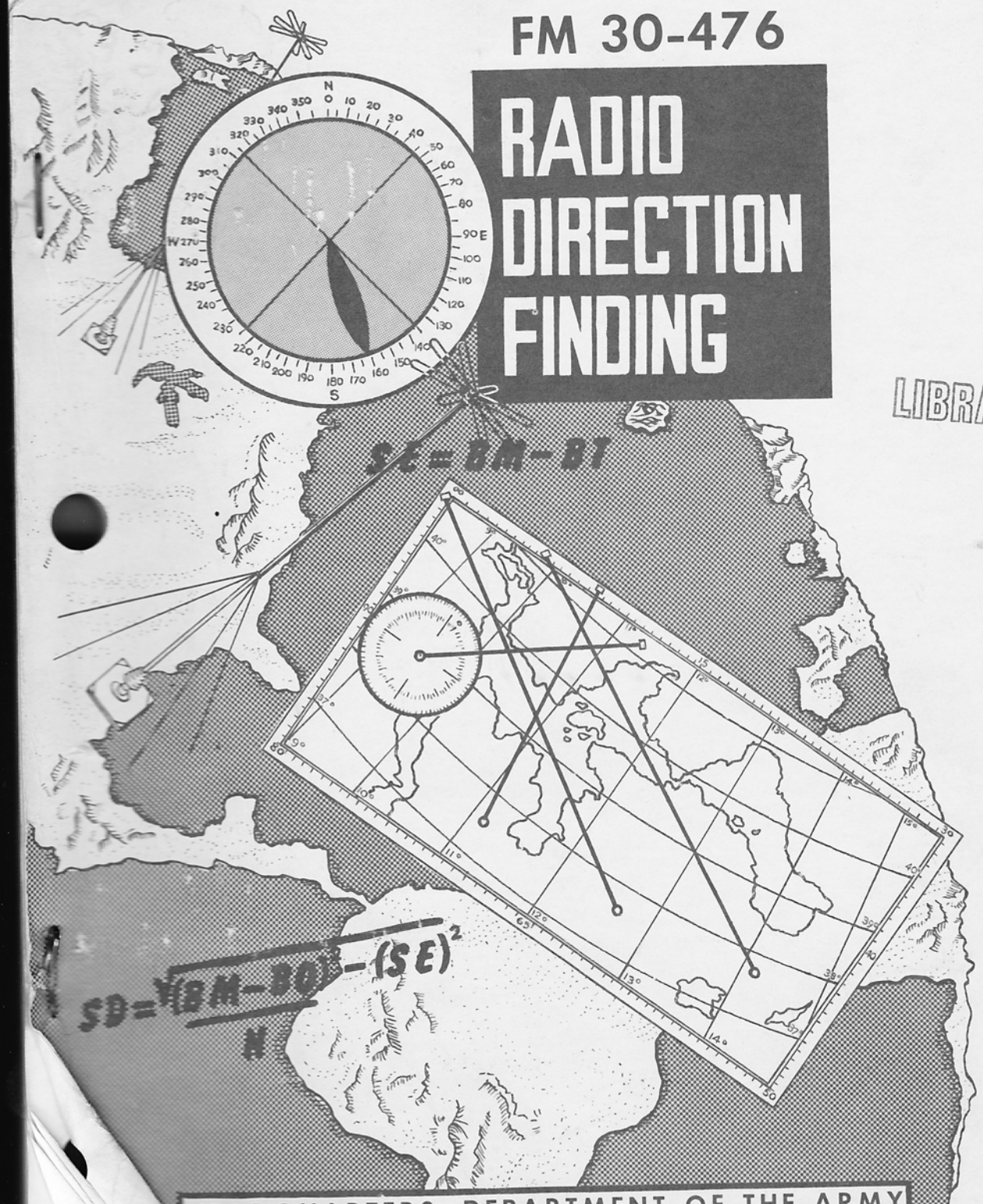
FM 30-476

RADIO DIRECTION FINDING



HEADQUARTERS, DEPARTMENT OF THE ARMY

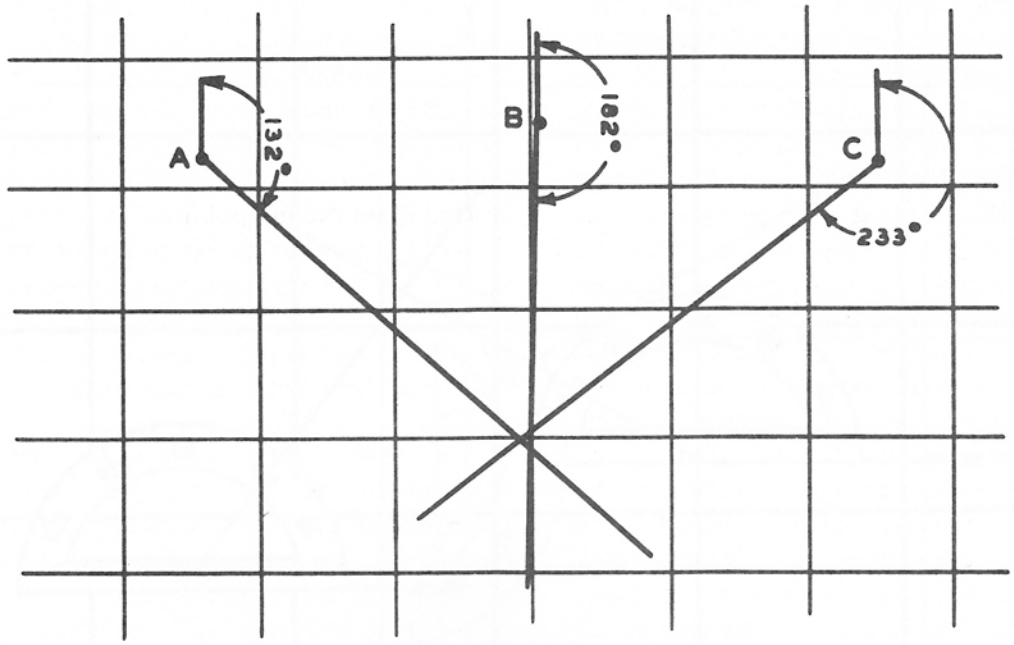


Figure 5–18. Plotting a perfect DF fix.

intersecting at an exact grid location, is so rare it is almost unknown. The plotter has many factors which he must resolve.

5–26. Evaluation by the DF Operator.

Initially, the bearing is obtained by the operator at the DF site and reported to the plotting center or control. The operator's experience, judgement, operating skills, and ability to read the bearings, are factors which affect the accuracy of the reported bearing. A system of evaluating the reliability of a bearing does exist; however, the specific details cannot be discussed within the classification limitations of this manual. Very basically, the operator affixes a designator which reflects a degree of confidence in target identification and a measure of signal conditions at the time the bearing was obtained.

5–27. Evaluation by the Plotter.

A DF plotter is substantially influenced by several human factors in his evaluation of bearings reported from the DF stations in his net. As his experience builds, and reported fix locations are confirmed by enemy contacts and other irrefutable means, the plotter will grant increasing credibility to one DF site over another. Known site error itself will, on many occasions, cause the plotter to reject, or accept on reduced reliability, bearings from certain stations. A change of operating personnel at a particular site, if known to the plotter, may also influence his decision on the reliability to assign a reported bearing. In spite of the standard assignment of reliability indicators, plotting is still very much influenced by these human factors.

Section VI
DETERMINATION OF FIX AREA

5–28. Methods Used to Determine Probable Target Locations.

DF fixes illustrated previously have been "perfect" with all bearings intersecting at an exact grid location. Of course, such a fix seldom occurs because of the inherent errors in DF operations. The continually changing electromagnetic environment of each DF site and the errors discussed previously contribute to these inherent errors. Consequently, fixes obtained after plotting three bearings may appear on the plotting map as indicated in figure 5–19. It is readily apparent that the triangle formed by the three plotted bearings could cover a substantial portion of the tactical area; therefore, methods had to be established to evaluate the most probable location of the target in the triangle. Some of the methods used are the bisection of the medians (sides) of a triangle, bisection of the angles of a triangle, and the Steiner point method. Of these three, the Steiner point method is the most commonly accepted, especially for tactical use. As illustrated in figure 5–20, there is little difference in the three solutions. Strategic DF nets will most often use the visual inspection method, but prior to using this method, a reliable data base must be established.

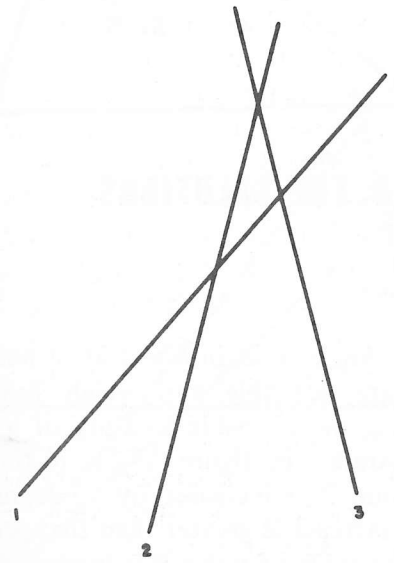


Figure 5–19. Three-station fix, error triangle.

a. Bisection of the Medians of a Triangle. Evaluating a fix using this method, the plotter must draw a line from the midpoint of each median to the opposing angle. As shown in figure 5–20, a line is plotted from the midpoint of line AB to angle C, another from midpoint of line BC to angle A, and the last line from the midpoint of line AC to angle B. The error triangle solution or probable target emitter location is the point where the three lines intersect (A^1).

b. Bisection of the Angles of a Triangle. Determining the error triangle solution by bisecting the angles of the triangle is shown in figure 5–20. First, the plotter must determine the degree of each angle, then each angle must be bisected. In figure 5–20, the bisecting lines are drawn from angle A to point 1, from angle B to point 2, and last, from angle C to point 3. The solution (B^1) is the point where three lines intersect.

c. Steiner Point. The Steiner point method of determining the location of the target within the error triangle is probably the easiest and most accurate once a template is constructed. Draw a large circle on a sheet of clear plastic and drill a small hole in the exact center. Three lines are etched from the center to the outside of the circle exactly 120 degrees apart, thus trisecting the circle. Lay this template over the error triangle formed after the three bearings are plotted, rotate and maneuver it until each of the 120 degree lines is over the corners of the error triangle. Mark the location (C^1) with a pencil through the hole in the center of the template (fig. 5–20). This mark is reported, by grid coordinates, as the probable target location.

d. Visual Inspection. The visual inspection method of fix evaluation

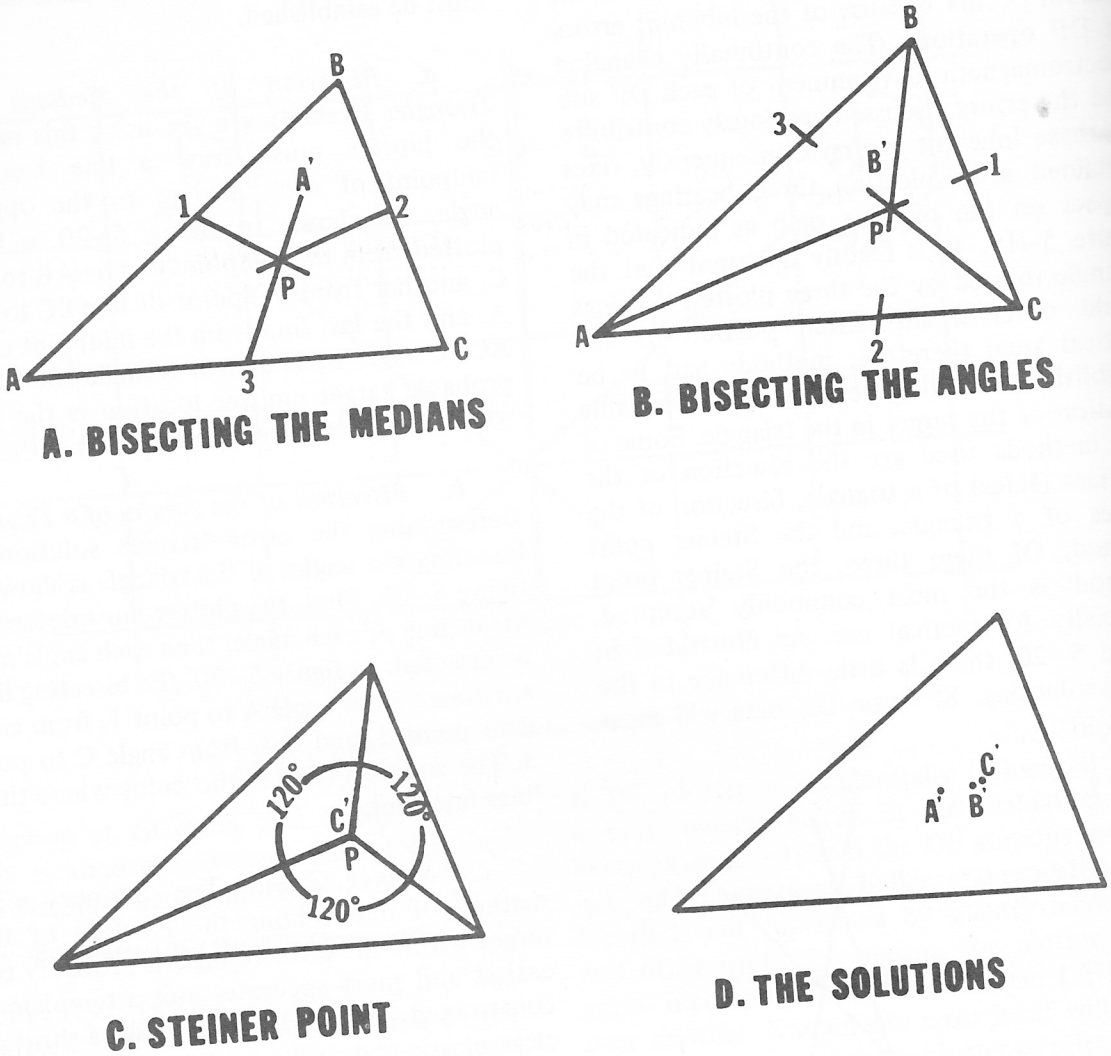


Figure 5–20. Error triangle solution.

encompasses several factors relating to the reported bearings. Paragraph **5–26** described how the operator assigns a classification or evaluation to the bearing. This factor is blended with the known reliability of the DF site based upon past performance. The distance that a radio wave travels before reaching the DF site as well as the terrain features around the DF site are also considered in the visual inspection method of fixing the probable location of a target emitter. Angles that intersect at or near right angles are desirable and weigh heavily in producing the probable location of a target. As illustrated in figure 5–21, if the angle from point A is increased by 10 degrees, the area of increase is greater than that produced when the angle of point B is increased by 10 degrees. This is the reason angles near 90 degrees are desirable. To better illustrate visual inspection, the original bearings from four DF stations have been plotted (figure