Assignment

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Subject Surveyin 2

(Q1) What is triangulation? Explain the orders of triangulation in detail?

* Triangulation:—

Triangulation is a surveying method that measures the angles in a triangle formed by three survey control points... the angles and distance are than used with the initial known position, and complex formulae, to calculate the position (latitude and longitude) of all others point in the triangulation network.

* Orders of triangulation:—

(a) Primary 1st order Triangulation:-

- In primary triangulation a very large areas (Whole country) are covered and the highest possible accuracy is obtained.
- Well proportional triangles must refined, instrument and method of observation and computation are used.

Average triangle Closure = 1sec

Maximum triangle Closure = 3sec

Length of Sides of triangle = 30 to 60 km

length of the base line = 5 to 20 km

Degree of accuracy = 1 in 500,000

Check on the base = 1 in 25,000

(B) Secondary or 2nd order Triangulation:—

- With in the primary triangles other points are fixed at closer interval so is form a secondary series of triangles which are connected to the primary system at interval.
- Comparatively small triangle are used. the instrument and method are not of the same refinement (accuracy)
- in this case.

Average triangle closure = 3sec

Maximum triangle closure = 8sec

Length of the base line = 2 to 6km

Length of Sides of triangle = 8 to 70km

Degree of accuracy = 1 in 50.000

Check on the base = 1 in 10.000

(c) Tertiary or 3rd Order Triangulation:-

- Within the secondary triangles points are established in short intervals to obtain horizontal control for detail survey.

Average triangle closure = 6sec

Maximum triangle closure = 12sec

Length of the base line = 1 to 3 km (1/2 to 3/2 miles)

Length of sides of triangle = 1.5 to 10km

Degree of accuracy > 1 in 50.00

Check on the base = 1 in 30.00.

(Q2) Two triangulation stations A and B, 50 miles apart have elevation 1000 feet and 1100 feet respectively. The intervening ground may be assumed to have uniform elevation of 850 feet. Find the minimum height of signal required at B so that the line of signal may not pass near the ground than 15 feet

Solution:—

Min elevation of line of sight

$= 850 + 15 = 865$ feet

Thus elevation is taken as datum

elevation of A $= h_1 = 1000 - 865 = 135$ feet

tangent distance D_1 corresponding to h may be calculated as h_1 feet $=$

$0.574\ D_1^2$ (miles)

$$D_1 = \sqrt{\frac{h_1}{0.574}} = \sqrt{\frac{135}{0.574}} = 15.33 \text{ miles}$$

$D = D_1 + D_2$

$50 = 15.33 + D_2$

$D_2 = 34.67$

$h_2 = 0.574\ D_2^2 = 0.574\ (34.67)^2$

689.95 feet

(Q3) Explain the direct and indirect methods of Contouring in detail?

* Methods of Contouring.

- There are mainly two methods of Locating Contours:-

(1) Direct method and.

(2) indirect Method.

(1) Direct Method :-

- In this method. the contours to be Located are directly traced out in the field by locating and making anumber of points on each contour. These points are then surveyed and plotted on plan and the contours draw throug them.

- In this method is most accurate but very slow and tedious as alot of time is wasted in searching points of the same elevation.
- This is suitable for small area and where great accuracy is required.

Procedure :—

- The start with a temporary B.M is established near the area to be surveyed with reference a permanent B.m by fly levelling.
- The Level is then set up in such a position so that the maximum number of points can be commanded from the in strument station.
- if the height of instrument is 82.48m than the staff reading required to Locate 82.81 and 80m Contour are 0.48 . 1.48, and 2.48 m respectively.

★ Indirect Method :-

In this method the points located and surveyed are not necessarily on the contour lines but the spot levels are taken along the series of lines laid out over the area. The spot levels of the several representative points representing hills, depressions, ridge and valley lines and the changes in the slope all over the area to be contoured are also observed. Their positions are then plotted on the pla and the contours drawn by interpolation. This method of contouring also known as Contouring by spot Leve

(Q4) Explain the different methods for Locating Soundings?

(Ans) Soundings may be Located by the following methods which are Commonly used.

(1) By transit and stadia?

(2) By range and one angle from shore.

(3) By range and time intervals.

(4) By range and one angle from boat.

(5) By two angle from shore.

(6) By two angle from boat.

(7) By intersecting ranges.

(8) By Cross rope.

(9) By distances along a wire or rope stretched a Crossed a stream between stations.

- Bes used in conjunction with other methods.
- In such case first and last sounding on a line of sounding are located by angular observed from shore.
- The intermediate sounding are then located by interpolation according to time intervals.

* By two angle from boat.

- In this point the position of sounding are located by measuring two angles simultaneously with a sextant.

From the boat (P) to three shore signals or any points (A, B and C) whose position have been previously known.

- The points sighted should be well defined such as chimney, light house etc.
- In order to minimize the errors in measuring the angles and plotting them the nearer object should be preffered to distant one. This method is commonly used where no ranges are employed.

* By transit and stadia:-

In this method a transit is set up at point on the range of the stadia readings are taken on a stadia rod held on the bottom of the boat at the instant the sounding is taken.

- The transit can be set up at any shore line whose position has been previously fixed.
- In shallow water the stadia rod may be dispensed with and the stadia readings when soundings are taken far from shore.

* By range and time interval:-

- In this method the sounding boat is rowed at uniform speed along the range and the soundings are taken at regular interval of time.
- The method is particularly applicable is still water and or short distance and when great accuracy is not required.

Example:-

- The new height of instrument and the required staff reading are then Calculated in a Smaller manner and the process repeated till all the contour are Located...
- The position of the contour points are located suitably either simultaneous with levelling or a after words.
- A theodolite a compass or a plane table traversing is usually adopted for locating these points.
- The points and then Plotted on the plan and the contour drown by joining Corresponding points by betted Curved lines.

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(Q5) The scale of the photograph is 1cm. = 150m.

The photograph size is 30 cm x 30 cm

determine the number of photograph required to cover an area of 200km2, if the Longitudinal overlap is 70% and side overLap is 35%

Solution :-

$L_p = 30cm$, $W_p = 30cm$

$O_l = 0.7m$, $O_w = 0.35m$

$S = 150$

L_g = ground length covered $= S L_p (1 - O_l)$

$= 150 \times 30 (1 - 0.7)$

$L_g = 1350 m$

$= 1.35km$

W_g = ground Width Covered $= S W_p (1 - O_w)$

$= 150 \times 30 (1 - 0.35)$

$W_g = 2925m$

$= 2.925km$

A_g = Net ground area = $L_g \times l_g$ = 1.35×2.925

= $3.948\ km^2$

N = Number of photograph required

$$= \frac{200}{3.948}$$

$$= 50$$