

# The Bomb Power Indicator

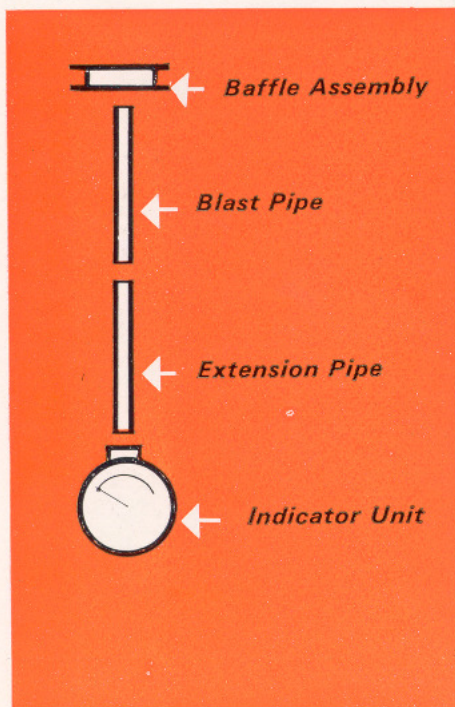
by Observer Lieutenant O. M. RICHARDS

## INTRODUCTION

A nuclear explosion produces several phenomena which are used by the Royal Observer Corps to obtain information on the power of the weapon detonated, the height of the burst and the ground zero. Amongst these effects is a blast or "shock" wave which spreads out in all directions and it is this which is recorded on the Bomb Power Indicator at a Royal Observer Corps post.

The blast wave is produced by the sudden liberation of energy in the explosion which results in the generation of hot, compressed gases. Since these are at a very high temperature and pressure they naturally expand very rapidly, and the result is the creation of the "shock" wave. The "front" of this is recorded, when it arrives at a post, on the Bomb Power Indicator.

From this pressure information, it is possible, when the distance of a post from ground zero is known, to compute the power of the weapon in kilotons or megatons.



## DESCRIPTION

The instrument has four component parts as follows:

**Baffle Assembly.** This consists of two circular steel plates of 6 inches diameter, spaced 1 inch apart. The centre of the lower plate has a  $\frac{3}{4}$ -inch hole to coincide with the internal diameter of the blast pipe. The assembly is threaded for attachment to the top of the blast pipe.

**Blast Pipe.** This is a galvanised steel pipe, 4 feet 6 inches in length which penetrates the roof of the post and ends in a screwed coupling just below ceiling level. To this is fitted the extension pipe.

**Extension Pipe.** This is 2 feet in length and incorporates a double bend at the lower end to allow the indicator to be mounted clear of the wall of the post. Below this is attached, by means of a second screw coupling, the indicator unit.

**Indicator Unit.** This is mounted on a wooden disc at an angle so that the dial can be read by an observer seated at the instrument table.

*Note:* Under normal peace-time conditions the baffle assembly is stored in the post and the top of the pipe is covered by a screwed "cap". The blast pipe should normally protrude about 6 inches out of the ground when the post is covered with the standard depth of 3 feet of earth.

◀ Figure 1

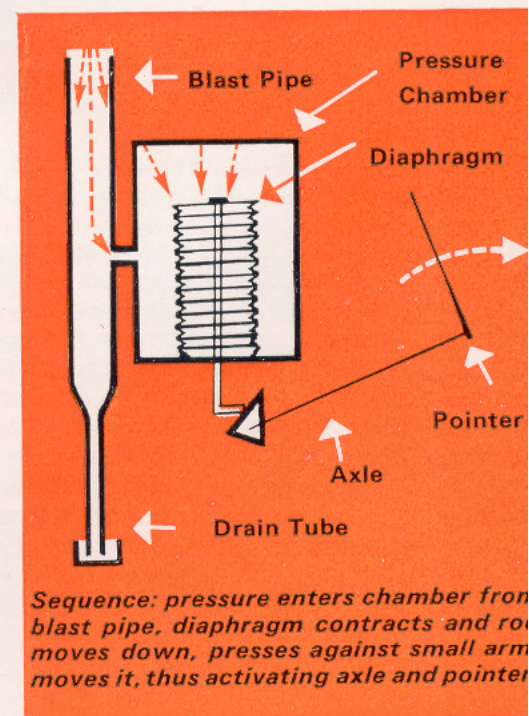
Figure 2 ▶

## INDICATOR UNIT

### (Description and Function)

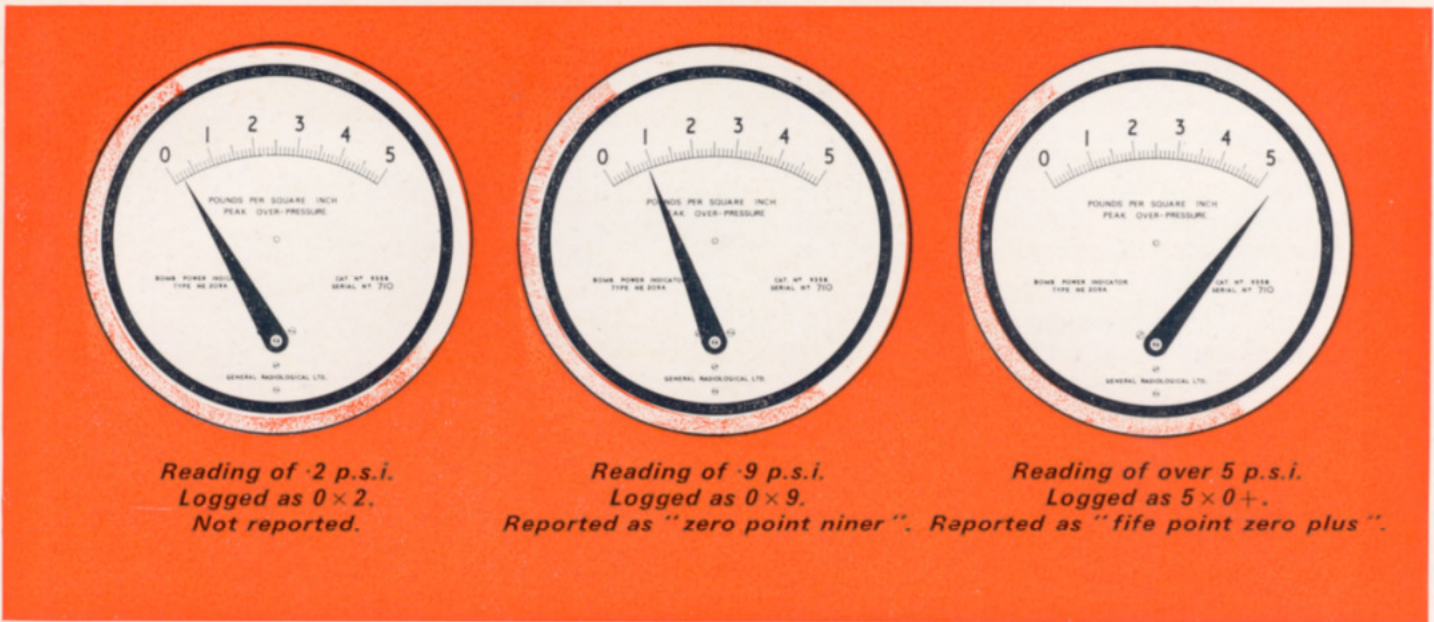
This Unit is a simple mechanical instrument incorporating a pressure

chamber inside which is a diaphragm (Fig. 2). To the free end of this diaphragm is attached a steel rod which passes through its centre and projects outside of the chamber. The arrival of a blast wave at the post will result in the pressure being built up in the chamber, this causes the diaphragm to contract, and there is an outward movement of the steel rod. The right angle on its end bears on, but is not connected to, a small arm on an axle. Movement of the rod is reflected by a movement of the arm. Fitted on the opposite end of the axle is the pointer on the front of the indicator unit, this indicates the appropriate reading of pressure. We remember that the rod in the diaphragm is not connected mechanically to the small arm, therefore when the pressure equalises, the pointer on the scale will remain on the reading. To reset the



*Sequence: pressure enters chamber from blast pipe, diaphragm contracts and moves down, presses against small arm, moves it, thus activating axle and pointer*





pointer to zero it is necessary to press the reset button on the base of the unit; again this is a simple mechanical movement, and results in the pointer being pushed back.

Because moisture may be formed by condensation in the pipe, a small diameter drain tube is fitted at the base of the instrument and the end of this, under operational conditions, is covered by a small screwed cap complete with a rubber seal. This is attached to the unit by a small chain. Care must be taken not to screw the cap home too hard, as this might force the seal into the drain tube.

The scale on the indicator gives readings up to five pounds per square inch above the normal atmospheric pressure. This can be taken as one atmosphere, or fifteen pounds per square inch. Therefore although the range of the scale may appear to be insignificant, a reading of five pounds per square inch would indicate a rise of one third above normal pressure. The primary divisions on the scale are at the pound readings, the secondary divisions are one tenth of a pound, and in a "Tocsin" report, readings are given to the nearest tenth of a pound per square inch (Fig. 3).

**PREPARATION**

**for operational use**

Under normal peace-time conditions, the baffle assembly is stored in the post, and the drain cap is left off the end of the tube at the

base of the indicator unit. The post should possess a cock wrench, which fits the square section on the cap covering the end of the blast pipe outside the post (Fig. 4).

If the post is manned in an emergency, or when practising during exercises, the following is the sequence to be used when preparing the Bomb Power Indicator for use.

- (a) Remove cap on blast pipe, and fit the baffle assembly (Fig. 5).
- (b) Replace the cap on the drain tube at the base of the indicator unit (Fig. 6).
- (c) Ensure that the pointer is set to zero by pressing the reset button.

**MAINTENANCE**

Should be carried out annually, preferably in the spring before any exercises take place. This consists of dismantling all the component parts of the equipment with the exception of the blast pipe which is an integral part of the post structure.

The threads on the pipes inside the post should never be painted, but should be kept free of grit and dust and kept lightly greased.

The sequence for the cleaning drill is as follows:

- (a) Remove the screws which hold the indicator unit on to the wooden disc, unscrew the locknut to the top of the thread, then screw the

*continued overleaf*



Fig. 4. Blast pipe with cap in position. This is unscrewed with the cock wrench. Fig. 5. Baffle assembly in position on blast pipe. Fig. 6. Indicator unit attached to extension pipe and screwed on the wooden disc on the wall of the post. Note the drain tube cap in position. The reset button is visible just in front of the drain tube.



*continued*

coupling up to meet this, this will free the unit from the extension pipe.

*Tools for unscrewing the locking nut and coupling can usually be borrowed locally but in the event of difficulty each group headquarters has one 14-inch Stilson wrench and one 11-inch adjustable spanner available for such a contingency.*

(b) By blowing through the drain tube with the unit upside down, any particles of rust or dirt may be blown out. If there is excessive moisture in the unit, it should be reported to Group Headquarters.

(c) Remove the cap from the end of the blast pipe outside the post, and pull through a piece of rag by means of the nylon cord, or any suitably strong cord available.

(d) When the cleaning procedure has been carried out, the indicator unit should be refitted on to the extension pipe, and then screwed to the wooden disc. Threads should be lightly greased.

This is the only maintenance required, it is recommended however that the cap on the end of the blast pipe outside the post should be taken off regularly and kept greased. This is important because if the cap is allowed to rust in position extreme force in trying to free it could result in the blast pipe becoming unscrewed below ground level. If through neglect the cap does become difficult to remove the blast pipe should be held with a wrench as a precaution against this happening.

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