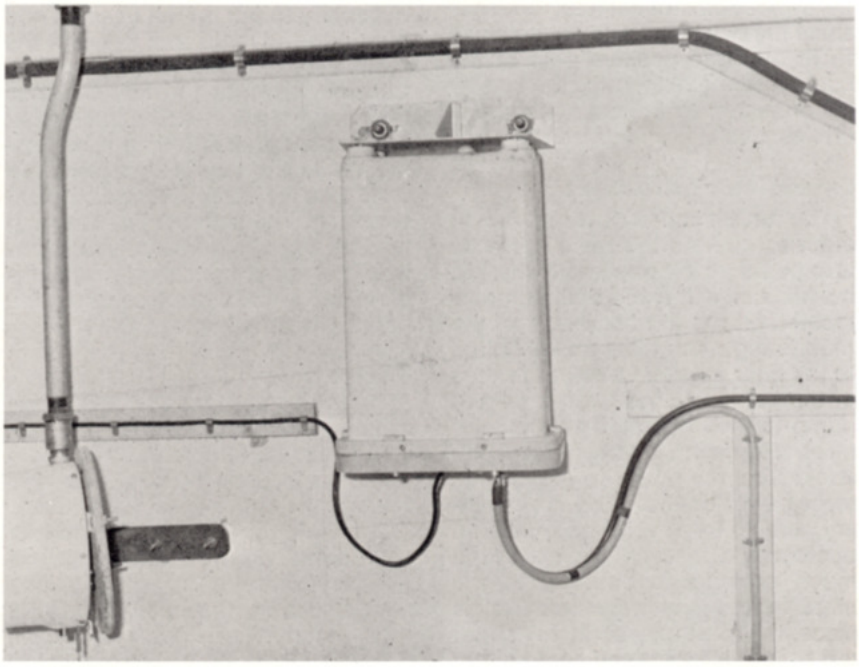


Mounting bracket for mast on rear of ventilator shaft

It should be stressed at this point that the post radio is only intended to be used *in the event of a breakdown of normal lines of communication*. The following actions would therefore only be taken in the event of such a breakdown or for the purpose of testing the equipment at the commencement of operations.

These actions would consist of connecting the set to its battery, erecting and pumping up the aerial mast. (The mast would be connected but lying on the ground until radio was required).

(Continued overleaf)



Close-up of radio set showing positioning to the right and slightly above BPI dial

Attaching aerial dipole to upper section of telescopic mast before mast is erected

It is of the utmost importance that the battery connection is carried out in the correct sequence otherwise the radio can be seriously damaged. Once the leads are connected to the battery the radio is "on". To avoid damaging the radio it is absolutely essential that the leads from the set to the battery are connected positive to positive and negative to negative. All master posts will have conversion battery terminals for fitting to the Nife battery for use with the radio set. The large conversion terminal should be fitted to the positive battery terminal and the small one to the negative.

Two different types of cable ends are at present in use on master posts, namely, crocodile clips or washers. The washer type is by far the safest since the negative lead is fitted with a small washer and the positive lead with a large washer. By connecting up the negative cable first it would be impossible to connect wrongly since the washer would be too small to fit over the positive post of the battery. Remember, once the battery is connected to the set the radio is on "receive".

Extension of the mast

The further action now required in order to operate the radio correctly is to pump up the pneumatic mast to its full height. The hand pump is located on the left hand side of the monitoring room table and is bolted to the floor. The air valve at the base of the pump is closed and the hand pump is then operated to raise the mast. Normally it takes about 35 strokes on the pump to extend the mast fully. Some caution is necessary here, however, because on occasions a mast will stick. If too much pressure is built up in the mast before any movement takes place, the mast may suddenly shoot out to its full extent and could either jump off its bracket or shoot the dipole up into the air. The purpose of the keep plates fitted to the mast now becomes apparent. Provided that the keep plates have been fitted in the correct position (i.e. so that the right angle lip of plate is pointing inwards on the underside of the bracket) the mast cannot jump out of its bracket. Proper tightening of the clamping screw which secures the dipole into its holder will similarly prevent the dipole from shooting out of its holder.

On no account should any form of lubricant be applied to the mast. Firstly the lubricant could have a detrimental effect on the pneumatic seals and secondly the presence of oil or grease on the mast would encourage dust or grit to stick which could cause further damage to the seals.

Operation

With the mast extended and the battery connected it is now only necessary to put on the headset and plug into the radio jack beneath the table. To receive, just listen. To transmit, depress the key fitted to the headset jack box. The transmitter will not radiate full power immediately the key is depressed, so wait two or three seconds before speaking. The transmit key is spring loaded and should be released immediately your transmission is complete. Incoming messages cannot be heard with the key depressed.

Faults

Failure to contact the operations room on radio or loss of contact when already operating on radio could be caused by the following faults:

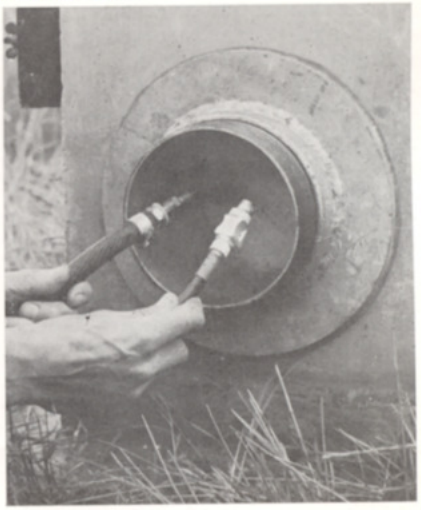
1. A blown fuse. A fuse holder containing a cartridge type fuse is fitted in the positive line between the radio and the battery. *Remedy: Replace fuse.*
2. Bad battery connectors. *Remedy: Check all connections and tighten.*
3. Low voltage. *Remedy: Exchange the battery for post lighting battery.*

Never charge a battery while it is connected to the radio.

Operating procedures

The procedures used for radio communications from posts are designed to be as short as is consistent with clarity. Well-known radio jargon can be used as this assists with brevity. For example the word "Roger" meaning "Your message is received and understood" or "Wilkco" which means "Your message is received, understood and I will comply with your instructions". One simple word, which is readily understood and saves a tremendous amount of transmission time.

Metal dome cover, with key, which houses two connections, the bayonet type locking plug for the air hose and the other to take the plug on the end of the coaxial cable from the aerial



Aerial coaxial cable lead-in and pneumatic hose from foot of mast

Call signs, too, can be brief. The call sign of the control station will be the name of the Group, for example "Horsham" or "York" etc. The call sign of a post will be the operational number of the cluster of which the post forms a part, simply "Ten" or "Twenty-five" as the case may be.

During the initial manning up of a post the radio circuit would have to be tested. The control station should always be the originator or instigator of all such tests. The test takes the form of a brief description of reception standards and is carried out by the number one observer on the post. A typical testing sequence could be as follows: Control: *Horsham testing, Horsham testing; Ten, do you read?*
Ten: *Ten, loud and clear.*
Control: *Fifteen, do you read?*
Fifteen: *Fifteen, weak but readable* . . . and so on until all radio posts have been tested.

On satisfactory completion of this test the mast will be retracted and laid on the ground, the radio disconnected from its battery and the post will return to normal landline working.

When there has been a breakdown in landline communications between 10 Cluster and the operation room, the post display plotter should carry out the necessary actions and inform the Post Controller. In turn, the Post Controller will inform the Communications Supervisor. The Communications Supervisor, after consulting with the Duty Controller, will then instruct the Post Controller to go over to radio working. The control radio at Group Headquarters will now be put into action and its aerial extended. The radio post in the cluster which has lost its landline will automatically go on to listening watch by connecting power supplies to the radio and by erecting and pumping up the aerial mast.

Each post display plotter in the operations room normally has two clusters under his control. If it should be necessary for either of these clusters to go over to radio working then the other cluster under his control must also be instructed to revert to radio. Therefore, in the example quoted above, both 10 and 15 clusters will be on radio.

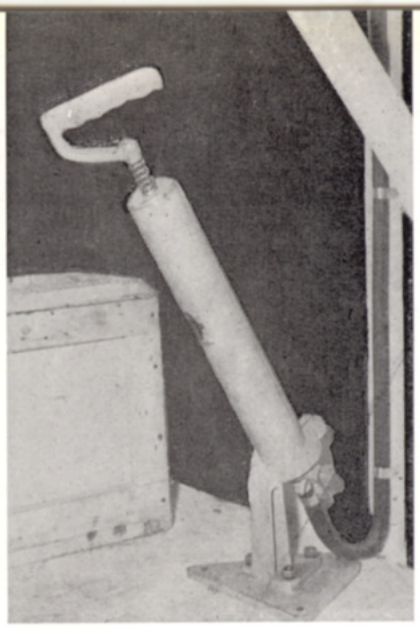
Whilst a particular pair of clusters are working on radio the post display plotter for those clusters will operate on the lowest numbered key on his keyboard. To connect the post display plotter to his posts the Radio Controller will also throw up the lowest numbered key of the pair on the Post Controller's keyboard.

When on radio the number two observer in the post will continue to operate the loudspeaker telephone and will collect information from the other posts in the cluster, record it in the radio operator's log, and hand it to the number one observer for retransmission over radio to the operations room.

The number two observer at the radio post will now virtually be acting as a post display plotter so far as the other posts in his cluster are concerned. Although all the posts under his control will continue to take readings every five minutes, reports of readings will only be made every ten minutes. The sequence of events is therefore as follows: Posts in even numbered clusters (ie 10, 20, 30, etc) will be called for their readings by the number two observer over the loudspeaker telephone at every odd ten minutes past each hour (ie 5, 15, 25 etc). Posts in odd numbered clusters will be called on the hour and every ten minutes.

The radio operator at the radio post will report these readings when called for by control at the next five minute cycle. To quote an example, number two observer at the radio post in 10 cluster calls for and records all readings from the cluster at 2005. These readings will be reported by the radio operator (number one observer) at 2010.

Tocsin and nuclear burst reports will of course take priority over any other type of message. To enable posts to break in with this vital information it will be necessary for the Controller at Group Headquarters and radio operators on the posts, to observe pauses when reporting. The radio operator will pause and listen out to a count of three after reading the report from one post and before continuing with the next. The Controller will wait and listen out for a count of three between reports from each cluster.

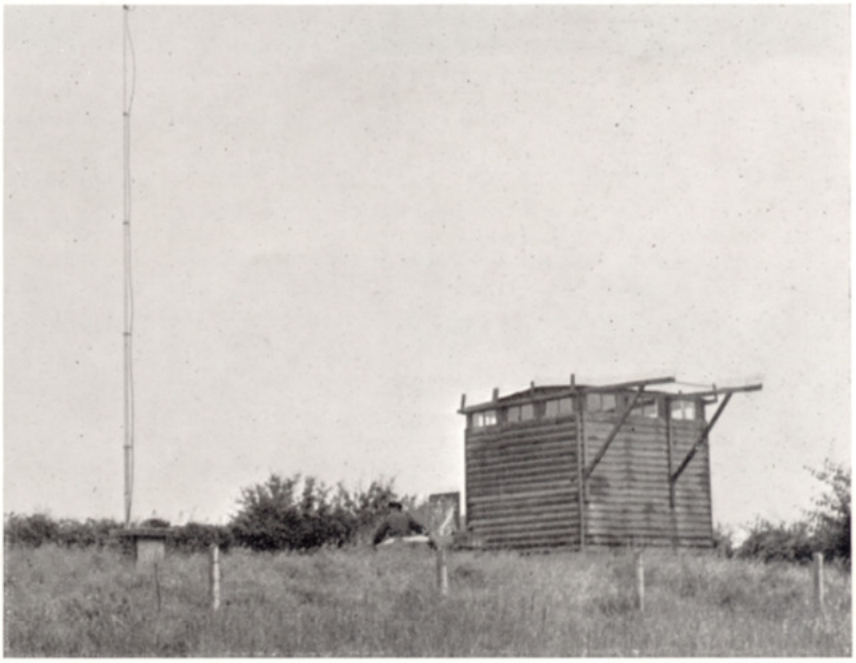


Pneumatic pump in monitoring room

All information will be routed to the appropriate post display plotter via the relevant key on the Post Controller's keyboard and the plotter will record the information in accordance with SOPs.

In the unlikely circumstances of every cluster in a Group losing its landline communications, it must be borne in mind that all information would be under the control of and passing through one man, the Radio Controller. Under such circumstances there could be delays and it might become necessary for him to be selective in order to cope with the volume of traffic.

As a back-up to our normal lines of communications radio is vital if we are to perform our task in wartime. Our operational effectiveness could depend upon our ability to operate our radios efficiently and with discipline.



Telescopic mast fully extended to operating height of 32 feet