Name:

Hassan Zaib Khattak

ID:

7958

Section:

B

Deptt:

BE(C)

Subject:

Advance Surveying

Submitted to:

Engr Abdul Farhan

Iqra National University

Question No 01 2

What is transition curve? How super elevation is effected by the speed of vehicle and radius of the curve? prove it with the help of equation and diagram.

Transition Curve:

A Curve of varying radius is called transition curve. It is also called Spiral Curve. It is used in both highway and railway between tangent and Circular Curve in order to have smooth transit-ion from tangent to the curve and from curve to the tangent

OR

Transition Curve is a curve of varying radius introduce between a straight and a Circular curve or between two branches of a Compound Curve or reverse curve.

Super elevation and proves:

When Vehicle moves from tangent on to the curve force acting on it an.

Weight of vehicle

Gravity of vehicle

Let

w = Weight of vehicle

P = Centrifugal force

V = Space of vehicle m/s

g = Acceleration due to gravity

R = Radius of the curve

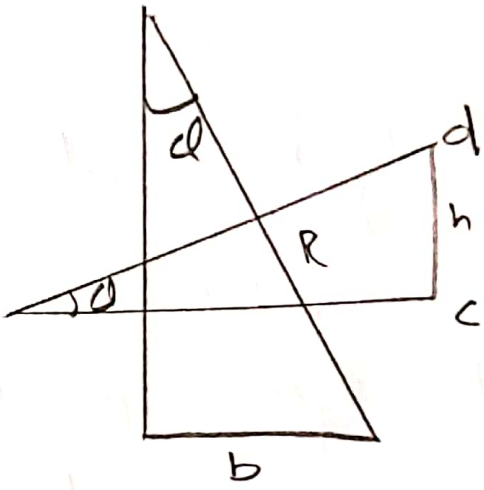
h = Super elevation

b = Width of the road.

For equilibrium the resultant R of the P and W must be equal and opposite to the reaction perpendicular to the road or railway surface.

$$P = \frac{m^2}{R} \quad \frac{wv^2}{gR} \qquad W = mg$$

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



$$\tan\alpha = h/b = \frac{dc}{ac} = P/W$$

$$\tan\alpha = h/b = P/W = \frac{v^2}{gR}$$

$$h = b\tan\alpha$$

$$h = b\frac{v^2}{gR} \longrightarrow \text{highway}$$

$$h = b\frac{Gv^2}{gR} \longrightarrow \text{Railway}$$

Where G = distance between center of rail

Super elevation is gradually applied along a transition curve. Full super elevation is attained in junction of the transition curve with the Circular curve

Question No 02:

What is the difference between traingulation and trilateration? Also explain the principles of traingulation and trilateration.

Differentiate b/w traingulation and trilateration:

Traingulation	Trilateration
① All angles are measured in traingulation.	① All sides are measured in trilateration
② Distance of base lines is measured.	② Azimuth of the inital line is measured.
③ Some check base lines are also measured to control scale error	③ Some check angles are measured to control azimuth error
④ Intervisibility between station is essential	④ For small area it is possible to measure distance without inter-visibility.
⑤ There are more internal checks in comparison with trilateration in the	⑤ There are less internal checks in comparison with traingulation in the same

same geometric figure	geometric figure
(5) The side lengths are computed on the basis of measured angle applying sine law.	(5) The angles are compound on the basis of measured side lengths applying cosine law.

Principles of Traingulation:

(1) In traingulation all the three angles of each traingle are measured in the field along with one baseline.

(2) The side of the first traingle whose length is predetermint is called the base line and vertices of the individual traingles are known as traingulation stations and the whole figure is called the traingulation system or traingulation figures

(3) To minimize accumulation of errors in lengths subsidiary bases at suitable intervals are provided.

(4) Again, if the coordinates of any vertex of the traingle and azimuth of any side are also known, then coordinate of the remaining vertices

may be Computed.

5. The traingulation stations at which astronomical observation for azimuth are made are called laplace station.

Principles of trilateration:

1. Trilateration is a highly accurate and preaise method of establishing and expanding horizantal control.
2. Method of control survey in which a network of traingles is used as in traingulation system.
3. All three sides of each traingles are measured in the field with the distance measuring instrument (EDMs, tapes, other apparatus).
4. Horizontal angles are not measured in the field
5. Angle in a trilateration system are Computed indirectly from the length of the sides of traingle by Cosine formula.

Question No 03(a):

What is the hydrographic Survey? Why we do it and what are the factor to be determine while Conducting hydrographic Survey?

Hydrographic Survey:

It is the branch of Surveying which deals with water bodies e.g Lake river etc

The usual fundamental principles of Surveying and leveling are adopted for acquiring data for determination

1. Water Volume
2. Rate of flow
3. To determine the Shape of the area underlaying the water Surface etc.

It is the physical features present under water. It is Science of

measuring all factors beneth water that affect all the marine activities 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.

Why we do hydrographic Survey?

A major purpose of hydrographic Surveying is to obtain data necessary for preparation nautical charts, which show water depths, navigation Channel, structure (such as piers), breakwater and so on and which are used by mariners. The main development/measurment performed in hydrographic surveying in water. Hydrographic Surveying are main purpose tide measurment, river and stream discharge measurment and massive structure like bridge, dam etc

Factor to be determined while Conducting Hydrographic Survey:

Following are factor while Conducting hydrographic Survey.

1. Survey Equipments
2. Preparation of hydrographic Survey Specification (to review of existing Data).
3. Issue to design units.
4. Programe planning of that units.
5. Reconnaissance requirement
6. Datailed Survey planning
7. Plane for Compilation and Checking of Data

Question No 03 (b):

What is Sounding and purpose of Sounding. Also name the equipments used to determine Sounding?

Sounding:

The process of determining depth below the water surface is called Sounding

Sound is analogous to levelling on land. The reduced level of any point on the bottom of a water body is obtained by substracting the sounding from the mean sea level.

Purpose of Sounding:

1. Preparation of accurate charts for navigation.
2. Determination of the quantities of the materials to be filled
3. Obtaining information for design of

of breakwaters, sea Well etc.

(4) The Sounding points should be selected keeping in mind that all the important irregulation are recorded.

(5) The soundings are thus made along a series of straights lines at right angles to the shoreline

(6) The spacing between the sounding lines and between the sounding points depends upon the nature of submarine surface as well as on the object of the survey.

(7) Usually spacing between sounding line is kept 30m and spacing between sounding points is kept 7.5m to 15m.

Name of equipment Used to determine the Sounding:

The equipment used to determine the sounding are:

1. Shore Signals and buoys
2. Sounding equipment
    1. Sounding boat
    2. Sounding pole
    3. Lead line
    4. Weddell's Sounding machine
    5. Echo Sounding machine/Fathometer
3. Angle measuring equipment
    1. Theodolite
    2. Prismatic Compass
    3. Sextant

Question No 04 (A):

What is the photogrammetry and Why we do it?

Aerial photogrammetry:

In terrestrial photo-grammetry Photographs are taken from a fixed position on ground while in the aerial photogrammetry and aircraft Camera Setup is used to take photographs from air flying over the ground. In this article we will discuss about the aerial Photography

Why we do Aerial photogrammetry:

Sometimes it is difficult to survey a large area of land on foot. This is where UAVs come in they make the entire process of survey-ing land more affordable and efficie-nt. UAVs can fly either several hundreds feet in the air or close

to the ground, depending on the topography of the land being surveyed. Acquiring perspective from high up is beneficial since the imagery returned will display larger part of the land all at once. However despite the efficiency of drones, surveyors must always allow for areas that present obstacles even to UAVs. These obstacles could be anything from trees to dense brush. In these cases the vehicles can fly closer to the ground, or the camera pointed at an angle to see what additional information can be gotten from the new perspective. UAV photogrammetry in land surveying has met a strong need in construction planning and managment.

Question No 04 (b):
Shortly explain the procedure of aerial photography.

Procedure of Aerial photography:

1. Establishing Control Points
2. Flight planning & Photography
3. Photo interpretation and Stereoscopy
4. Parallax and measurment of parallax
5. Construction of map & Cartography

(1) Establishing Control points:

Control points are points established on ground with known relative position. The photography captured is observed by setting these control points are boundaries, So point should be established in such away that they should be easily identifiable on photography.

(2) Flight planning & Photography:

Flight planning is nothing but knowing height to the maintained by flight

While taking photos, area to be covered in each photography, number of photography, nos of strips and time interval between exposures

(3) Photo Interpretation and Stereoscopy

Photo interpretation is done by instrument called Stereoscopy which cotains magnifiers so, one can observe the three dimensional model of area through it and also ease of drawing of maps of photographed area. For accuracy, control station, elevations, length of lines should be sufficiently available.

(4) Parallax and Measurment of

Parallax:

An aerial photograph can be studied to get the location of an object by its co-ordinates in the photograph.

(5) Construction of maps and Cartography:

After Collecting all photograph, its time to create or plot the map. There are several methods available to plot the details of map and one of the method is stereoscopic method