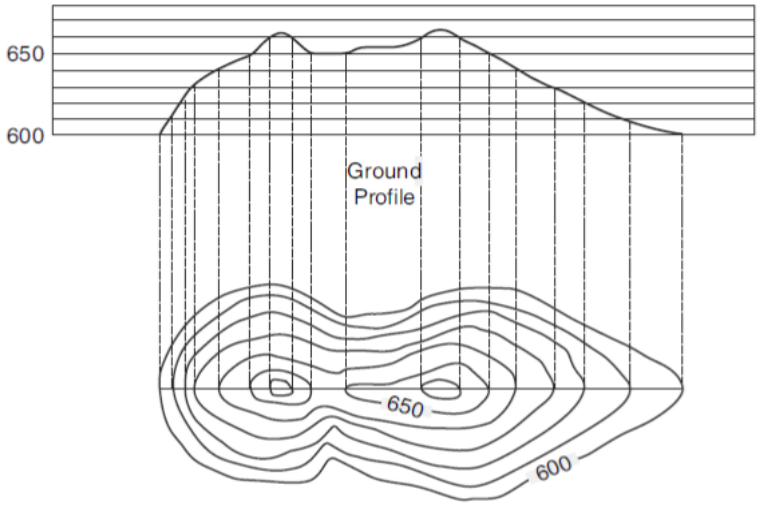
CONTOURING.

A contour may be defined as an imaginary line passing through points of equal elevation. Thus, contour lines on a plan illustrate the conformation of the ground.

A contour line may also be defined as the intersection of a level surface with the surface of the earth. The best method of representation of features such as hills, depressions, undulations, etc., A contour representation along with the ground profile is shown in Fig. From the contour representation of Fig. it is evident that steeper the slopes of the surface the more crowded are its contour lines. Hence, contour lines are usually found spaced on a map or plan with different densities.



Contour representation

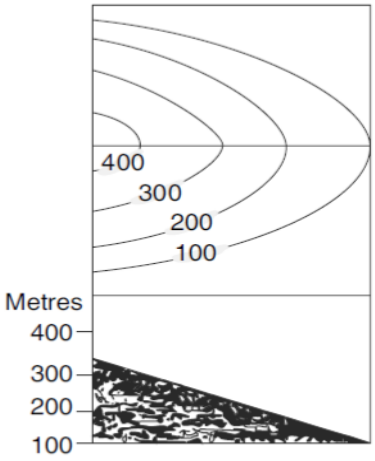
Contour interval

The vertical distance between consecutive contours is termed as contour interval. It is desirable to have a constant contour interval throughout the map. However, in special cases, a variable contour interval may also be provided. For example, in India, the high mountain region along the northern frontiers had to be contoured for some parts at double the normal contour interval owing to excessive average steepness. A variable contour interval is, as far as possible avoided since it gives a false impression of the relative steepness of the ground in different parts of the map. Usually contour intervals are taken as 1 to 15 m.

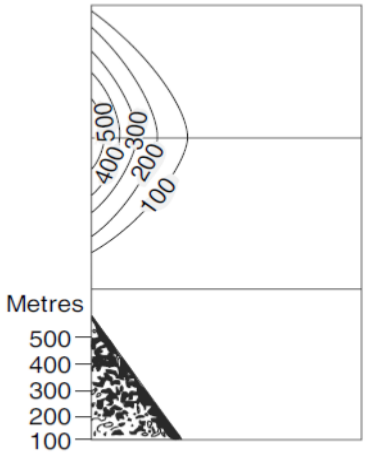
CHARACTERISTICS OF CONTOUR LINES:

SLOPES

A slope may be gentle or steep. A gradient up to 1 in 2.5 (20° with horizontal) is referred to as gentle slope (Fig. (a)), whereas higher gradients (20° – 45° with horizontal) are termed as steep slopes. A very steep slope is termed as scrap. A high scrap is known as crag.



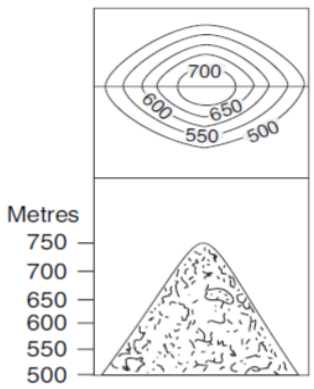
(a) A gentle slope



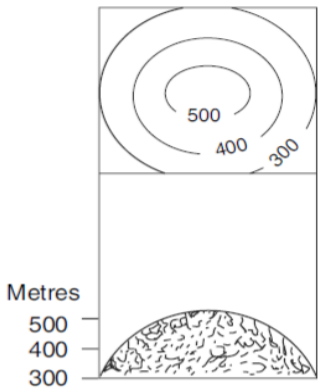
(b) A steep slope

HIGH-LYING FORMS

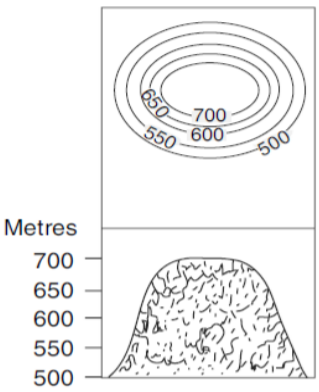
These are characterised by elevated grounds, for example hill, hillock and plateau. Hills are elevated ground usually with a pointed peak. The contours of a hill (Fig.(c)) are a bit circular in shape with increasing contour values inwards. Hillocks are elevated lands, quite low in height with gentle side slopes (Fig.(d)). A plateau is a broad relief feature which has a relatively even surface at the top (Fig.(e)), but is conspicuously higher than the surrounding land. It is also known as table land. Since the top is almost flat, very few contours will be there as compared to the sides which are often steep and thus have closely spaced contours.



(c) Hill



(d) Hillock

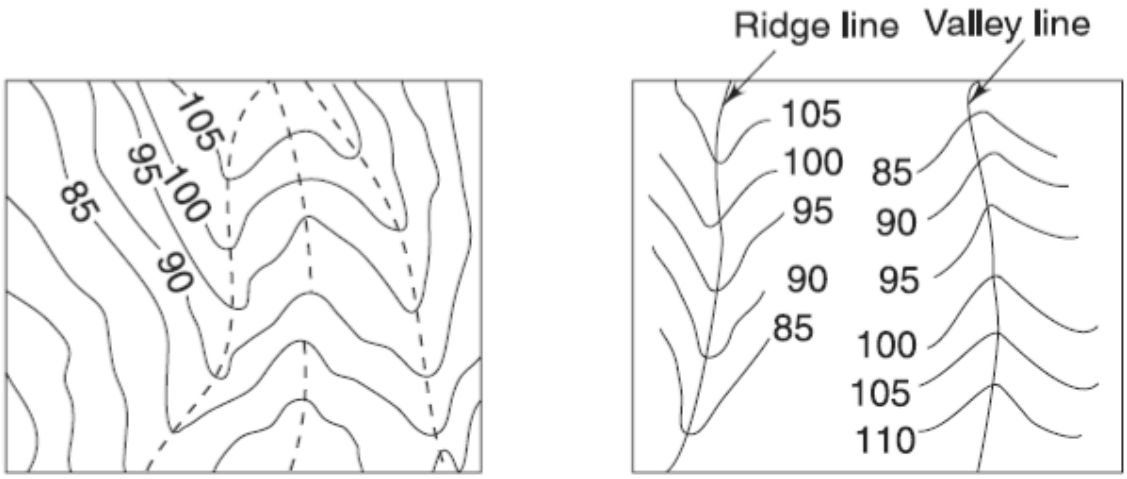


(e) Plateau

VALLEY LINE AND RIDGE LINE

The slopes of ravine intersect along a line referred to as the axis of the ravine, the line of discharge, or a valley line in case of a valley. The counter part of a ravine is a ridge—a convex form of terrain gradually declining in one direction. Two ravines are usually separated by a more or less pronounced ridge (Fig.(f)).

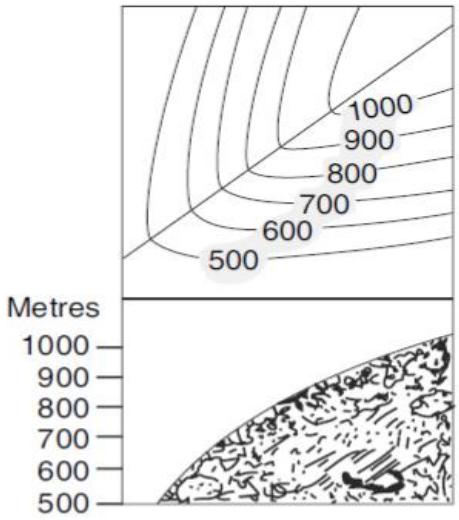
The line along which the slopes intersect is referred to as the axis of ridge, the watershed or watershed line. The watershed line is usually wavy.



(f) Valley and Ridge line

SPUR

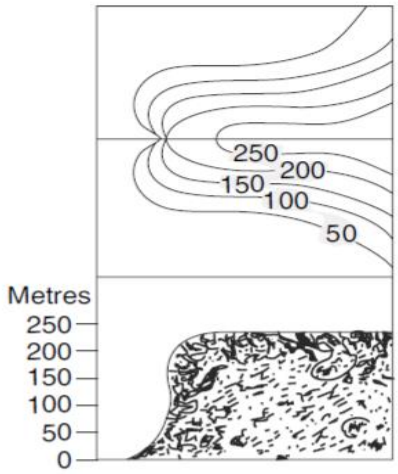
A part of land in form of tongue, which juts out from a hilly area is known as spur (Fig. (g)). The contours are similar to that of a valley, with a difference that here the counter values decrease towards the Vee.



(g) Spur

CLIFF:

Contour lines of different elevations can unite to form one line only in the case of a vertical cliff



(h) Cliff

Two contour lines of different elevations cannot cross each other. Two contour lines having the same elevation cannot unite and continue as one line A contour lines must close up on itself though not necessarily within the limits of the map. Contour lines cross a watershed or ridge line at right angles they form curves of U-shape round it with the concave side of the curve towards the higher ground. Contour lines cross a valley line a right angle they form sharp curves of V-shape. The same contour appears on either side of a ridge or valley, for the highest horizontal plane that intersects the ridge must cut it on both sides.

METHODS OF LOCATING CONTOURS

The location of a point in topographic survey involves both horizontal as well as vertical control. In general the field method may be divided into two methods.

i. Direct Method

ii. Indirect method

Direct Method:

i) In the direct method t he contour to be plotted is actually traced on the ground only those points are surveyed which happen to be plotted. After having surveyed those points they are plotted and contours are drawn through them.

ii) The method is slow and tedious and is used for small areas and where great accuracy is required. the field work is two-fold

i. Vertical control

ii. Horizontal control

Indirect methods:

i) In this method, some guide points are selected along a system of straight lines and their elevations are found. The points are then plotted and contours are then drawn by interpolation

ii) These guide points are not, except by coincidence, points on the contours to be located. while interpolating, it is assumed that the slope between any two adjacent guide points is uniform,

The following are some of the indirect methods of locating the ground points.

i) By Squares

ii) By Cross sections

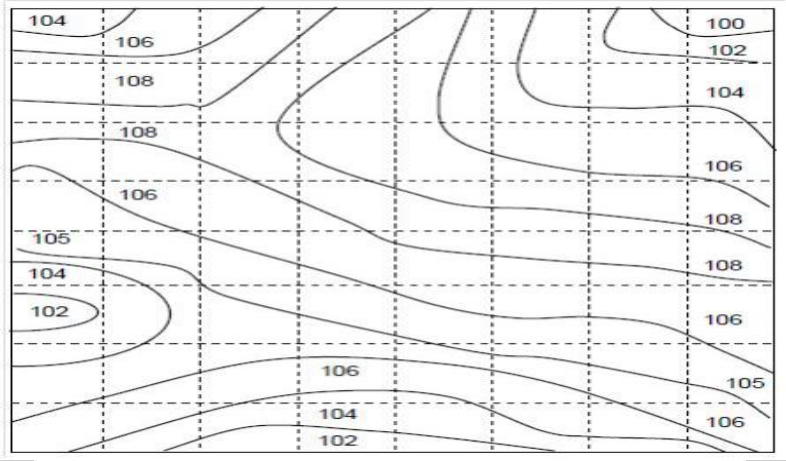
iii) By Tacheometric method

1.By Squares

The method is used when the area to be surveyed is small and the ground is not very much undulating.

The are ai s divided into a number of squares. The size o tf he square may vary from 5t o 20 m depending upon the nature of the contour and contour interval. The elevations of the corners of the square are then determined by means of a level and a staff. The contour lines may then be drawn by interpolation. It is not necessary that the squares may be o ft, he same size. Sometimes rectangles are also used in place of squares. When there are appreciable breaks in the surface between corners, guide points in addition to those at corners may also be used.

The squares should be as long as practicable, yet small enough to conform to the inequalities o tf he ground and to the accuracy required. The method is also known spot levelling.



1. By Cross sections: -

In this method, cross-sections are run transverse to the centre line of a road, railway or canal etc. The method is most suitable for railway route surveys. The cross-sections should be more closely spaced where the contours curve abruptly, a s in ravines or on spurs.

The cross-section an dt he points can then be plotted and the elevation of each poi nit s marked. The contour lines are interpolated on the assumption that the rei s uniform slope between two points on two adjacent contours.

Thu st, he points marked with dots ar et he points actually surveyed in the field while the points marked with x on the first cross-section are the points interpolated on contours.