

GLOSSARY

Accuracy

The closeness to the truth of measurement data or station coordinates.

Adjustments

Since all real measurements are imperfect, some amount of error will accumulate in the course of a survey. That error can be logically distributed throughout the survey by various adjustment procedures. Adjustments can and should be done with any set of measurements for which error can be assessed. Adjustment procedures do not correct the errors in the measurements. They simply produce a set of data that is self-consistent (e.g., the starting and ending points of a closed-loop leveling circuit have the same elevation - which is physical reality). The adjusted values are not necessarily true - they are just likely to be closer to the true values than the original measurements.

Azimuth

The horizontal direction of a line clockwise from a reference plane, usually the meridian.

Azimuth Angle

The angle less than 180° between the plane of the celestial meridian and the vertical plane with the observed object, reckoned from the direction of the elevated pole. In geodetic work, it is the horizontal angle between the celestial pole and the observed terrestrial object.

Backsight

A backsight is a reading taken on a position of known coordinate(s). Since a survey progresses from a point of known position to points of unknown position, a backsight is a reading looking "backward" along the line of progress.

Bearing

The direction of a line with respect to the meridian described by degrees, minutes, and seconds within a quadrant of the circle. Bearings are measured clockwise or counterclockwise from north or south, depending on the quadrant.

Benchmark

A survey mark made on a monument having a known location and elevation, serving as a reference point for surveying.

Booking

Booking means entering the field data in the field book.

Breakpoints

A breakpoint is a point where a change in some parameter of interest occurs. In surveying, breakpoints are usually associated with changes in slope.

Collimation

A physical alignment of a survey target or antenna over a mark or to a reference line.

Contour Line

An imaginary line on the ground, all points of which are at the same elevation above or below a specified datum.

Contour Interval

A predetermined difference in elevation (vertical distance) at which contour lines are drawn. The contour interval is usually the same for maps of the same scale.

Contour Map

A map that portrays relief by means of contour lines.

Control Points

Control Points are fixed points of known coordinates. Such information can give only elevation or can include all coordinates. Control points are determined by high-accuracy surveys.

Coordinates

Linear or angular quantities, or both, which designate the position of a point in relation to a given reference frame.

Datum

A reference point from which other points in a survey are measured from. A datum may be a known point within an existing survey grid or it may be any arbitrary point.

Electronic Distance Measurement (EDM)

EDM is a technique that is used to measure distances. EDM is based on the idea that light (and radio waves) travel at a finite velocity and by measuring how long a signal takes travel back and forth between two points and knowing the speed of light, the distance can be measured.

Elevation

The elevation of a point is its vertical distance above or below a given level reference surface.

Error

An error is the difference between the true value of a quantity and the measured value of the same quantity.

Face Left

Face Left refers to the position of a theodolite when the vertical circle is situated to the left hand side of the observer's face.



Face Right

Face Right refers to the position of a theodolite when the vertical circle is situated to the right hand side of the observer's face.



Field Books

Field books are standard forms for recording of survey data as it is collected.

Foresight

A foresight is a reading taken on a position of unknown coordinate(s). Since a survey progresses from a point of known position to points of unknown position, a foresight is a reading looking "forward" along the line of progress.

Geodesy

Determination of the time-varying size and figure of the earth by such direct measurements as triangulation, leveling and gravimetric observations.

Geodetic Surveying

Geodetic surveying is that branch of surveying wherein all distances and horizontal angles are projected onto the surface of the reference spheroid that represents mean sea level on the earth.

Geoid

An equipotential surface of the gravity field approximating the earth's surface and corresponding with mean sea level in the oceans and its extension through the continents.

GPS

Global Positioning System. A surveying technology using specialized radio receivers tuned to signals from military navigation satellites to position survey stations.

Horizontal Angle

A horizontal angle is the angle formed in a horizontal plane by two intersecting vertical planes.

Interior Angle

An angle between adjacent sides of a closed figure and lying on the inside of the figure. The three angles within a triangle are interior angles.

Interpolation Method

Determination of an intermediate value between given values using a known or assumed rate of change of the values between the given values.

Landmark

A survey mark made on a 'permanent' feature of the land such as a tree, pile of stones, etc.

Leveling

Leveling is the operation in surveying performed to determine and establish elevations of points and to determine differences in elevation between points.

Map

A conventional representation, usually on a plane surface and at an established scale, of the physical features (natural, artificial, or both) of a part or whole of the Earth's surface by means of signs and symbols and with the means of orientation indicated.

Map Scale

The ratio of a specified distance on a map to the corresponding distance in the mapped object.

Meridian

A meridian is one of the imaginary lines (longitudes) joining the North and South Poles at right angles to the Equator, measured by degrees from 0° at Greenwich to 180° .

Mistake

A mistake is not an error, but is a blunder on the part of the observer.

Monument

A permanently placed survey marker such as a stone shaft sunk into the ground.

Nadir

The nadir is that part of the celestial sphere that is directly below the observer. For a theodolite, it is the point directly below the vertical axis of the instrument.

Occupied Point

The physical point over which the instrument (level, transit, total station, etc.) is set up. It is the point from which any measurements taken while at that point are reckoned.

Parallax

A change in the position of the image of an object with respect to the telescope cross hairs when the observer's eye is moved. This can be practically eliminated by careful focusing.

Plane Surveying

Plane surveying is that branch of surveying wherein all distances and horizontal angles are assumed to be projected onto one horizontal plane.

Plumb Bob

A plumb bob is carefully machined, pointed weight that is suspended with a string. It is used to indicate a (local) vertical line through the point of suspension. Plumb bobs are commonly used for locating an instrument precisely over a fixed point or to project a vertical line between a tape and a point on the ground.

Point of Beginning

The starting point of the survey.

Position

The coordinates, in a horizontal reference system, of station mark or feature.

Precision

The repeatability of a measurement. (The amount by which a measurement deviates from its mean.)

Random Errors

A random error is one the magnitude and sign of which cannot be predicted.

Rod (Ranging Pole)

A surveying rod is used to sight on a target. A simple rod fitted with a sharp-pointed, shoe of steel and usually painted alternately in red and white bands at 1-foot intervals.

Set-up

In general, the situation in which a surveying instrument is in position at a point from which observations are made.

Sideshot or Intermediate Foresight

A shot onto an unknown point which is not a station on the traverse. Sideshots (or intermediate foresights) are booked as regular foresights onto traverse stations, but are not included in the calculations for vertical error of closure.

Sketch

A good sketch is invaluable. It will help to explain the job and show the orientations of various important features. It is definitely worth taking a few minutes to produce a good sketch. When you arrive at the job site, size up the whole thing. How is the job situated with respect to permanent features in the area (roads, buildings, fences, trees, etc.)? Begin by noting the permanent (or nearly so) features around the perimeter (and within) the job site. Drawing these provides a "frame" for the rest of the sketch. Then draw in the details of the job site. Always make the sketch with North at (or near) the top (or left side) of the page. Put an arrow with an "N" on the sketch to indicate North. Include the scale of the drawing. Be reasonably precise!!

Staff (Leveling Rod)

A staff is a measuring bar which has marked with gradations.

Surveying

The purpose of surveying is to locate the positions of points on the surface of the earth.

Systematic Errors

An error that, as long as conditions are unchanged, will always have the same magnitude and the same algebraic sign.

Tape

A tape is a flexible device used for measuring linear distances. There are tapes made of many materials, such as steel, invar. The most common tape used by surveyors is the steel tape.

Total Station

Electronic surveying instrument that combines angle and distance measuring capabilities in a single unit.

Traverse

A traverse is a series of consecutive line segments whose lengths and directions are determined by field measurements. A **closed traverse** either closes back upon its starting point, or begins and ends on stations of known positions. An **open traverse** does not close on either itself or a station of known position. An open traverse does not provide any means for checking for errors and mistakes.

Tribrach

The three-armed base, of a surveying instrument, in which the foot screws used in leveling the instrument are placed at the ends of the arms. Also called a leveling base or leveling head.

Tripod

The three-legged stand upon which surveying instruments and targets are mounted during use.

Vertical Angle

A vertical angle is an angle measured in a vertical plane.

Zenith

The zenith is that point of the celestial sphere that is directly overhead from the observer. For a theodolite, it is the point directly above the vertical axis of the instrument.

Zenith Angle

Measured in a positive direction downwards from the observer's zenith to the observed target.