According to EN 1993-1-1

Verification	Utilisation factor
Plastically resistant to longitudinal compression	0,764
Total loss of stability about the axis Y	0,789
Total loss of stability about the axis Z	0,903
Shear strength about the axis Y	0,764
Resistance to bulging under the action of forces (N,My,Mz)	0,903
Stability of web	0,764

Utilisation factor – 0,903

According to the results of the work it can be seen that the calculations according to DBN B.2.6-198:2014 resulted in a smaller cross-section and utilisation factor, compared to the results of calculations according to EN 1993-1-1. This difference can be explained by the fact that in the process of inputting the initial data into the software, to perform the calculation according to the Ukrainian norms required more clarifying information about the responsibility level of the structure, the ultimate flexibility of the element, in contrast to the European ones.

Therefore, we can conclude that the calculation according to the European norms is more universal, giving a greater safety reserve in comparison with the Ukrainian norms. At the same time, the results of calculation according to DBN B.2.6-198:2014 are more favourable from the economic point of view.

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RELIABILITY OF GEODETIC GROUNDING AS A GUARANTEE OF QUALITY GEODETIC CONSTRUCTION SUPPORT

Engineering and geodetic works are an important and integral part of the complex of works in the search, design, construction and operation of engineering structures. They are a component of the technology of engineering and construction works. The intensive level of development of scientific and technical progress in construction requires the introduction of modern highly effective geodetic technologies, which should ensure the performance of engineering and geodetic works.

The quality of engineering and geodetic support of construction at all its stages depends on the reliability of the results of geodetic measurements. The reliability of the results of geodetic measurements depends on the complex influence of factors: the influence of the external environment (the influence of refraction, the curvature of the Earth), the accuracy of geodetic instruments (high-precision, precise and technical precision instruments), the personal physical properties of the observer and the reliability of the points of survey justification. If it is impossible to completely get rid of the influence of the external environment, then with regard to other constituent factors, their influence can be reduced to a minimum.

Today, there is a wide range of geodetic instruments that allow you to perform angular measurements with an accuracy of up to tenths of seconds, linear measurements - up to tenths of a millimeter, and deviations up to half a millimeter per one kilometer of a double course. The availability of high professional training of geodesist specialists allows high-quality observations, and automated deduction systems completely eliminate the "human factor". However, unfortunately, the factor of reliability of geodetic justification is poorly studied. Reliability, in a general sense, is the ability to preserve over time within the established limits the values of all parameters that characterize the ability to perform the required functions in the specified modes and conditions of operation, maintenance, storage and transportation. [1] The reliability of geodetic points means their ability to maintain a stable spatial position during the entire period of operation, that is, to be durable and maintain the accuracy of their position according to the category of the geodetic network.

To select reliable points of the geodetic network for their use as points of survey justification, we will perform a reliability assessment. Let's calculate the probability of the location of immutability of the geodetic points:

$$P(\mathrm{t}) = \frac{N_0 - n(t)}{N_0} \quad (1)$$

where N_0 is the number of geodetic network points with constant position;

n(t) is the number of points of the geodetic network that have shifted.

The influence of various man-made and natural factors that disrupt the natural balance of the soil massif, and as a result, cause displacement of geodetic marks, create conditions in which it is impossible to achieve 100% reliability. Taking into account the negative impact of the external environment, we will accept for urban areas with man-made and overloaded zones, with different engineering and geological conditions, the reliability criterion of the geodetic network is at least 90%, i.e. $P(t) \geq 0.9$.

Let's calculate the maximum allowable number of geodetic points that can undergo displacements and lose their position stability. Let the plan-altitude marking geodetic network include 10 points, then from formula (1) we determine n(t)=0.1*N0=0.1*10=1 point, i.e., to ensure the reliability of the survey network, the loss of stable position of only one is allowed point in the process of geodetic support of construction. Taking into account that the average duration of the construction of a multi-story building can be from 1 to 4 years depending on its area and construction technology, we will calculate the maximum allowable failure intensity of the geodetic network, provided that Δti=2 years:

$$\lambda(t) = \frac{n(\Delta t_i)}{N_{cpi} \cdot \Delta t_i} \quad (2)$$

n(Δti) –is the number of failures of geodetic points in the interval Δti=2 years;
Ncri – is the number of operational objects in the middle of the interval Δti.

$$N_{cpi} = \frac{N_i + N_{i+1}}{2} = (10+9)/2 = 9,$$

Ni – is the number of operational objects at the beginning of the interval Δti;
N_{i+1} is the number of operational objects at the end of the interval Δti.

Then, λ=1/(9,5*24)=0,004, therefore, with a higher value of the intensity, the condition of maintaining 90% reliability is violated ($P(t) \geq 0.9$).

To determine the periodicity of monitoring the state of the geodetic network output points, we derive the formula:

$$t = -\frac{\ln P(t)}{\lambda} \quad (3)$$

t=-ln0,9/0,004≈10 months is the maximum period until the next observation of the stability of the geodetic base points for the given conditions. If instead of 90% we accept 95%, then this term will be halved and will be t=-ln0.95/0.004≈5 months, and at 99% we will get t=-ln0.99/0.004≈1 month.

On the basis of the performed calculations, it is recommended to carry out observations once a month to ensure the reliability of the geodetic base, which is used in the geodetic support of construction.

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RETROFITTING OF INDIVIDUAL HEATING POINTS

According to the Ministry of Regional Development, Construction and Housing and Communal Services, 80% of high-rise buildings in Ukraine need modernization. Experts advise to start the renovation of houses with the installation of an individual heating point, and not with insulation [1].

The introduction of innovative energy-saving technologies is currently the only solution for reducing heating costs. Without a coolant supply system into the heating system of the house, based on tracking of the real weather conditions and their constant changes, it makes no sense to consider significant cost savings. Therefore, the equipment of the automated individual heating point becomes the main task when solving the improvement of the energy efficiency of the system. Experts claim that it is quite possible to reduce heat consumption by up to 40% by installing a modern individual heating unit [2].

An individual heating unit is, in accordance with the requirements of Section 16 [3], a set of equipment that is designed to:

- to regulate the temperature of the coolant in accordance with weather conditions;
- to change and control the parameters of the coolant;
- to account for heat carrier and condensate costs, as well as heat load;
- to regulate the coolant flow rate;
- to protect the heating system from emergency exceeding of the coolant parameters;
- for additional cleaning of the coolant;
- to fill and feed the heating system;
- to create conditions for the use of combined heat supply using alternative energy sources.

Modern individual heating points are equipped with all the necessary automatic means that provide heat engineering control, accounting and regulation of quantitative and qualitative parameters of the heat carrier.

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