RAMA UNIVERSITY

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FACULTY OF RNGINEERING AND TECHNOLOGY (DEPARTMENT OF CIVIL ENGINEERING)

Lecture -07
FACTORS GOVERNING SELECTION OF CONTOUR INTERVALS

The survey leader has to decide an appropriate contour interval for his project before start of survey work. The Following factors govern the selection of contour interval for a project:

S.No	Factor	Select High CI like 1m, 2m, 5m or more	Select Low CI like 0.5m, 0.25m, 0.1m or less
1	Nature of ground	If the ground has large variation in levels, for instance, hills and ponds	If the terrain is fairly level
2	Scale of the map	For small scale maps covering a wide area of varying terrain	For large scale maps showing details of a small area
3	Extent of survey	For rough topographical map meant for initial assessment only	For preparation of detailed map for execution of work
4	Time and resources available	If less time and resources are available	If more time and resources are available

CHARACTERISTIC OF CONTOURS

Contours show distinct characteristic features of the terrain as follows:

I. All points in a contour line have the same elevation.

II. Flat ground is indicated where the contour are widely separated and the steep ground where they run close together.

III. A uniform slope is indicated when the contour lines are uniformly spaced and a plane surface when they are straight, parallel and equally spaced.

IV. A series of closed contour lines on the map represent a hill, if the higher values are inside

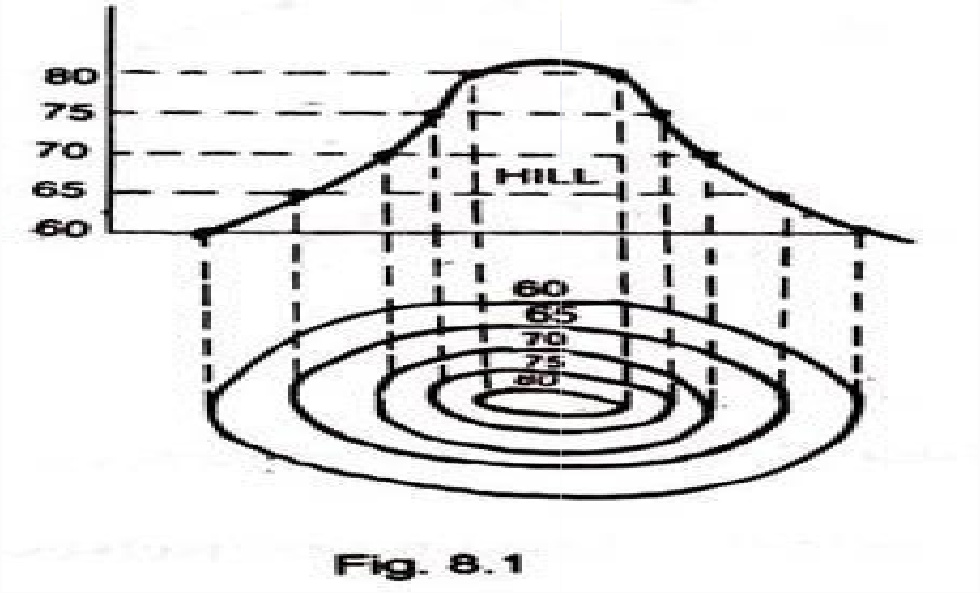

Fig. 8.1

CHARACTERISTIC OF CONTOURS

V. A series of closed contours on the map indicate a depression, if the higher values are outside.

VI. Contour lines across ridge or valley lines at right angles. If the higher values are inside the bend or loop in the contour, it indicates a “Ridge”. And if the higher values are outside the bend, it represents a “Valley”.

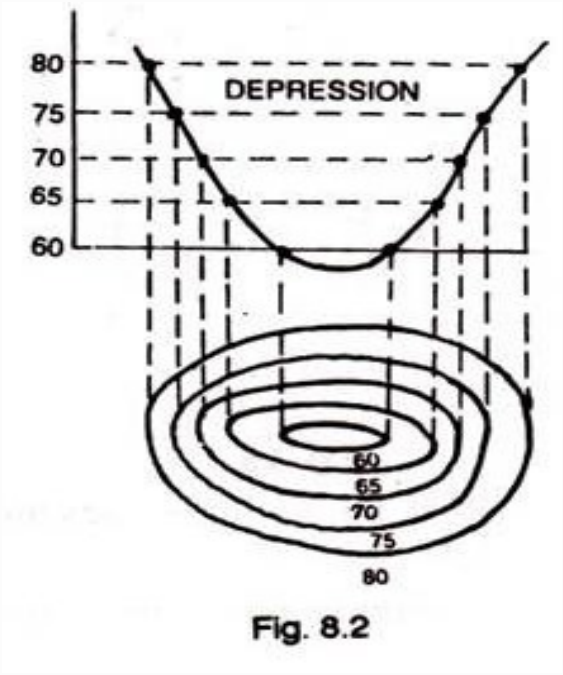

Fig. 8.2

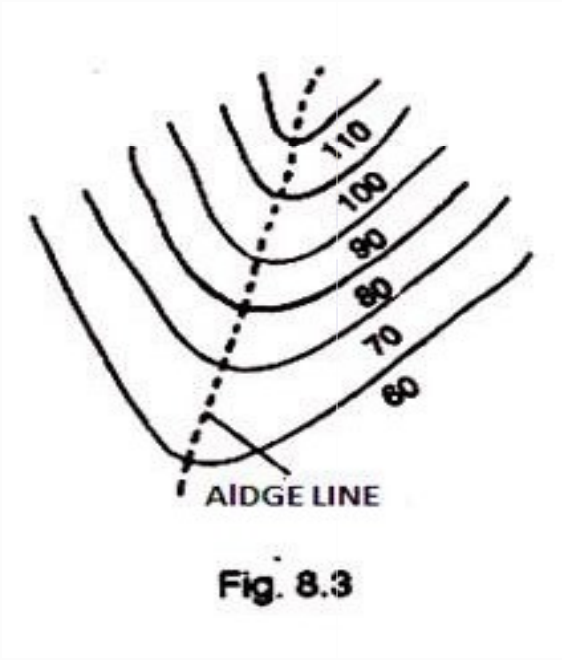

Fig. 8.3

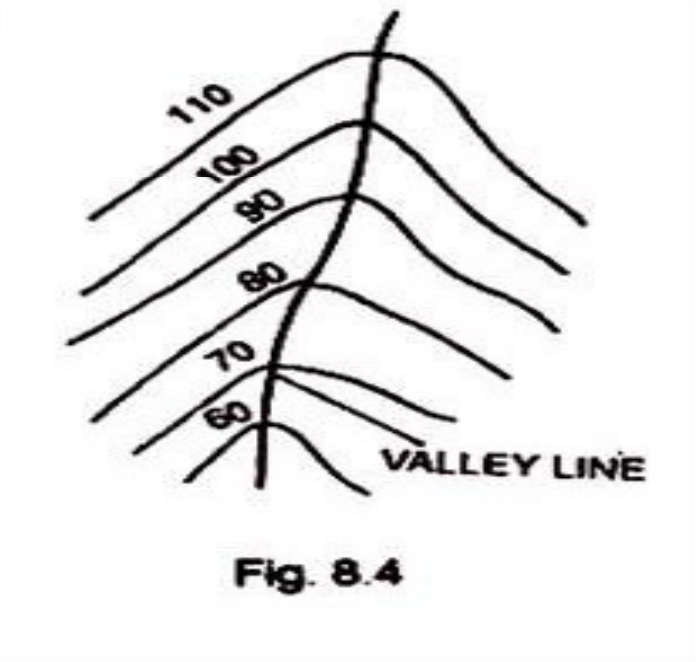

Fig. 8.4

CHARACTERISTIC OF CONTOURS

VII. Contour lines cannot end anywhere but close on themselves elders within or outside the limits of the map.

VIII. Contour lines cannot merge or cross one another on map except in the case of an overhanging cliff.

IX. Contours never run into one another except in the case of a vertical cliff . In this case, several contours coincide and the horizontal equivalent becomes zero.

X. Depression between summits is called a saddle. It is represented by four sets of contours. It represents a dip in a ridge or the junction of two ridges. And in the case of a mountain range, it takes the form of a pass. Line passing through the saddles and summits gives water shed line.

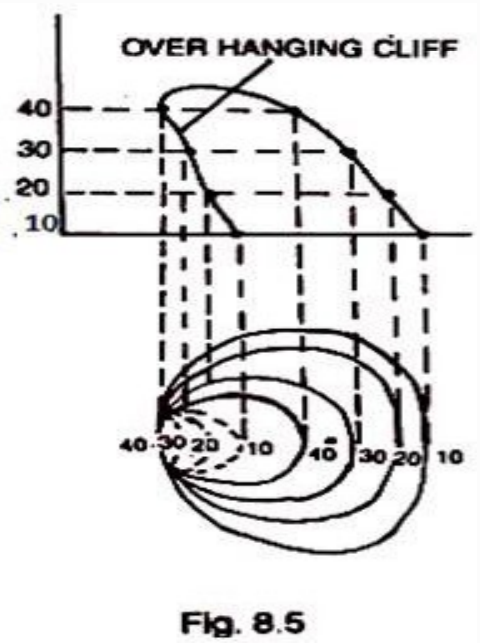

Fig. 8.5

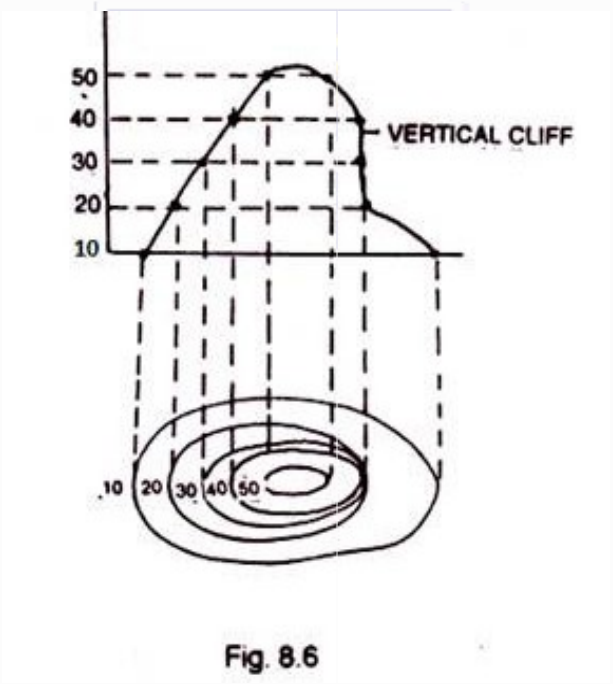

Fig. 8.6

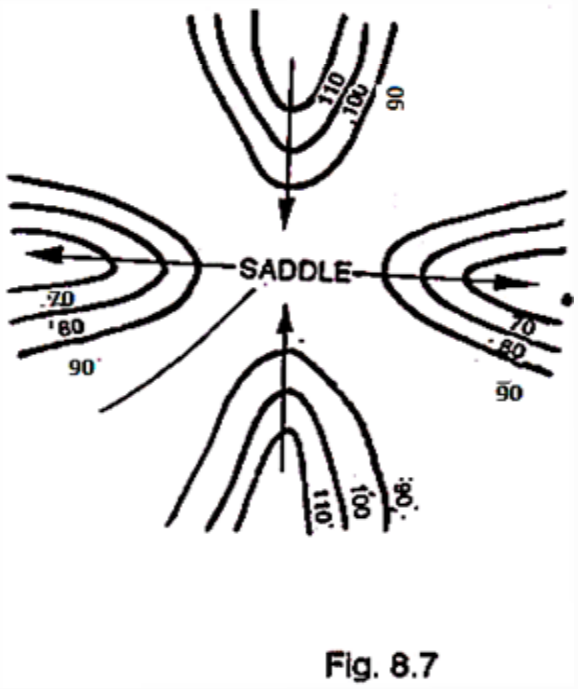

Fig. 8.7

METHODS OF CONTOUR

- Contouring needs the determination of elevation of various points on the ground and at the same the horizontal positions of those points should be fixed.

- To exercise vertical control leveling work is carried out and simultaneously to exercise horizontal control chain survey or compass survey or plane table survey is to be carried out. If the theodolite is used both horizontal and vertical controls can be achieved from the same instrument.

- Based on the instruments used one can classify the contouring in different groups:

I. Direct method, and
II. Indirect method.

DIRECT METHOD

- In this method, the contours to be located are directly traced out in the field by locating and making a number of points on each contour.

- These points are then surveyed and plotted on plan and the contours drawn through them.

- This method is the most accurate but very slow and tedious as a lot of time is wasted in searching points of the same elevation for a contour.

- This is suitable for small areas and where great accuracy is required.

METHODS OF CONTOUR

a. Vertical Control:

- The points on the contours are traced either with the help of a level and staff or hand level.
- The level is set at a point to command as much area as is possible and is leveled.
- The staff is kept on BM and the height of the instrument is determined. If BM is not nearby, fly leveling may be carried out to establish a temporary bench mark in that area.
- Having known the height of the instrument, the staff reading is calculated so that the bottom of the staff is at an elevation equal to the value of contour to be plotted. \
- Eg. If height of instrument is 800.250 meters the staff reading to plot a contour of 800 meters will be 0.250 meters. Taking one contour at a time(for 800m contour) the staff man is directed to keep the staff on those points where staff reading of 0.250 m is obtained every time.

b. Horizontal Control:

c. After having located the points for various contours vertically they are to be surveyed with a suitable control system for horizontally located.

d. For this, the location of points are traced by the method of plane tabling, chain survey or theodolite.

e. Then the contour are drawn through these points.

f. For accurate contouring sufficient number of the points at close interval are required.

g. The plotted positions of the consecutive points of any contour are simply joined by straight lines to form contour lines

METHODS OF CONTOUR

PROCEDURE

- To start with, a temporary B.M. is established near the area to be surveyed with reference to a permanent B.M. by taking flying levels. The level is then set up in such a position so that the maximum number of points can be commanded from the instrument station. The height of instrument is determined by taking a back sight on the B.M. and adding it to the R.L of the bench mark.

- The staff readings required to fix points on the various contours from the height of instrument. As an example, if the height of instrument is 72.58 m, then the staff readings required to locate the 72, 71 and 70m contours are 0.58, 1.58 and 2.58 m respectively. The staff is held on an approximate position of point and then moved up or down the slope until the desired reading is obtained.

- The point is marked with a peg. Similarly various other points are marked on each contour. The line joining all these points gives the required contour. It may be noted that one contour is located at a time. Having fixed the contours within the range of the instrument, the level is shifted and set up in a new position. The new height of instrument and the required staff readings are then calculated in a similar manner and the process repeated till all the contours are located.

- The position of the contour points are located suitably either simultaneously with levelling or afterwards. A theodolite or a compass or a plane table traversing is usually adopted for locating these points. The points are then plotted on the plan and the contours drawn by joining the corresponding points by dotted curved lines.

METHODS OF CONTOUR

Direct Method by Radial Lines:

- This method is suitable for small areas where a single point in the centre can command the whole area. Radial lines are laid out from the common centre by theodolite or compass and their positions are fixed up by horizontal angles and bearings. Temporary bench marks are first established at the centre and near the ends of the radial lines.

- The contour points are then located and marked on these lines as explained above and their positions are determined by measuring their distances along the radial lines. They are then plotted on the plan and the contours drawn by joining all the corresponding points

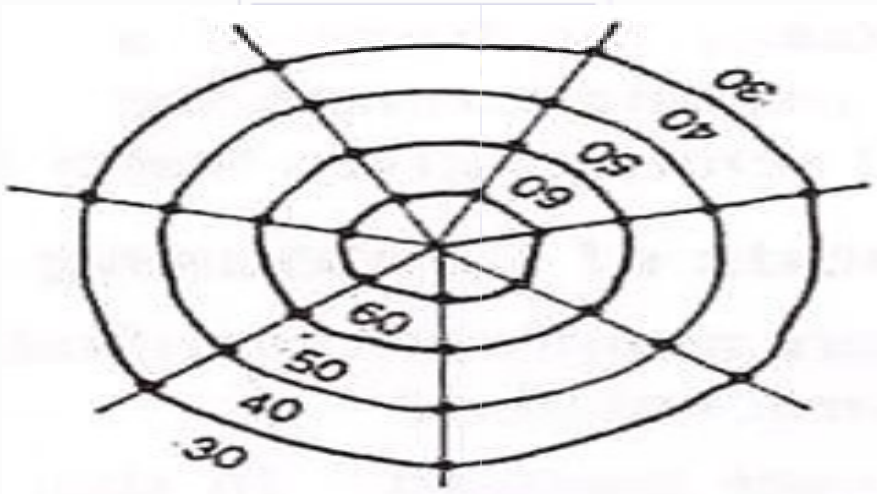

Fig. 8.8

THANK YOU