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Subject

Advance survey

Submitted to

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Q#01 (01)

①

What is transition curve?

Transition curve is a curve in plan which is provided to change the horizontal alignment from straight to circular curve gradually. i.e.

The radius of transition curve varies between infinity to R or R to infinity.

Transition curves are provided to serve the following purposes.

- (i) To introduce super elevation
- (ii) To introduce extra widening.
- (iii) To reduce the radius from infinity at a straight junction to a radius R at curved junction gradually.

How super elevation is effected by the speed of vehicle and radius of the curve?

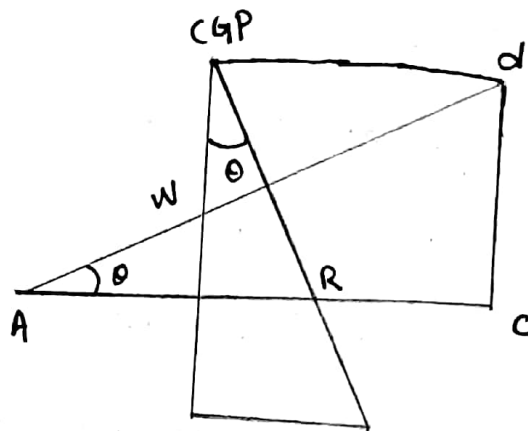
Superelevation

(2)

Superelevation is the banking of the roadway such that the outer edge of the pavement is higher than the inside edge. The use of superelevation allows a vehicle to travel through a curve more safely and at a higher speed than would otherwise be possible.

The transitional rate of applying superelevation into and out of curves is influenced by several factors. These factors are design speed, radius of the curve, minimum curve radii for horizontal alignment are determined by the design speed and superelevation rate. Higher design speeds require more superelevation than lower design speeds for a given radius. Superelevation is affected by these factors which are design speed, radius of the curve and are dependent of each other.

Mathematically:



w = weight of the vehicle

P = Centrifugal force

V = Speed of the vehicle (m/sec)

g = Acceleration due to gravity.

R = Radius of the curve

h = Super elevation in m

b = width of road in m

G = Distance between Centre of road and edge.

Equilibrium:

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

Equation for Super elevation-

$$e + f = \frac{v^2}{127R}$$

e = Rate of super elevation in %

f = Lateral friction factor

v = velocity of vehicle in m/s

R = Radius of circular curve in m

Q#02 Difference Between Triangulation and Trilateration

(A) Triangulation

The Method of Triangulation is based on the angles. The process of triangulation is done through on the basis of angles. From measured angles the positions of the points of interest are computed based on the measured angles and two known points. From those angles, the distances are computed which are in turn used to calculate coordinates for the target points.

(B) Trilateration :-

The Method of Trilateration is based on the distance. in the process of Trilateration the process is done with the distances. from those distances the angles are computed. once these angles are computed these can be used then in conjunction with the distances to get the position of the target points.

principle of Triangulation

- In the process of triangulation, All the three angles of each, triangle are in the field including one base line.
- The side of the first triangle whose length is predetermined is called baseline and vertices of the individual triangles are known as triangulation station

→ To minimize Accumulation of errors in length (6)
subsidiary bases at suitable intervals are
provided.

principle of Trilateration :-

→ It is a Method of Control survey in
which a network of triangles is used as
in trilateration

⇒ All 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 then coordinates of the stations
are determined

→ In Trilateration angles are computed indirectly
from the length of the sides of triangles.

Q #03 (A)

(7)

What is hydrographic survey?

It is the type of surveying which dealing with water bodies i.e. lake, river, sea etc. which effects maritime navigation, marine construction, dredging, offshore, oil exploration, and related activities. The hydrographical term is used to describe maritime cartography. which is the final stage of hydrographic process, these are widely used for determination of

(I) water volume.

(II) Rate of flow

(III) under the water determination of the area shape.

Hydrographic surveying is mainly conducted under the concern authority, these are carried by sensor, sounding or electronic sensor for shallow water bodies.

(B) Why we do hydrographic survey

⑧

The hydrographic Survey is done for the following purpose.

- (i) To determine depth of the bed.
- (ii) to determine shore lines
- (iii) to locate sewer of all by measuring direct current.
- (iv) locating of sea level.
- (v) Tide Measurement.
- (vi) River and Stream flow measurement
- (vii) planning of massive structures like bridge, dams, harbours.

(C) Factors to be determined while conducting hydrographic Survey :-

Following are the factors which can be determine while conducting hydrographic Survey.

- (A)
- (i) Surveying Equipments
 - (ii) preparation of a hydrographic survey specification
 - (iii) issue to a designated unit
 - (iv) programme planning of that unit
 - (v) Assessment of the task within that unit
 - (vi) Resource allocation
 - (vii) Detailed survey planning
 - (viii) plans for compilation and checking of data

Q # 3 (B)

Sounding :- The process of measuring the depth below the water surface is called sounding. This corresponds to the ordinary spirit levelling in land surveying where depths are measured below horizontal line established by level. The object of making sounding is thus to determine the configuration of

The sub sequence source.

Purpose of Sounding :-

- (i) Sounding is most important for any water body to improve its navigable properties. to know about siltation and scouring etc.
- (ii) in hydrographic surveying sounding is the measurement of depth below the water surface.
- (iii) in coast the main purpose and objective of sounding is to measure and find the depth below the water bodies.

Equipments using in Sounding :-

- (i) Sounding Boat.
- (ii) Sounding rods and poles
- (iii) Lead line.
- (iv) Sounding machine
- (v) Fathometer.

Q # 04 (A)

Aerial photogrammetry- Aerial photogrammetry is the process in which an aircraft with camera is used to take photograph from certain height in the air. A minimum of 3 to 4 control points needed in one photograph.

Reason for ~~Resource~~ uses for Aerial photogrammetry:-

The following are some of the resources uses for Aerial photogrammetry

It is used because it provides computer generated 2D and 3D Models. These Models are topographical in nature, they represent the dimensions and physical features of the area of land and in stuning accurately this Model can be relocated and zoomed

Along with surveying may of the uses of (12)
Aerial photogrammetry in different fields.

Q-104 (B)

procedure of Aerial photography :-

The following are the main steps of the Aerial photography.

- ① Establishing of control points.
- ② Flight planing and photography.
- ③ Photointerpretation and Stereoscopy.
- ④ parallax and Measurement of parallax.
- ⑤ Construction of map and Cartography.

Establishing control points

Control points are points established on ground with known relative positions. The photograph captured is observed by setting these control points as boundaries. There should be minimum 3 to 4 points (control points) in a photograph.

Flight planning and photography:-

Flight planning is actually knowing the height to be maintained while taking photo, coverage to be covered in each photograph, Number of photographs, no of strips and time of interval between exposures.

The End

