

Section V. ADJUSTMENT OF SIMULATED FIRE

128. **GENERAL.** Opportunities to practice adjustment of fire during actual firing are comparatively rare. The only way to become thoroughly familiar with the principles and rules governing fire adjustment is by regular and frequent training in their application. A satisfactory means of securing this training is by simulating fire and using the dispersion box. In using this device the problem should be made as realistic as possible. It may readily be used at battery drill with the normal fire control system.

129. **THE DISPERSION BOX.** A. Dispersion tape. The dispersion tape is a roll of paper divided into several hundred frames on each of which are placed four vertical marks to represent splashes. The center of the tape represents the center of dispersion. Four vertical marks are positioned in each frame according to laws of dispersion. For proper identification of shots in simulated salvo firing, three of the four marks bear different symbols. One bears a cross, another a circle, a third a double bar, and a fourth is plain. The tape is mounted on rollers in the box and is covered so only one frame is visible at a time. (Dispersion tapes and plans for constructing the box may be obtained, upon request, from the Coast Artillery Board.)

b. **Deviation scale.** (fig. 51). (1) This is a movable scale placed in a guide under the window of the dispersion box and graduated with the standard range reference numbers representing percentages of range. The graduations increase from left to right, with the midpoint, marked 300, representing the position of the target. The scale of the graduations should be such as to fit the dispersion zone of the dispersion tape and the probable error of the armament manned. It must be made locally by each battery. The depth of the dispersion zone on the tape issued by the Coast Artillery Board is 6.8 inches representing 8 P.E. or two forks. The scale of graduations may be determined from this relationship. For example, if the probable error in range for the armament is 0.6 percent, the scale of the graduations should be:

$$1 \text{ percent} = \frac{6.8}{8 \times 0.6} = 1.42 \text{ inches}$$

(2) An auxiliary deviation scale marked *over short*, and *hit* can be made for use with the bracketing method of adjustment. The width of the space marked *hit* on the deviation scale may be determined from the size of the danger space of the average target at medium range. (See table VII. TM 4-235.)

c. **Correction Scale.** The correction scale is identical with the deviation scale. It is fixed to the box with its normal (300) opposite the center of the dispersion tape.

129. **INSTRUCTIONS FOR USE.** a. The operator determines deviations by reading from the scale opposite the marks on the tape. He reads as many deviations from a frame as are needed for the salvo and moves the tape a predetermined number of frames to get the next set of deviations. A great number of combinations of deviations may be secured by changing the selection of marks to be read of the number of frames to be turned between readings. The tape may be turned in either direction. The only precaution necessary is that the selection of frames and marks be made by some predetermined rule which should be followed until the end of the problem in order to insure that the dispersion depends on chance.

b. Proper simulation of timing is one of the most important and at the same time, most difficult elements of successful drill. Except for such preliminary instructions as may be necessary, all problems should be conducted with the same timing as would be required during firing. No deviation should be reported to the person conducting the adjustment until the end of the period required for the time for flight and the normal functioning of the spotting section. Corrections should not be applied to the firing data sooner than could be done normally.

c. Care should be taken to keep the position of the deviation scale in step with the firing data. An adjustment correction should not be applied on the dispersion box until the fall of the shot fired with that correction occurs.

130. **OPERATION IN DRILL.** A. Place a pin at any desired position on the deviation scale. Insert the deviation scale in its slot with the pin opposite and on the correction scale.

- b. Determine a rule to be followed in selecting deviations on the tape and the number of frames to be moved. Following that rule, bring the proper frame of the dispersion tape into view in the window of the box.
- c. At the proper time, read the deviation from the deviation scale opposite the mark that represents the splash.
- d. Turn the tape to a new frame.
- e. When an adjustment correction is ordered, move the deviation scale until the pin is opposite that correction on the correction scale, timing the move to synchronize with the fall of the shots on which the new correction is applied. Proper adjustment is reached when the 300 of the deviation scale is opposite the 300 of the correction scale.

131. USE WITH THE SPOTTING BOARD. The dispersion box may also be used with the spotting board to determine simulated data to furnish to the spotters for battery drill. Deviations taken from the dispersion box are plotted on the grid of the spotting board; the deviation arms are set so that they intersect on the grid at these deviations; and the reading on the deviation disks are recorded. During drill these readings are transmitted from the spotting stations to the spotting board and will provide properly dispersed deviations for the spotting and adjusting details. In this way the spotters and adjusters can be coordinated with the rest of the battery.