

SHAH HASSAN.

ID- 7978

Subject- Advance Engineering Survey.

To

Engr. Abdul Farhan.

Q No-01

Transition Curve:

A curve of varying radius is called transition curve between tangent and a circular curve. It is also known as spiral curve. It can be inserted in between the two branches of a compound or reverse curve.

Types:

There are three common types of transition curve;

- 1) Cubic Parabola (railways).
- 2) Clothoid or spiral (railways)
- 3) Lemniscate (Highways)

Superelevation:

It is the amount by which the outer edge of a curve on a road or railway is banked above the inner edge when a vehicle passes to a curved path, the following forces act on it;

- 1) Weight of vehicle.
- 2) Centrifugal force both acting through centre of gravity of vehicle.

The effect of centrifugal force is to push the vehicle off the track. Now to counteract the action, the plane of the road surface is made perpendicular to resultant of centrifugal force and weight of vehicle.

Mathematically

W = Weight of vehicle .

P = Centrifugal force .

v = Speed of vehicle (m/sec)

g = acceleration due to gravity .

R = Radius of curve .

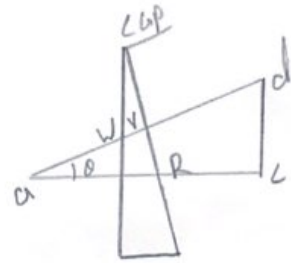
h = Super elevation in m .

b = width of road in m .

G = distance b/w centre of rails .

For equilibrium,

the resultant of weight and centrifugal force must be equal and opposite to the reaction perpendicular to road .



(ii)

As we know that

$$P = \frac{Wv^2}{gR}$$

$$\Rightarrow \frac{P}{W} = \frac{v^2}{gR}$$

If θ is the inclination of road surface, the off resultant to vertical is also θ ,

So we have

$$\tan \theta = \frac{dc}{ac} = \frac{P}{W} = \frac{bv^2}{gR}$$

on Roads:

$$b \tan \theta = \frac{v^2}{gR}$$

On Railways:

$$b \tan \theta = \frac{Gv^2}{gR}$$

Radius:-

$$b \tan \theta = \frac{v^2}{gR}$$

$$R = \frac{v^2}{b \tan \theta g} \quad (\text{for roads})$$

and,

$$b \tan \theta = \frac{Gv^2}{gR}$$

$$R = \frac{Gv^2}{b \tan \theta} \quad (\text{for railways})$$

Speed of vehicle:

$$b \tan \theta = \frac{v^2}{gR}$$

$$v^2 = b \tan \theta gR$$

$$v = \sqrt{b \tan \theta gR}$$

(For roads)

$$b \tan \theta = Gv^2$$

$$v^2 = \frac{b \tan \theta gR}{G}$$

$$v = \sqrt{\frac{b \tan \theta gR}{G}}$$

Q No-02

Triangulation:

Triangulation is a process in surveying in which tracing and measurements of a series or a network of triangles is used for determining distances and relative positions of points over an area.

Principles of triangulation:

- In triangulation all the three angles of each triangle are in the field along with one base line.
- The side of the first triangle whose length is predetermined is called base line and vertices of

the individual triangles are known as triangulation stations.

- To minimize accumulation of errors in length, subsidiary bases at suitable intervals are provided.

Trilateration:-

The method of surveying in which the lengths of the sides of a triangle are measured and from the information angles are computed.

This method does not involve the measurements of angles.

Principles of trilateration:-

- It is a method of control survey in which a network of triangles is

used as in triangulation.

- All the three sides of each triangle are measured in the field with distance measuring instruments.
- Horizontal angles are measured in the field.
- Trilateration is adjusted after the computation of the angles and the co-ordinates of the station are determined.
- In trilateration angles are computed indirectly from the lengths of the sides of triangle.

Difference blw triangulation & trilateration

- 1) In triangulation all angles of the triangles are measured, while in trilateration all the sides of triangles are measured.
- 2) In triangulation base line is measured while in trilateration azimuth of initial line is measured.
- 3) For triangulation intervisibility blw stations are essential while, In trilateration It is possible to measure distance without intervisibility.
- 4) There are more internal checks in triangulation as compared to that of trilateration.

Q No-3 (Part-A)

Ans: Hydrographic Survey:

Hydrographic surveying or bathymetric surveying is the survey of physical factors present under water.

It is science of measuring all factors beneath water that affect all the marine activities like dredging. Marine construction offshore drilling etc.

Hydrographic surveying is mainly conducted under authority concern. It is mainly carried by means of sensor, sounding or electronic sensor system for shallow water.

=> Factors to be determined while conducting hydrographic survey:-

(111)

Following are the factors which would be done while doing hydrographic survey.

a) Survey Equipment

b) Preparation of a hydrographic survey specification.

c) Issue to a designated unit.

d) Program planning of that unit.

e) Assessment of the false with in that unit.

f) Reconnaissance requirement.

g) Resource allocation.

h) Detail survey planning

i) Planes for completion & checking data.

=) Why we do hydrographic surveying:

To get following information
we do hydrographic surveying.

- 1- Depth of bed can be determine.
- 2- Shore lines can be determine.
- 3- Locating sewer fall by measuring direct current.
- 4- Locating mean sea level.
- 5- Tide measurement.
- 6- River & stream discharge measurement.
- 7- Massive structures like bridges, dams & harbours are planned.

Q 3 (Part-B)Ans:Sounding:

- The process to determining depths below water surface is called sounding.
- Sounding is analogous to levelling on land.
- The reduce level of any point on the bottom of a water body is obtained by subtracting the sounding from the mean sea level.

Purpose of Sounding:

- Preparation of accurate charts for navigation.
- Determination of the quantities of the material to be filled.
- Obtaining information for design of break water, sea walls etc.

Equipments for sounding:

The essential equipments and instrument employed for taking the sounding may be grouped as :

- Shore signals and buoys.
- Sounding equipment.
- Angle measuring instruments.
- Sounding boat.
- Sounding pole or rod.
- Lead line.
- Weddell's sounding machine.
- Echo sounding machine / Fathometer.

Q-04 Part-A

Aerial Photogrammetry:

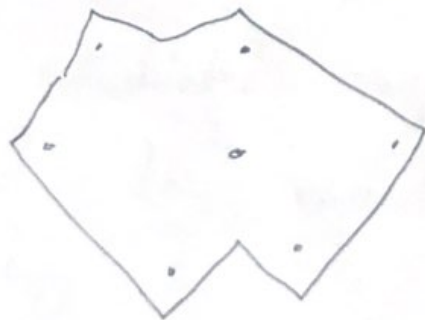
The technique of photographing the earth's surface or features of its atmosphere or hydrosphere with cameras mounted on aircraft, rockets, or Earth-orbiting satellites and other spacecraft.

Why do we do it!

Because it is an important application of remote sensing, with a sophisticated range of cameras being used to collect information on geology, land use, agricultural management, water, forestry etc.

Q-4 (Part-B)* Procedure of Aerial Photography:Establishing control points:

- There should be min of 3 to 4 control points are needed in one photograph.
- It depends on scale map.
- Flight control and cartographic method of mapping.

Aerial photography area

• Ground control points.

Parallax and Measurement of Parallax:

- An angle photograph can be studied to get the location of an object by its co-ordinates in the photograph.
- Similarly, to know the third dimensional of same object, there should be minimum of two points of observation is needed from different angles.

Construction of Map and Cartography:

After collecting photographs its time to create plot the map.

There are several method to plot the detail of map.

- Stereoscopic method is one of them.