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**LAND NAVIGATION 1**

**TERMINAL LEARNING OBJECTIVE(S)**

1. Given periods of daylight or darkness, a route card, lensatic compass, and designated points, while wearing a fighting load, navigate with a compass to arrive within 100 meters of each designated checkpoint. (OCS-PAT-1003)

**ENABLING LEARNING OBJECTIVE(S)**

1. Given periods of daylight or darkness, a route card, lensatic compass, and designated points, while wearing a fighting load, execute a pace count to arrive at a designated checkpoint without error. (OCS-PAT-1003a)

2. Given periods of daylight or darkness, a route card, lensatic compass, and designated points, while wearing a fighting load, execute the methods used for shooting an azimuth to arrive at a designated checkpoint without error. (OCS-PAT-1003b)

3. Given a lensatic compass, and designated calibration points, calibrate a compass to arrive at a designated checkpoint without error. (OCS-PAT-1003c)

1. **NOMENCLATURE OF THE LENSATIC COMPASS.** The lensatic compass has many parts, but can be classified into three main parts. These parts are the base, cover, and eyepiece. The individual parts of the compass are:

a. **Thumb Loop.** This serves as a retaining device to secure the compass in the closed position. It is also used as a wire loop for the thumb when holding the compass in position for sighting on objects.

b. **Cover.** When closed, this protects the face of the glass crystal. It can be used to sight on objects when folded at a 90-degree angle to the other half of the compass. Swiveled completely forward, the compass will lay flat.

c. **Sighting Wire.** The sighting wire and its use are similar to the front sight of a weapon.

d. **Eyepiece.** The eyepiece is the black, hinged part containing the sighting slot and the lens. It is used as an aid in sighting an azimuth and to lock the compass dial when the compass is closed. This protects the delicate balance of the compass dial.

e. **Sighting Slot.** The sighting slot can be used similarly to the rear sight of a rifle.

f. **Bezel Ring.** The bezel ring holds the upper glass crystal and helps preset a direction for night compass work. It has 3-degree serrations on the outer edge and a clicking device for night compass usage.

g. **Black Index Line.** The black index line is a stationary line used as a reference line for determining direction. It is placed over the compass dial and is aligned with the sighting slot and the sighting wire.

h. **Floating Dial.** The compass dial is delicately balanced and free floating when in use. It can be locked in place by closing the eyepiece. It contains two complete circular scales; one in degrees (360), and one in mils (6400).

2. **SYSTEMS OF MEASUREMENT**

a. For military use, direction is expressed as units of angular measure from a base line. There are two systems of measurement used by the military:

(1) **Degrees.** The most common unit of measure is degrees, with its subdivisions of minutes and seconds. There are 360 degrees on a compass.

(2) **Mils.** Another system is mils. This system is commonly utilized in artillery and gunnery. In this system, a circle is divided into 6400 mils.

b. **Base Lines.** A direction is an angular measurement from a base line. One of the three types of north will generally serve as a baseline in land navigation.

c. **Angles Of Measurement.** Degrees can best be understood by dividing a circle into 360 equal angles, like the spokes of a wheel. The lines drawn from the center of the circle divide the circumference into 360 equal arcs. Each of the angles thus formed represents one degree of angular measurement.

### 3. **FOLLOWING AN AZIMUTH**

a. **Azimuth.** The most common military method of expressing a direction is by using azimuths. An azimuth is defined as a horizontal angle, measured in a clockwise manner from a north base line.

b. **Back Azimuth.** A back azimuth is the opposite direction of an azimuth. To determine a back azimuth:

(1) If the original azimuth is greater than 180 degrees, subtract 180 degrees to obtain a back azimuth.

(2) If the original azimuth is less than 180 degrees, add 180 degrees to obtain a back azimuth.

(3) Remember **LAMS**. (**L**ess **A**dd **M**ore **S**ubtract)

### 4. **METHODS USED IN SHOOTING AN AZIMUTH**

a. **Compass To Cheek Method (Sighting Method)**

(1) Pivot the thumb loop all the way under the compass.

(2) Raise the cover 90 degrees.

(3) Raise the eyepiece to a 45-degree angle. If the eyepiece is not raised enough it may affect the desired free-floating effect of the compass dial. Align the slot in the eyepiece, the sighting wire in the cover, and the target. The azimuth can be read by glancing down at the dial through the lens in the eyepiece.

b. **The Center Hold Method.** This is the preferred method for land navigation.

(1) Pivot the thumb loop all the way under the compass.

(2) Open the cover until it forms a straight edge with the base; pull the eyepiece to the rear most position.

(3) Place your thumb through the thumb loop, form a steady base with the second and third fingers and extend your index finger along the side of the compass.

(4) Place the thumb of the other hand between the eyepiece and the lens; extend the index finger along the remaining side of the compass and the remaining fingers around the fingers of the other hand, pull your elbows firmly into your sides.

(5) To measure an azimuth, turn your entire body toward the object and point the compass cover directly at the object.

(6) Look down and read the azimuth from beneath the fixed black index line.

### 5. **CARE OF THE COMPASS**

a. **Compass Inspection**

(1) **Inspection.** Compasses are delicate instruments and should be cared for accordingly. A detailed inspection is required when first obtaining and using a compass. One of the most important parts to check is the floating dial, which contains the magnetic needle. The user must also make sure the sighting wire is straight, the glass and crystal parts are not broken, the numbers on the dial are readable, and **most important**, that the compass dial does not stick!

(2) **Accuracy.** A compass in good working condition is very accurate. However, a compass has to be checked periodically on a known line of direction, such as a surveyed azimuth using a declination station. Compasses with more than 3 degrees + or – variation should not be used.

(3) **Protection.** If traveling with the compass unfolded, make sure the rear sight (eyepiece) is fully folded down onto the bezel ring. This will lock the floating dial and prevent vibration, as well as protect the crystal and rear sight from damage.

b. **Compass Handling**

- (1) Handle the compass with care. The dial is set at a delicate balance, which could be damaged by a shock.
- (2) Close and return the compass to its pouch when not in use. In this way, it is not only protected from possible damage, but is also readily available for use when needed.
- (3) Attach a string or a lanyard between the thumb loop and your equipment to prevent loss.
- (4) Compass readings should never be taken near visible masses of iron or electrical circuits. The following are suggested as approximate, safe distances to insure the proper functioning of the compass:
  - (a) Metal helmet or rifle - 0.5 meters
  - (b) Machine gun - 2 meters
  - (c) Telephone wires and barbed wire - 10 meters
  - (d) Field guns and tank - 18 meters
  - (e) Power lines - 55 meters

6. **PACE COUNT**

- a. A pace is equal to two steps, or approximately 60 inches. Every person has a different length of natural pace. To utilize pacing in navigation, first determine the required number of paces taken in a certain distance.
- b. In the field, the average pace must often be adjusted because of uncontrollable conditions such as the following:
  - (1) Slopes. Pace is lengthened on the downgrade and shortened on the upgrade.
  - (2) Winds. Headwinds shorten the pace while tail winds increase it.
  - (3) Surfaces. Sand, gravel, mud etc., tend to shorten pace.
  - (4) Elements. Snow, rain, and ice reduce length of pace.
  - (5) Clothing. Excess weight shortens the pace.
  - (6) Stamina. Fatigue affects the length of the pace.

7. **ORIENTING THE MAP**. There are two methods to orienting a map.

- a. **Inspection Method**. Compare the features on the map to the actual terrain and rotate the map until they are aligned.
- b. **Compass Method**. With the map in a horizontal position, place the straight edge of the compass on any north-south grid line. Rotate the map and compass until the north arrow and the black index line form the same V-shaped angle corresponding to the declination diagram.

**NOTES:**

**REFERENCE:**

1. Map Reading and Land Navigation
2. Map Reading and Land Navigation

FM 3-25.26 Chapter 9, page 3  
FM 21-26