



## GEODETIC DIMENSIONING STUDIES AND POINT-DIMENSION LOCATION COORDINATE SCHEME CREATION PROCESSES

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### ABSTRACT

*The article covers the issues of creating planned control over the industry with the necessary accuracy and geodetic conditions of the plots of engineering structures being built using satellite technologies, total stations, depending on the calculations of dimensions and coordinates design features of engineering structures under construction, as well as a technological scheme for installation construction structures and industrial equipment, various schemes for creating such geodetic dimension control are considered and the cases of application of reverse linear angle slot are described as an example. Errors in source data are one of the main errors affecting the accuracy of geodetic constructions, including is the solution of the inverse linear-angular slot. It is necessary to calculate initial errors in creating a geodetic network in several stages. The root-mean-square errors in the location of the second-stage data from the first stage affect the slope values of the geodesic dimension. This phase points, their errors affect the geodetic coordinate value of the position of the third phase points, etc. The reason errors of geodetic measurements that occur at each stage of creating control for their occurrence, as well as makes it possible to determine changes in the stability of points during the production of excavation, construction and assembly works. When determining the coordinates of an individual project point by the general station at the stage of removing the size error, the entire network in most cases, they are not equalized and several magnitudes of error may occur in the coordinates of the starting points where the total station is located. To this orientation is error-free. As a result, determining the error indicators of the point coordinates of the control network or the removal of design points of elements of building*



*constructions and equipment is also considered to meet the requirements, that is, the measurement accuracy is artificially increased and does not meet the specified requirements. The actual obtained geodetic measurements will continue to have serial errors. This is because the accumulation of errors in the initial data is not taken into account and when the number of steps (stages) of control creation increases. The purpose of this work is to analyze the influence of measurement errors and initial data in the creation of geodesy and control at several stages of construction on the basis of reverse angles and a priori on the industrial site determined. It consists in assessing the accuracy of the position of geodetic points.*

## Introduction

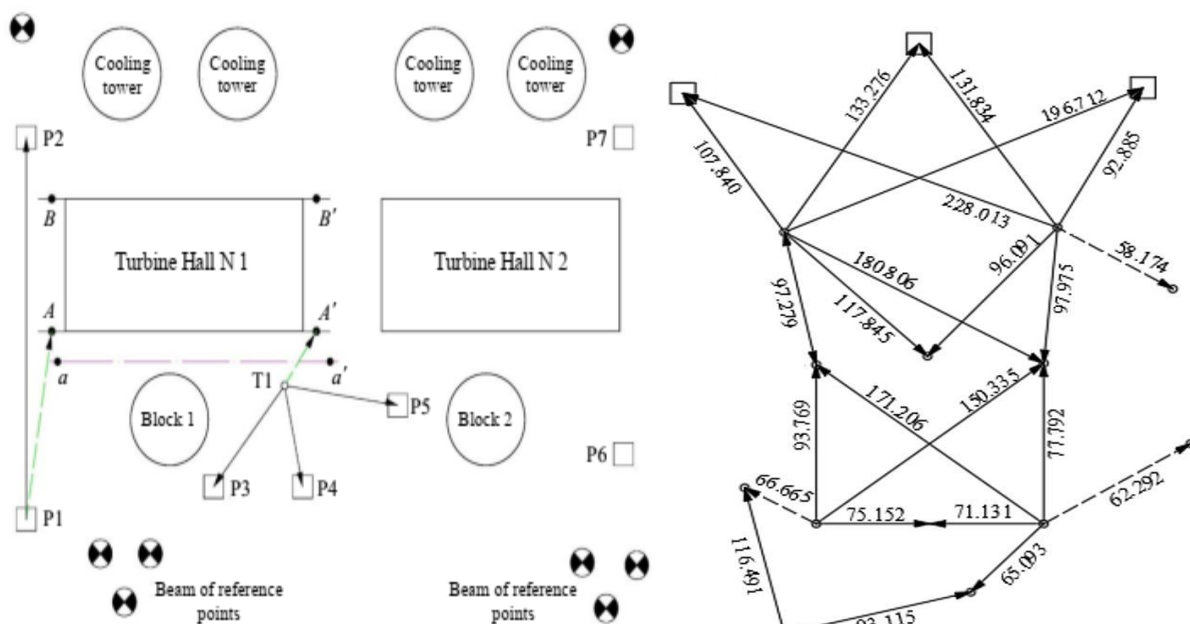
For the construction of engineering structures and technological installation equipment at industrial sites, consists of the following. a planned multi-layered management is created and divided into parts.

# The design relative location of buildings and structures, the main angular axes of the objects under construction, engineering supply networks, we can monitor the production processes of executive studies and geodetic deformation monitoring;

# Building (structure) internal center grid on initial and installation horizons for geodetic analysis construction of these buildings and structures, as well as expansion of the technological installation with the help of equipment, the size coordinates are determined by the equal value method.

Previously, the creation of external management was carried out in the form of a construction network, in which there was the sides of a square or rectangle, the length of which is mostly 100 or 200 m. After all the geodetic measurements, several methods were used to process them and evaluate the accuracy of determining the coordinates for all points. Geodetic measurements performed throughout the construction industry, they were later accepted as equivalent and in relation to them, central work was carried out in the future - geodesy of the main and general axes engineering structures and often are technological axes of equipment. And now, in some cases, design organizations recommend creating an external control. Geodetic dimensions creates the possibility of calculating the shape of the building grid of any length of a square or rectangle. But when it is prescribed to use a satellite in carrying out geodetic measurements at the created grid points and technologies or linear angular structures using high-precision general stations are calculated in technological programs. With the advent of satellite technologies and total stations in geodetic production, the technological scheme of creating external control, the method of performing measurements has changed. This significantly, as well as obtaining coordinates on the industrial site with the required geodetic coordinate dimension value significantly simplified and the time required to perform measurements is reduced. Measurement processes have

been accelerated. In fact, the determination of geodetic dimensions and the creation of external center control in the form of construction grid has largely ceased in the industrial field, it has been replaced by satellite measurement technologies, also earth-based methods - free station method or polar coordinates (polar line) began to be used. However, the practice of using them shows that in some cases the coordinates are calculated control points occur without pre-equalizing the measurement results together. This situation is aggravated by the tightening of external control of the industrial site, because the errors of the initial data of the points of the previous stage of control are not taken into account, which causing the accumulation of errors in determining the coordinates of the points of each subsequent step. Because of this, unacceptable distortions appear in linear angular structures of all stages. Planned control of the industrial site at high altitude, which significantly reduces the accuracy and accelerates the work of the center. This factor is especially true when determining the coordinates of control points and provides options for solving the inverse linear-angular slot or polar coordinate method. Therefore, the article considers the schemes for creating the initial planning control of the industrial site, as well as various geodetic surveys and development schemes of its condensation stages based on the application of the method reverse linear-angular slot and polar coordinates are calculated. Error analysis affects the initial stage and the data of the previous control stage, including the value of the final inverse point of the determination of the main and main indicators, is calculated based on the value of the error dimensions of the coordinate determination of the next generated stage. Geodetic common axes of structures, center points for the installation of separate building structures construction of engineering structures, initial placement of center axes for technological coordinate axes are calculated using equipment setup.



Picture 1. creating a location diagram of the main buildings on industrial sites. Attaching geodetic dimensions of a point.

Coordinates planned to create an external center control were transmitted by satellite and technologies from the point of the state geodetic network or from the base station to a part of the control points there should be procedures for relative determination of the



position of the centers of the control points in relation to the points of the industrial site, for example, P1, P2, P3, P4 and P5, and according to their requirements, the regulatory document, the state geodetic network or the base station point. It should not exceed the value of  $5 \text{ mm} + 0.5 \text{ mm} / \text{km}$  and the limit error value in the post-processing mode It should not exceed 20.0 mm. This means that the error value of the relative position of two adjacent grid points is possible It should be 23-30 mm. the boundary error of the normative document is attached to the indicated point. Geodesic point the value of the relative position of the outer center control points can reach 50.0 mm. At the same time time indicates that the inner center network should be created at the initial horizon and from the external central control points are attached to the coordinate points at equal geodetic values. In this regard, remove the main and general axes Engineering structures, especially responsible ones, are carried out with gross errors from adjacent (different) external control points, taking into account these errors in their relative location. Therefore, to exclude the influence of unacceptable errors in the external position control points for the status of internal network points, defined for the creation and operation of the internal center network of the specified regulatory document. The (initial) coordinate system of this grid to obtain the point of intersection of the numeric and letter axes it is necessary to attach coordinate points to the dimensions of the structure (finished floor level) at the initial horizon.

## Conclusion

As a result of the analysis of the schemes for the creation of planning control of external geodetic dimensions the following conclusions can be made by the method of inverse angular line and polar coordinates in the industrial area:

# If the wrong values of the initial data or the wrong geodetic dimensions when creating the planned management of the industrial facility the points of its first stage are not taken into account and their combined equalization is carried out; then it is artificially reduced to more of determining the coordinates of all points and sizes equal to twice their actual values are assumed;

# Due to the fact that the condensation of the planned control of the industrial site is carried out in sequence in several stages, there is an increase (accumulation) of the error values of the initial data of each stage, this leads to an increase in the actual values of the error coordinate position of the control points;

# Coordinate values to determine the coordinates of control points of each step as a result decreases compared to their actual values;

# To objectively evaluate the geodetic values obtained to determine the coordinates of the dimensions external control points, initial error values should be taken into account sequentially and should be compared with the data of all previous stages;

# According to studies, it is possible to condense to the third level to perform center work. In this case, the control can be used to communicate with the internal hub network. (indicating two different accuracy of engineering-geodesic constructions), provision it is necessary to perform central work for the mutual axial connections of the structure, as well as for the installation of columns;



# The obtained geodetic dimension values of the points if the control is calculated further to the next step limits meet the requirements of the center work for the installation of foundations of the point error type only.

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