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GB 50026-2020

Replacing GB 50026-2007

Standard for engineering surveying

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1 General

1.0.1 This standard is formulated in order to unify the technical requirements of engineering survey, achieve advanced technology, economical and reasonable, and make engineering survey results meet the principles of reliable quality and safe application.

1.0.2 This standard is applicable to general measurement work in the field of engineering construction.

1.0.3 In engineering surveying, the medium error should be used as the standard for measuring the accuracy of surveying and mapping, and twice the medium error should be used as the limit error. For projects with high precision requirements, the observation precision can be evaluated according to the method in Appendix A.

1.0.4 The types of areas for engineering surveys should be divided into general areas, urban construction areas, industrial and mining areas, and water areas.

1.0.5 For measuring instruments used in engineering surveys, use management should be strengthened, corresponding rules and regulations should be formulated, and verification should be carried out according to the prescribed cycle. The software used should pass the test or verification.

1.0.6 Check the measurement result data quoted in the project.

1.0.7 In addition to complying with this standard, the engineering survey shall also comply with the current relevant national standards.

2.1.1 Satellite positioning measurement satellite positioning

The technology and method of using a satellite positioning receiver to receive multiple positioning satellite signals of a satellite navigation system to determine the position of a ground point is referred to as satellite positioning.

2.1.2 Satellite positioning control network satellite positioning control network

The measurement control network established by using satellite positioning measurement technology and methods is referred to as satellite positioning control network or satellite positioning network.

2.1.3 real time kinematic control survey real time kinematic control survey

A method for measuring and setting control points using carrier phase real-time dynamic differential measurement technology.

2.1.4 triangular network triangular network

The measurement control network is composed of a series of connected triangles, and the observation elements are angle and distance.

2.1.5 triangular control network survey

The method of determining the position of the control point by measuring the triangulation network is a general term for the previous triangulation measurement, trilateration measurement and edge angle network measurement.

2.1.6 2"class instrument 2"class instrument A goniometer with a nominal error of 2" in rounds of horizontal observations under a standard environment.

2.1.7 5mm class instrument 5mm class instrument When the ranging length is 1km, the distance measuring instrument calculated according to the nominal accuracy formula of ranging is 5mm in the ranging error.

2.1.8 free station measurement free station

After arbitrarily setting up a station, measure the side lengths and angles to a small number of known points around, obtain the coordinates of the station according to the principle of corner resection, and then measure and set up other points.

2.1.9 GNSS-leveling

The normal height of the point is obtained by using satellite positioning to fit the elevation measurement or using the refined results of the regional quasi-geoid.

2.1.10 paper topographic map

A topographic map with paper or Mylar as its initial support.

2.1.11 deformation monitoring deformation monitoring

The process of monitoring the shape or position change of the monitoring object and related influencing factors, determining the change characteristics of the monitoring object over time, and performing deformation analysis.

2.1.12 three dimensional laser scanning technology

Non-contact active measurement technology that obtains various information such as the three-dimensional coordinates of the surface of the measured object and the intensity of reflected light by emitting laser light, mainly including ground three-dimensional laser scanning, vehicle three-dimensional laser scanning and airborne lidar scanning.

2.1.13 Point cloud point cloud

Obtain massive point collections of target surface properties in three-dimensional space by means of measurement.

2.2 Symbols

A - the fixed error of the main technical indicators of the satellite positioning measurement control network;

a - nominal fixed error of the total station;

B--The proportional error coefficient of the main technical indicators of the satellite positioning measurement control network, and the width of the tunnel excavation face;

b - the nominal scale error coefficient of the total station;

C-collimation difference;

D--length of ranging side, length of satellite positioning elevation checking route, distance from RTK measuring base station to checking point, grid side length, measuring slant distance;

Dg--the length of the ranging side on the Gaussian projection plane;

DH--the length of the distance-measuring side reduced to the average elevation plane of the survey area;

DP--horizontal distance of survey line;

D0--reduced to the length of the ranging side on the reference ellipsoid;

d--Basic average length, pile diameter, side length round-trip distance measurement is poor;

DS05, DS1, DS3 - level of optical level;

DSZ05, DSZ1, DSZ3 - automatic leveling optical level, digital level;

fbeta--the angular closure difference of the wire loop or the azimuth angle closure difference of the attached wire;

H--Water depth, height of buildings (structures), height of columns, length of vertical part of installation measuring pipeline, height of bridge tower, buried depth of tunnel;

Hm--the average elevation of the two ends of the ranging side;

HP - the average height of the survey area;

h-height difference, caisson height of building construction, buried depth of underground pipeline, tunnel height;

hd-basic contour distance;

hm-the height difference between the geoid in the survey area and the reference ellipsoid;

i-the angle between the collimation axis of the level gauge and the axis of the vial, point number, side number, and triangle number;

K - Atmospheric refraction coefficient;

KM - correction factor;

L--Length of leveling section or route, length of main axis of outer profile, length of crown block or crane track, total length of bridge, span diameter of bridge, length of embedded parts, length between two openings of tunnel excavation, tunnel length, collimation The length of the line, the front and rear distances from the monitoring body or monitoring section to the tunnel excavation face;

l--horizontal distance from the measuring point to the pile in the line, the length of the transverse centerline in meters from the intersection point, and the width of the river (river, canyon) crossed by the bridge;

M-the denominator of the surveying scale;

Mw--Height difference full median error;

Mdelta -height difference accidental error, point error of check point;

Mh - the height error of the digital elevation model;

m - medium error;

mD - error in ranging;

mDi--The actual distance measurement error and the average distance measurement error of the i-th side;