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OFFICER CANDIDATES SCHOOL
TRAINING COMMAND
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TACT 1003
SEP 2014

LAND NAVIGATION 3

TERMINAL LEARNING OBJECTIVE(S)

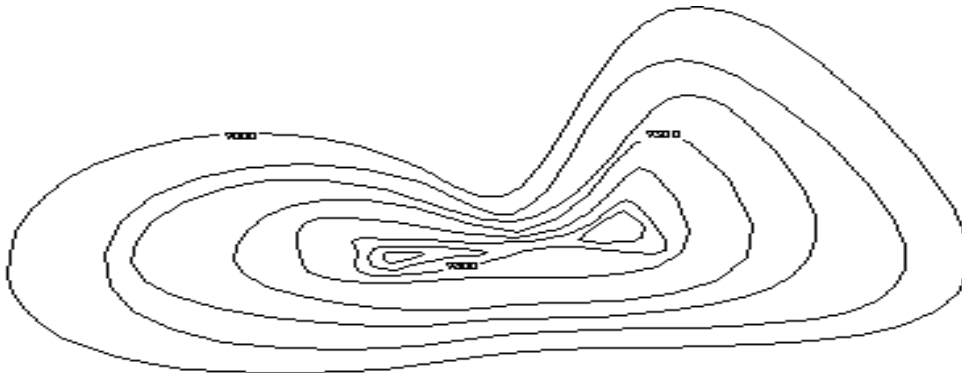
1. Given a military topographic map, protractor, and objective, navigate with a map and compass to arrive within 10 meters of the objective. (OCS-PAT-1002)

ENABLING LEARNING OBJECTIVE(S)

1. Given a topographic map, identify terrain features without error. (OCS-PAT-1002e)

1. **CONTOUR LINE**. A line drawn on a map representing an imaginary line on the ground along which all points are at the same elevation.

- a. Characteristics of contour lines indicate a vertical distance above or below a datum plane.
- b. The vertical distance between adjacent contour lines is known as the contour interval, and the amount of the contour interval is given in the marginal information.
- c. Starting as sea level, the zero contour, each contour line represents an elevation above sea level.
- d. On most maps the contour lines indicate the nature of the slope.



2. **TYPES OF CONTOUR LINES**

a. **Index Contour Line**. Starting at zero elevation, every fifth contour line is drawn with a heavier line. These are known as index contours. Along each index contour the line is broken and its elevation is given.

b. **Intermediate Contour Line**. The contour lines falling between index contours are called intermediate contours. They are drawn with a finer line than the index contours and do not have elevations given.

c. **Supplementary Contour Line**. A third type of contour line that is not often used is the supplementary contour line. This line is depicted as a dashed line and is used to indicate a minimal change in elevation or terrain between two intermediate contour lines. Using the contour lines on a map, the elevation of any point may be determined by:

- (1) Finding the contour lines on a map from the marginal information, and noting both the amount and the unit of measure.
- (2) Finding the numbered contour line nearest the point for which the elevation is being sought.
- (3) Determining the direction of the slope from the numbered contour lines index contour to the desired point.

(4) Counting the number of contour lines that must be crossed to go from the numbered index contour line to the desired point and noting the direction up or down. The number of lines crossed, multiplied by the contour interval is the distance above or below the starting value.

(5) If the desired point is on a contour line, its elevation is that of the contour line.

(6) For estimating elevation of a point between contours, most military needs are satisfied by estimating elevation to an accuracy of one half the contour interval.

(7) To estimate the elevation to the top of an unmarked hill, add half the contour interval to the elevation of the higher contour line around the hill.

(8) To estimate the elevation of the bottom at a depression, subtract half the contour interval from the value of the lowest contour line around the depression.

3. **RELIEF FEATURES**

a. **Slopes**. The spacing of the contour lines indicates the nature of the slopes.

(1) **Uniform steep slope**. Contour lines evenly spaced and close together indicate a uniform steep slope. The closer the contour lines are to each other the steeper the slope.

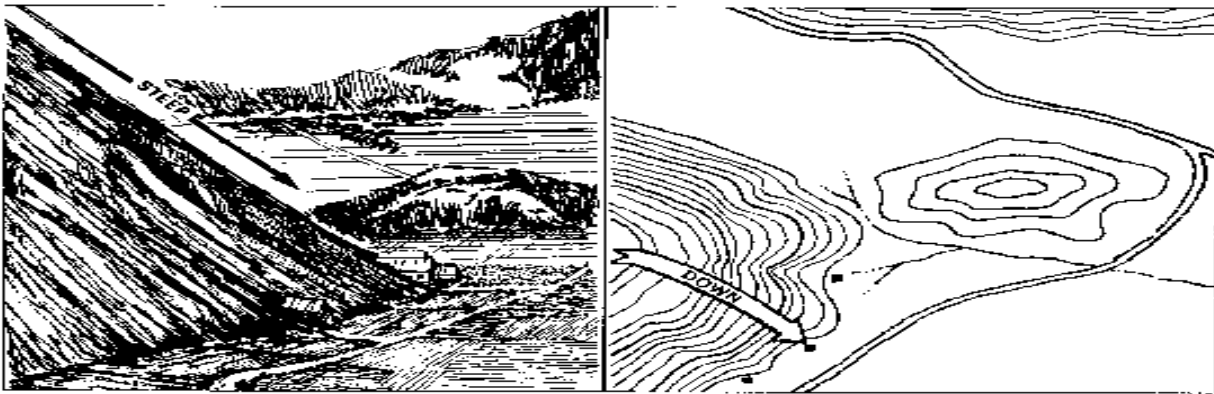


Figure 10-7. Uniform, steep slope.

(2) **Uniform gentle slopes**. Contour lines evenly spaced and wide apart indicate a uniform gentle slope.

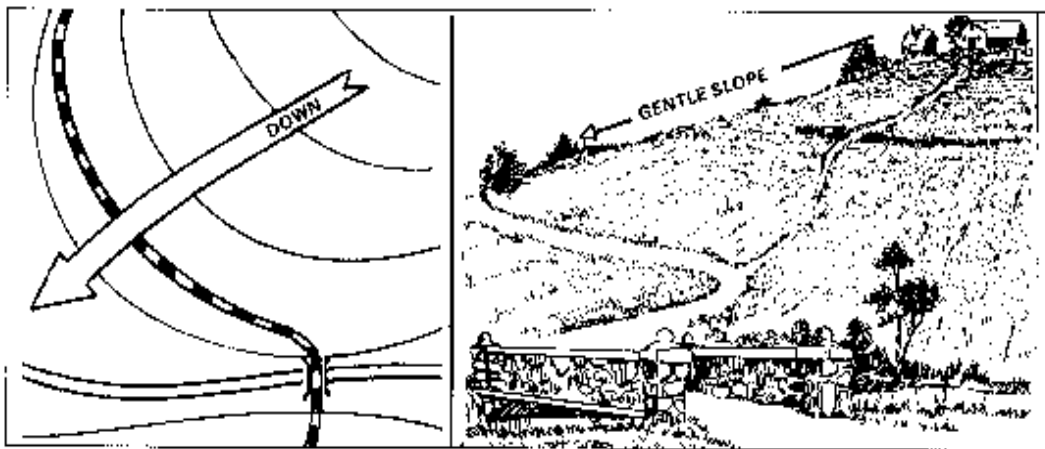


Figure 10-6. Uniform, gentle slope.

(3) Convex slope. Contour lines widely spaced at the top and closely spaced at the bottom. An observer at the top of a convex slope cannot observe most of the slope, or the terrain at the bottom. The further up the slope, the easier it is to climb.

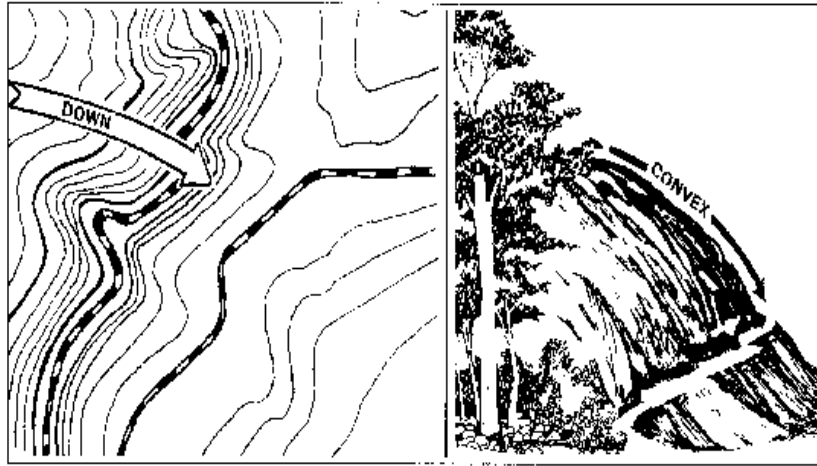
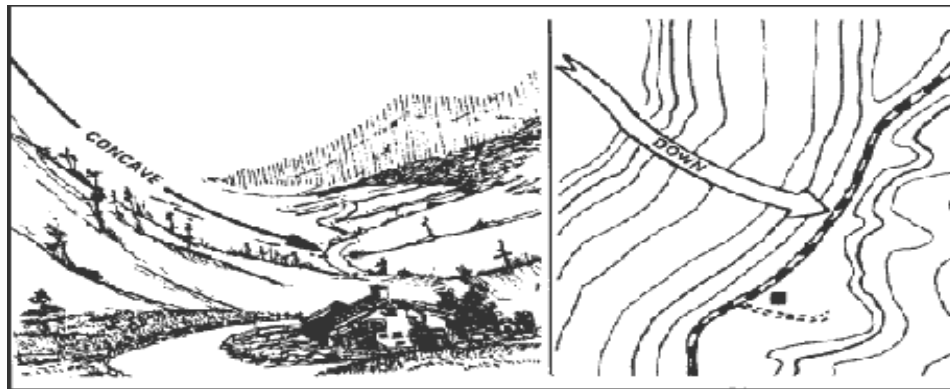


Figure 10-9. Convex slope.

(4) Concave slope. Contour lines are closely spaced at top and widely spaced at bottom. An observer at the top of the concave slope can observe the entire slope and the terrain at the bottom. The further up the slope, the more difficult it is to climb.



4. TERRAIN FEATURES

a. Hill. A point or small area of high ground. Contour lines will represent the hill by being a closed loop within a small area on the map. When you are located on a hilltop the ground slopes down in all directions.

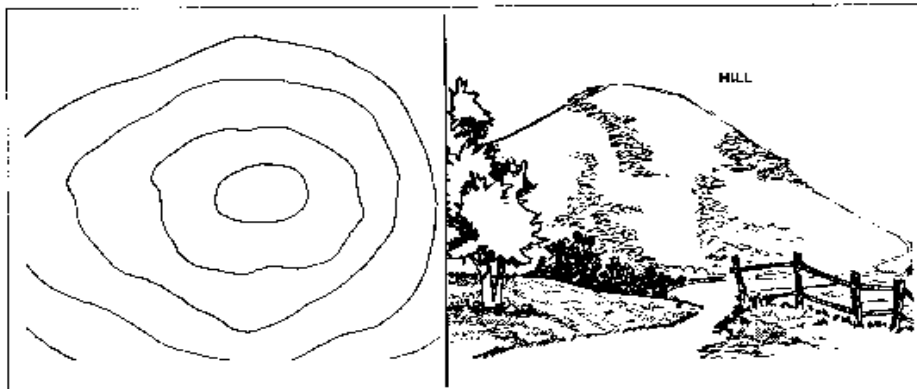


Figure 10-17. Hill.

b. **Draw**. A less developed stream course in which there is essentially no level ground, and therefore, little or no maneuver room within its confines. The ground slopes upward on each side and towards the head of the draw. Draws occur frequently along the sides of ridges. Contours indicating a draw are V shaped, with the point of the “V” toward the head of the draw.

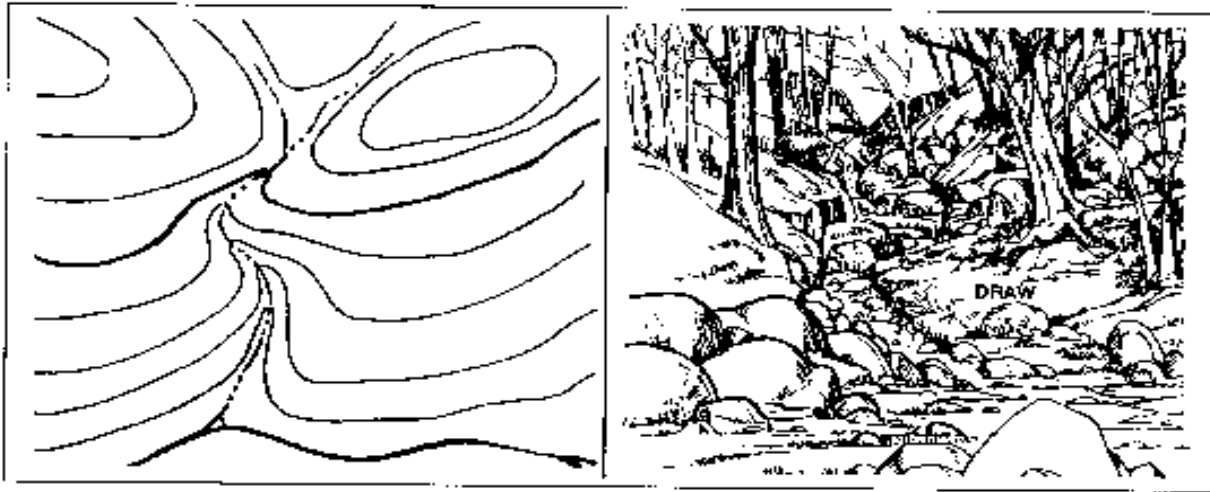


Figure 10-22. Draw.

c. **Ridge**. A line of high ground, with normally minor variations along its crest. The ridge is not simply a line of hills. All points of the ridge crest are appreciably higher than the ground around it.

d. **Finger**. A usually short continuously sloping line of higher ground, normally jutting out from the side of a ridge. A finger is often formed by two cutting draws down the side of a ridge.

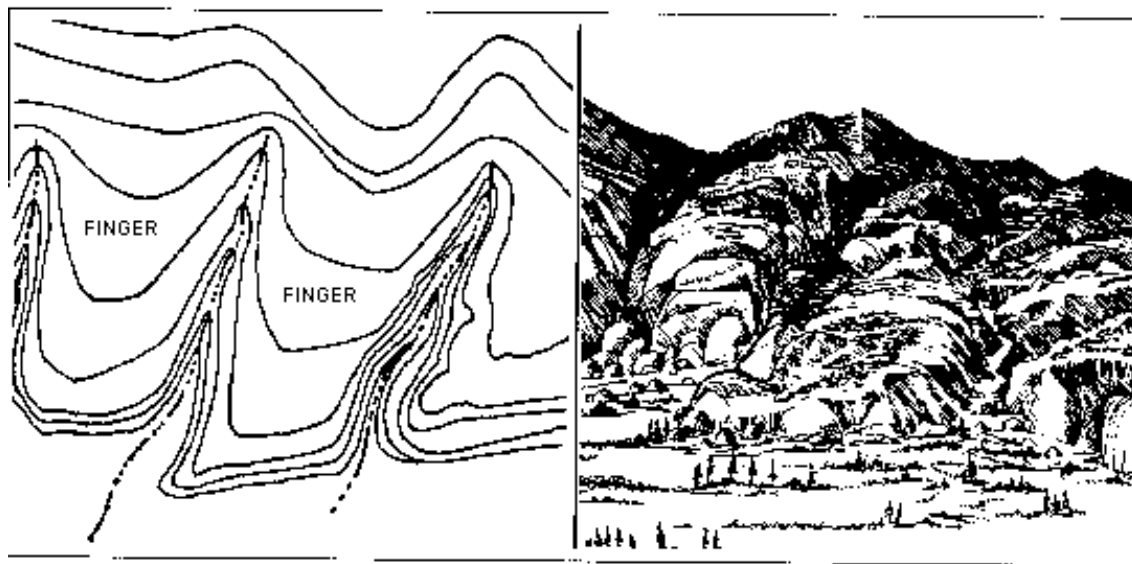


Figure 10-23. FINGER

e. **Saddle.** A dip or low point along the crest of a ridge. A saddle is not necessarily the lower ground between two hilltops. A saddle is simply a dip or break along an otherwise level ridge crest.

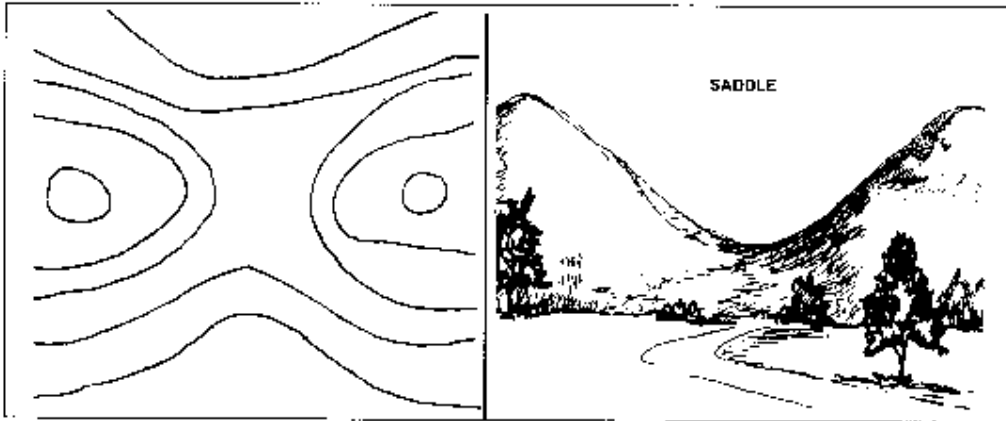


Figure 10-18. Saddle.

f. **Cliff.** A vertical or near vertical slope. When a slope is so steep that it cannot be shown by the contour interval, it is shown by ticked "carrying" contours. The tick marks always point toward lower level of elevation.

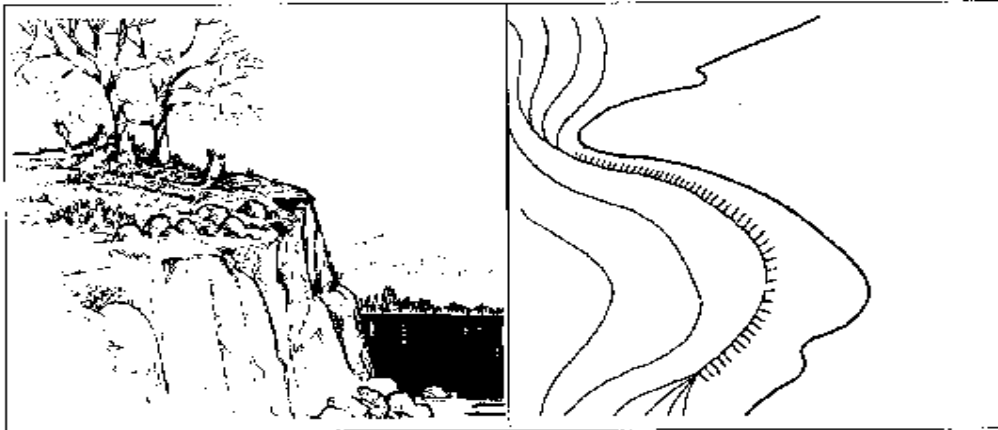


Figure 10-24A. Cliff.

g. **Depression.** A low point or sinkhole surrounded on all sides by higher ground. Tick marks are used in conjunction with contours to show the lower elevation of a depression. One additional contour with tick marks will be used for each depth equal to the contour interval of the map.

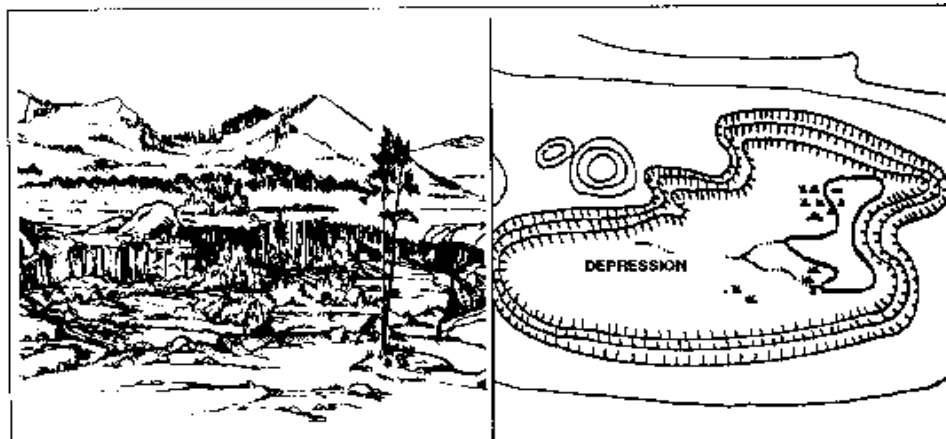


Figure 10-21. Depression.

h. **Cuts and Fills.** Man-made features by which the bed of a road or railroad is graded or leveled off by cutting through high areas and filling low areas along the right of way. Tick marks are used on a fill to show the lower elevation. The tick marks will point away from linear features such as roads, railroad tracks, and trails. The contours on a cut are parallel to the linear feature. Cuts are formed by removing the high areas along the linear features path.

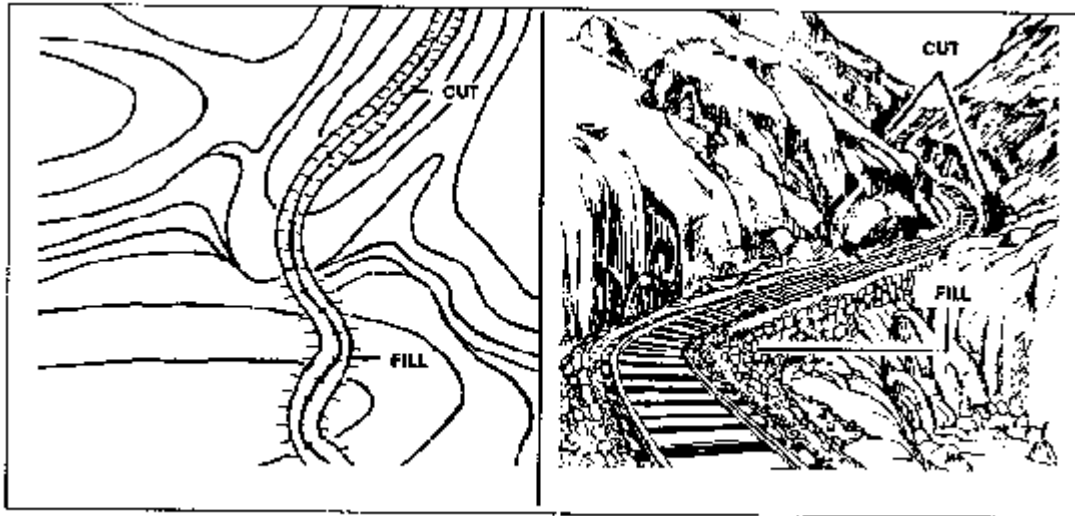
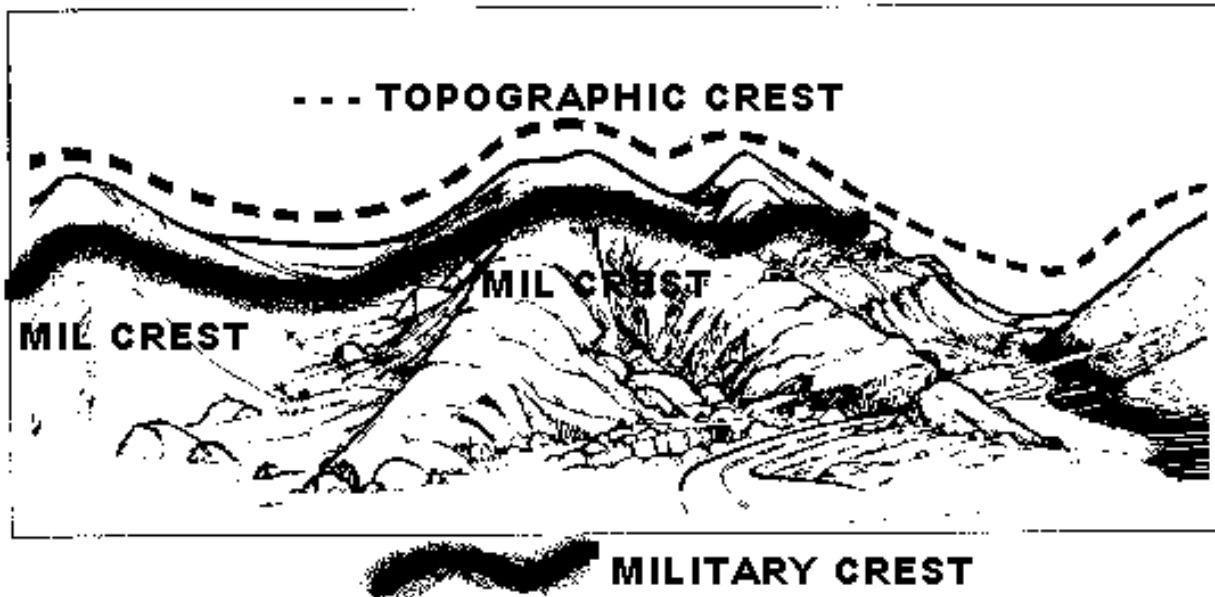
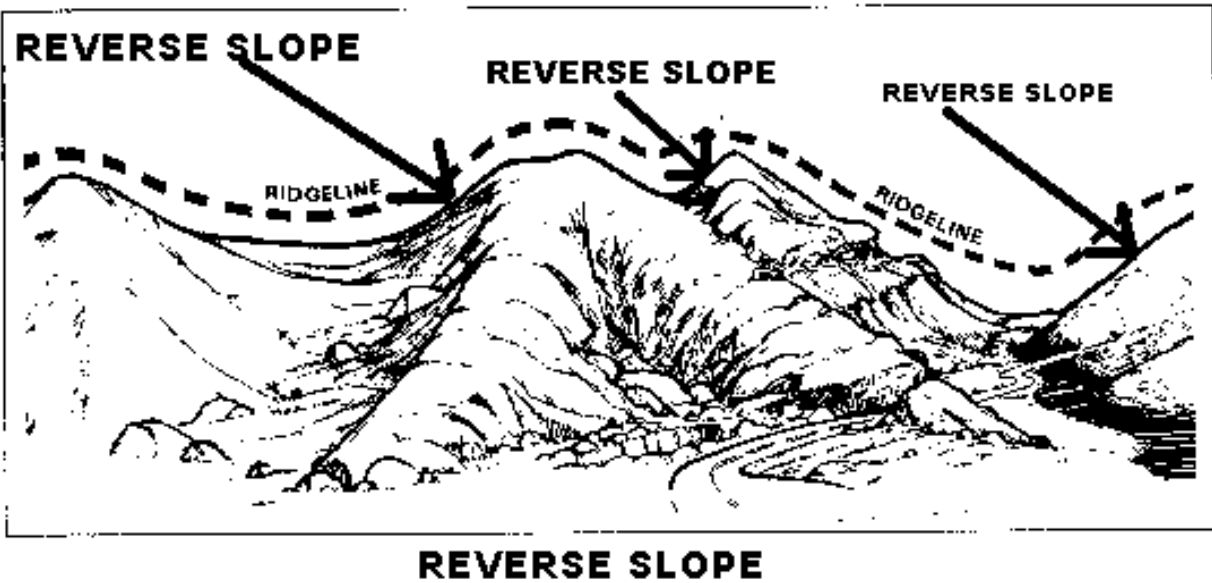


Figure 10-25. Cut and fill.

i. **Military Crest.** An area on the slope of a hill or ridge just below the topographic crest from which maximum observation and direct fire can be obtained. Using the military crest reduces the chances of a unit sky lining itself.



j. **Reverse Slope**. Any slope, which descends away from the enemy. A reverse slope defense reduces the chance of enemy observation and thus the effects of direct and indirect fire.



NOTES:

REFERENCES:

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

FM 3-25.26
FM 21-26

Chapters 3-6, 9, 10

TACT 1003-8