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Designing of buildings and structures at land sliding and slide hazardous segments of slopes

Slyusarenko Yuriy[1], Tytarenko Volodymyr[2]*, Shuminskiy Valerii[3], Vynnykov Yuriy[4]

[1] The State Research Institute of Building Constructions https://orcid.org/0000-0002-0447-3927
[2] The State Research Institute of Building Constructions https://orcid.org/0000-0001-9746-2399
[3] The State Research Institute of Building Constructions https://orcid.org/0000-0002-8751-1983
[4] Poltava National Technical Yuri Kondratyuk University https://orcid.org/0000-0003-2164-9936
*Corresponding author: *0679199507@ukr.net*

The main document of the regulatory framework for the design of buildings and structures on landslide and landslide-prone areas is DBN.1.1-46:2017 «Engineering protection of territories, buildings and structures from landslides and landslides. The main provisions» and the state standard DSTU-N B V.1.1-37:2016, «Manual on engineering protection of territories, buildings and structures from landslides and landslips». In development of the provisions of this set of regulatory framework, a number of regulations and standards have been developed to ensure the construction of buildings and structures on landslide and landslide-prone areas, considering the complex geological and hydro geological conditions of the construction site.

Keywords: landslide, building, structure, class of consequences (responsibility), design, construction

Проектування будівель і споруд на зсувних та зсувонебезпечних ділянках схилів

Слюсаренко Ю.С.[1], Титаренко В.А.[2]*, Шумінський В.Д.[3], Винников Ю.Л.[4]

[1] ДП «Державний науково-дослідний інститут будівельних конструкцій», м. Київ
[2] ДП «Державний науково-дослідний інститут будівельних конструкцій», м. Київ
[3] ДП «Державний науково-дослідний інститут будівельних конструкцій», м. Київ
[4] Полтавський національний технічний університет імені Юрія Кондратюка
*Адреса для листування: *0679199507@ukr.net*

Основними документами комплексу нормативної бази стосовно проектування будівель та споруд на зсувних і зсувонебезпечних ділянках є ДБН В.1.1-46:2017 «Інженерний захист територій, будівель і споруд від зсувів та обвалів. Основні положення» та ДСТУ-Н Б В.1.1-37:2016 «Настанова щодо інженерного захисту територій, будівель і споруд від зсувів та обвалів». Для розвитку положень цього комплексу нормативної бази розроблено низку нормативних актів і стандартів, які дозволяють забезпечити проектування будівель і споруд на зсувних та зсувонебезпечних ділянках з урахуванням складних інженерно-геологічних і гідрогеологічних умов ділянки будівництва. У комплексі нормативної бази наведено основні принципи та вимоги щодо проектування, будівництва й реконструкції будівель і споруд на зсувних та зсувонебезпечних ділянках усіх видів і класів наслідків (відповідальності), екологічні вимоги при їх проектуванні й оцінювання існуючих інженерно-екологічних умов та прогнозу їх можливої зміни на території (ділянці будівництва). Цей комплекс нормативних документів слід застосовувати при проектуванні будівель та споруд на зсувних і зсувонебезпечних ділянках. Вибір типу фундаментів будівель та споруд і заходів закріплення схилів повинен базуватися на техніко-економічному порівнянні варіантів, на інженерних розрахунках, а також вимоги щодо охорони навколишнього природного середовища, забезпечувати стійкість територій, надійне й безперебійне функціонування впродовж розрахункового терміну служби об’єктів, які проектуються. При подальшому вдосконаленні проектування будівель та споруд за комплексом нормативних документів та стандартів можливе їх розширення із залученням існуючих та нових ДБН і ДСТУ.

Ключові слова: зсув, будівля, споруда, клас наслідків (відповідальності), проектування, будівництво

Introduction. Constant growth of territories with dangerous geological processes happens in Ukraine. The number of landslides increases and previously stable slopes transit to the category of dangerous landslides. As a result, engineering and geological risk of territories development and the occurrence of emergency situations are increasing. The territories majority with smooth-moving relief with ordinary engineering and geological conditions and the dangerous geological processes absence are built up currently in Ukraine. It causes decreasing of free territories for construction with favorable conditions and the necessity of designing and erecting new construction projects in areas with complex engineering and geological conditions, in a landslide and landslide hazardous areas and in zones of dangerous geological processes.

Such areas are characterized by significant marks variations of the earth surface, the possibility of landslide processes activation, high levels of groundwater standing, complex engineering and geological conditions, the presence of lands with special properties, etc.

The National regulatory framework of Ukraine for the design of buildings and structures in a landslide and landslide hazardous areas includes a set of normative documents and standards for their design in the usual and complex engineering and geological conditions and in zones of dangerous geological processes.

The Ministry of Regional Development of Ukraine has instructed the DP NDIBK to develop new construction norms in the specified direction, which should measure up the modern requirements for the construction norms and the development level of the scientific and technical base of the construction industry. DP NDIBK has developed DBN V.1.1-46:2017 and DSTU-N B.1.1-37:2016 that are the main part of the normative documents and standards' set of Ukraine regarding the design of buildings and structures in a landslide and landslide hazardous areas in various engineering and geological conditions.

Analysis of recent sources and publications. The issues of buildings and structures erection in a landslide and landslide hazardous areas in conventional and complicated engineering and geological conditions, as well as in zones of dangerous geological processes, methods of bases strengthening, constructive solutions of counter landslide and retaining structures are set out in a number of normative documents and standards. There are DBN V.2.1-10 and Changes №1 and №2, DBN V.1.1-45, DBN V.1.1-46, DSTU-N B V.1.1-37, DSTU-N B V.1.1-39, DSTU-N B V.1.1-40, DSTU-N B V.1.1-44[3-9].

Identification of unsolved issues in the considered problem. The existing set of normative documents and standards for the design of buildings and structures in a landslide and landslide hazardous areas does not fully ensure the possibility of their design at the modern level.

DBN V.2.1-10-2009 and Changes №1 and №2 relate to designing the foundations of buildings and structures in convenient engineering and geological conditions. These documents were adopted a long time ago, and, therefore, a number of their conditions are out of date, does not measure up modern requirements and it is needed to be modified. The introduction of new DBN V.2.1-10:201X «Bases and foundations of buildings and structures. Basic provisions» and standards in their development enables to update the set of normative documents on the design of buildings and structures in a landslide and landslide hazardous areas, which are projected in the territories in convenient and complex engineering and geological conditions and in zones of dangerous geological processes, including seismic influences.

The purpose of development of the DBN V.2.1-10:201X is to improve the existing state building codes [3 – 5] in the field of buildings and structures design foundations, considering modern principles of its design. These norms are an integral part of normative documents and standards set that establish mandatory requirements for the buildings and structures design in a landslide and dangerous landslide areas and are intended for use at all stages of construction objects life cycle.

The main material and results. In the draft of DBN V.2.1-10:201X general conditions and requirements for the design, construction and reconstruction of buildings and structures foundations of all types and classes of consequences (responsibilities) are given, basic requirements for design of engineering preparation of bases, engineering design content, environmental requirements for buildings and structures foundations design are contained.

The choice of buildings and structures foundations type and measures for fixing the slopes should be based on technical and economic comparison of options, on engineering calculations, considering urban planning requirements, as well as requirements for environmental protection, ensuring the stability of the territories, reliable and uninterrupted functioning during the estimated objects life cycle that are projected.

The contexture of normative documents set and standards for buildings and structures design on the landslide and landslide hazardous areas in convenient and complex engineering and geological conditions in zones of dangerous geological processes is presented in Fig. 1.

For buildings and structures (construction object) design on landslide and landslide hazardous areas, a set of basic normative documents and standards (Figure 1) and comprehensive approach to the assessment of construction projects should be applied and performed according to the scheme (Figure 2).

The sequence of construction object design is given in the form of items in Fig. 2.

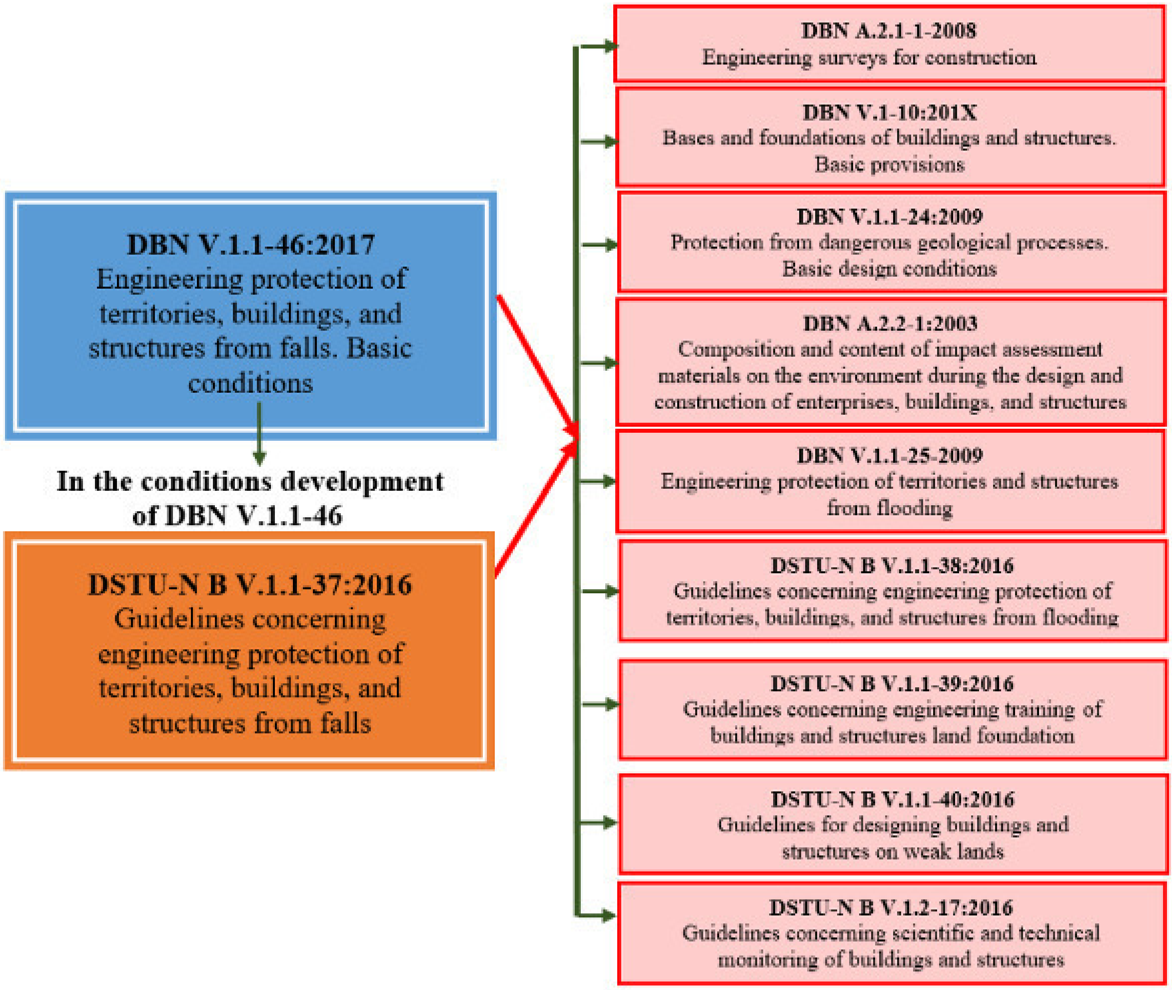

Figure 1 – The contexture of a set of normative documents and standards for the design of buildings and structures on the landslide and landslide hazardous areas

1. Engineering, geological and hydrogeological surveys on the construction site are performed for DBN A.2.1-1-2008 [10]. On the basis of engineering geological surveys there are performed:

– engineering and geological zoning of the territory due to the danger of landslide processes, as well as the peculiarities of its development;

– assessment of slopes stability and its expected changes, indicating the type of possible landslide processes, their location, size, as well as soil masses movement magnitude and velocity;

– evaluation of indirect effects caused by landslide processes (deformation of existing buildings and structures).

The analysis of engineering, geological and hydrogeological conditions of the construction site enables to determine the type of slope (landslide or landslide hazardous), the initial data for calculating the slope stability (types of soil and their physical and mechanical characteristics, groundwater levels, etc.) and presence of lands with special properties.

2. Construction site inspection enables to determine the presence of landslides traces (soil bulgings) on the slope, its type, and to designate the widths for calculating slopes stability.

3. Design of buildings and structures for a site without a slope is made according to DBN V.2.1-10 [3-5].

4. The calculation of the slope stability in the natural state is carried out using two basic methods.

They are based on the theory of limit balance considering the stress state of the soil mass in limit balance conditions [1, 2]:

1) By blocks method (the method of G. M. Shakhunyants).

2) According to the slope soil stress-strain state analysis.

The coefficient of slope stability k_{st} is equal to the sum ratio of all retaining forces (moments) (R_i) to the shear forces (moments) (F_i)

$$k_{st} = \frac{\sum_{i=1}^{i=n} R_i}{\sum_{i=1}^{i=n} F_i} . \qquad (1)$$

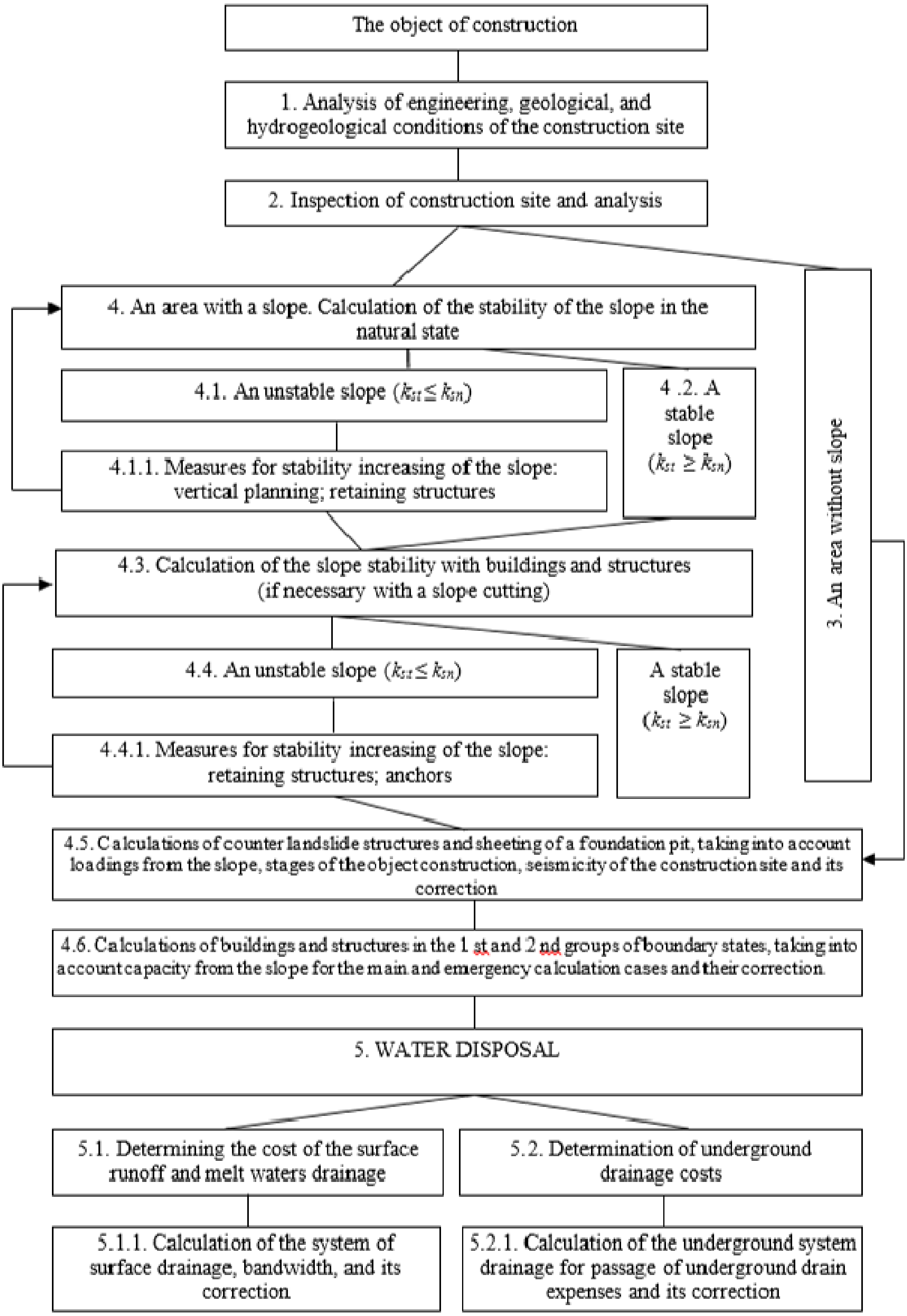

Figure 2 – The scheme of an integrated approach to the evaluation of construction projects in a landslide and landslide hazardous areas

The blocks method (the method of G. M. Shakhunyants enables to calculate slope stability from the natural to the project state at the first limit state - for the carrying capacity (under limit balance condition). Calculations are performed for the slope considering static, hydrodynamic and filtration capacities.

Assessment of slopes stability by the method of limit balance is recommended to perform in the following sequence:

1) analysis of engineering and geological conditions and choice of calculation section (sections);

2) compilation of the calculation scheme considering the features of the engineering and geological structure and physical and mechanical properties of soils;

3) generalization of the calculation scheme (simplification of the slope geometry by joining into one group the soils with the same or close physical and mechanical characteristics, removing non-essential forms of relief and geological elements, replacing the curvilinear sections of earth surface and depressions surfaces by straight lines);

4) determination of external additional capacities (magnitudes and directions of external additional capacities on the slope, application points of concentrated forces, boundaries and distributed nature of distributed forces);

5) determination of surface or sliding surfaces (sliding surface line (or set of such lines) considering peculiarities of engineering and geological structure and soils physical and mechanical properties (weak soils, the presence of hollows, peculiarities of hydrogeological conditions, etc.);

6) the landslide separation of the soil into blocks (compartments) according to the configuration of the slide surface;

7) determination of the stability coefficient by the formulas of the limit balance.

The method of finished elements considers the stress-strain state of the soil mass considering soil elastic and plastic behavior with building constructions and structures in the soil massif.

The essence of the finite element method is that the settlement system is replaced (approximated) by a system with a finite number of freedom degrees, that is, the discretization of the system is performed on separate elements that are interconnected by nodes. The work of a discrete system is determined by the interaction of individual finite elements.

The finite element method enables to perform calculations on the limit states of both groups in the same calculation scheme with one land model.

The indicator of slope stability degree in the finite element method is the reliability coefficient (slope stability coefficient k_{st})

$$k_{st} = \frac{c_v}{c_{cr}} = \frac{tg\varphi_v}{tg\varphi_{cr}}, \tag{2}$$

where c_v, φ_v are soils initial strength characteristics; c_{cr}, φ_{cr} are critical strength characteristics corresponding to plastic soil fluidity in the considered area.

Assessment of slopes stability by finite element method is recommended to perform in the following sequence:

1) choice of the sections calculation;

2) compilation of calculation scheme;

3) generalization of calculation scheme (unification of soils with similar physical and mechanical characteristics into a single group, neglecting the insignificant forms of relief and geological elements, replacement of curvilinear Earth surface spots and depression surfaces by straight segments);

4) determination of external additional loadings (value and direction of external additional loadings on a slope, application points of concentrated loadings, limit and distribution character of distributed loading;

5) calculation of underground water pressure;

6) calculation of domestic stresses in a soil;

7) determination of the reliability factor (stability coefficient of a slope k_{st}) utilizing the «reduction of c and φ» method.

For stress-strain state simulation of soil, the nonlinear model is used which strength criteria is described by the Coulomb-Moor's law. The soil is considered to be the elastic and ideally plastic material which deformation occurs in accordance with the Prandtl chart.

As a result of calculations by two methods, the coefficients of stability reserve k_{st} are determined for the most characteristic cross-sections and compared to normalized values k_{sn}. Then conclusion as for slope stability is made (when $k_{st} \geq k_{sn}$ the slope is steady, when $k_{st} \leq k_{sn}$ the slope is unstable, and when $k_{st} \approx 1$ there is a state of the boundary equilibrium of the soil massif that, as a rule, causes landslide).

4.1. Considering unstable slope in natural condition ($k_{st} \leq k_{sn}$) the slope stability basic means and activities increasing are necessary to utilize, that is [1, 2]:

– retaining structures (retaining walls), pile foundations and deeply layered foundations;

– soil massif cementation by some of the conventional methods;

– foundations that are flowed around by soil sliding masses;

– bank protection structures for protection banks and slopes against erosion and leaching (sea, river, at reservoirs and ponds);

– regulation of underground drain (drainage of deep and shallow laying, wall drainage and catchment);

– regulation of surface drain (protection of slopes surfaces from the infiltration of rain and meltwater into the soil, installation of drainage structures);

– slope tilt reduction (soil cutting at slope the top and laying out of soil masses at the foot for an additional loading in the places of the expected soil bulging);

– anti-erosion constructions;

– artificial change of the slopes relief by adjusting the balance and planning the sliding surface and adjacent territory (cutting of various protrusions, banks, filling up the hollows, etc.);

– agroforestry (trees planting, bushes, perennial grasses);

– organization of a protective anti-landslide regime on the slope.

The means and activities of engineering protection choice for objects from landslides must be based on technical and economic comparison of variants, engineering calculations. It should consider city planning requirements, requirements for environmental protection and rational use of land resources, provide territories stability higher degree, reliable and uninterrupted functioning during the estimated service life of the objects under protection.

4.2. With a steady slope in the natural state ($k_{st} \geq k_{sn}$) buildings and structures are being "incorporated" into the slope (with a slope cutting if necessary). To facilitate the operation of retaining structures the part of land sliding pressure can be redistributed to building or structure foundation [1, 2].

4.3. Calculations and analysis of slope stability with buildings and structures are carried out (with a slope cutting when necessary). When calculating slope stability, it is necessary to consider position of a sliding surface that is lower than its calculation or deformed horizons zones, including zones under the supports (piles) lower ends. With calculation of a slope stability there must be performed calculations of the filtration strength of the slope soil at the spots of groundwater bulging, heterogeneous soils and soils that are easily exposed to suffusion, and at the contacts of soils with drainage sandbanks (filters) [1, 2].

4.4. When the slope is unstable ($k_{st} \leq k_{sn}$) along with buildings and structures (with a slope cutting when necessary) there must be utilized only the basic means for slope stability increasing (**section 4.1**).

4.5. Based on the initial data of engineering geological and hydrogeological surveys at a constructions site the calculation of excavation sheeting is performed. The calculation must consider slope loading, object construction stages, and area seismicity. When necessary, the design is corrected according to calculation results [3 – 5].

4.6. Calculation of buildings and structures is carried out according to the 1 and 2 groups of limit states for a basic and emergency design cases considering the slope loading, seismicity of the area, and, when necessary, the design is corrected according to calculation results [3 – 5].

5. The operation of the drainage system of surface and underground waters from the construction site is analyzed. One of the main causes of landslides is the soaking of soils from groundwater, which leads to load-bearing capacity decrease of the soil massif. Water dampens possible slide surfaces, which reduces frictional forces and contributes to a landslide.

The discharge of groundwater from the plateau occurs through the slopes. The speed of groundwater motion on or near the slopes increases while territory flooding. As a result, the pressure gradient increases, suffusion, and fluidity phenomena develop, mechanical properties of soils decrease, loess loams in particular. The development of these negative phenomena is often associated with the presence of hollows in the waterproof layer [11-13].

5.1. Calculation of surface runoff of rain and meltwaters from the catchment is performed. Measures to regulate surface runoff are the mandatory part of protective structures and devices complex aimed at increasing the general and local stability of slopes [14].

Estimated rainwater costs in the landslide zone should be determined by the method of limit intensities. The period of the one-time excess of the estimated rain intensity should be set at least 5 years, and with a proper technical and economic justification – not less than 10 years.

The bandwidth calculation of the surface drainage system from the construction site surface runoff and its adjustment is performed [14].

Laying of water-supply communications in landslide areas is not enabled. In exceptional cases and the relevant technical and economic justification the laying of water- supply communications is possible on the surface of the Earth in the passage or semi-passage channels, which should be beyond the landslide and landslide hazardous areas.

On areas adjacent to slopes, the surface runoff should be controlled using drainage channels, trays, as well as guarding shafts, which provide interception of surface waters [12, 13].

5.2. Calculation of underground runoff at the construction site is performed. Design of bases water protection, underground engineering structures, in-depth structures, and foundations is carried out for maintaining the durability of structures, eliminating the accelerated wear of reinforced concrete elements in watered environment. Requirements for water protection should be developed considering the influence of water [12, 13]:

– temporary influence due to infiltration of atmospheric precipitation, flood flooding, water supply disruptions;

– permanent influence due to the presence of moisture in the soil or groundwater.

The regulation of the underground runoff should be used in a complex of protective structures and measures in order to eliminate or weaken the action of groundwater on soils (reducing its density and strength), reduction or elimination of hydrostatic and filtration pressures, etc.

Types, sorts, designs, and dimensions drainage devices main elements should be assigned depending on the engineering-geological and hydrogeological conditions of the slope (slope), terms of the protected area use, conditions of work on the basis of water balance, filtration and hydraulic calculations, as well as technical and economic comparison of variants. In landslide zones, the following types of drainage devices should be used:

– horizontal drainage – trench (tubular drainage) with pipes (including drainage pipes with tubing filters), without pipes (drainage slots) and galleries; tunnels; stratum drainages;

– vertical drainage – drilling wells and mines;

– combined drainage systems – a combination of horizontal and vertical drainage.

Calculation of the underground drainage system from the construction site is performed and corrected to account for a bandwidth of underground waters runoff [12, 13].

The location of drainage systems should be linked to the general scheme of the general landslide countermeasures complex, considering possible change in the boundaries of landslide deformations, and the depth of laying the networks of these systems should be justified.

When adjusting groundwater levels, it is necessary to consider:

– interception and reduction of water levels to exclude bulging on landslide or landslide hazardous slopes;

– captation of water outlets on the slopes;

– drying-out the landsliding massif of soil;

– stabilization or reduction of water levels in contact with retaining foundations or structures.

Discharge of drainage waters from territories should, as a rule, be self-sufficient. In case of impossibility of such withdrawal, it is necessary to arrange pump stations.

The project must contain the necessary engineering solutions to preserve, protect or improve the environmental situation on the site of construction and adjoining territory [15].

Scientific and technical support should be provided for complex construction or reconstruction projects, special engineering-geological, hydro-geological, engineering-environmental conditions and complex relief; structures in the zone of influence (risk) of new construction (reconstruction) or areas where dangerous geological processes are possible [11, 16].

Monitoring is carried out at the stages of designing and construction as well as reconstruction and works on buildings preservation: significant consequences CC3 – in all cases, CC2 – in complex engineering and geological conditions, in areas of dense construction, in the influence zone of new construction or reconstruction [17].

Monitoring at the stage of construction and operation for functional purposes must contain visual-instrumental physical observations and surveys (including geodetic control) of structures, bases, territories, hydrogeological and ecological observing system, and analysis of results.

Conclusions. Application of normative documents and standards (DBN and DSTU) set for buildings and structures design in landslide and landslide hazardous areas in conjunction with the scheme of integrated approach to the evaluation of construction projects in these areas enables to perform buildings and structures design more efficiently and reasonably, to increase objects reliability and safety, to bring the practice of designing buildings and structures in landslide and landslide hazardous areas in accordance with modern requirements.

With further improvement of buildings and structures design in respect of normative documents and standards set and integrated approach scheme to the evaluation of construction projects, it is possible to expand them with the help of existing and new DBN and DSTU, as well as construction projects evaluation scheme improvement.

References

1. DBN V.1.1-46:2017. (2017). *Інженерний захист територій, будівель і споруд від зсувів та обвалів. Основні положення.* Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
2. ДСТУ-Н В Б.1.1-37:2016. (2017). *Настанова щодо інженерного захисту територій, будівель і споруд від зсувів та обвалів*. Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
3. ДБН В.2.1-10:2009. (2009). *Основи та фундаменти споруд. Основні положення проектування*. Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
4. ДБН В.2.1-10:2009. (2011). *Основи та фундаменти споруд. Основні положення проектування. Зміна 1.* Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
5. ДБН В.2.1-10:2009. (2012). *Основи та фундаменти споруд. Основні положення проектування. Зміна 2.* Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
6. ДБН В.1.1-45:2017. (2017). *Будівлі і споурди в складних інженерно-геологічних умовах. Загальні положення*. Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
7. ДСТУ-Н В Б.1.1-39:2016. (2009). *Настанова щодо інженерної підготовки грунтової основи будівель і споруд*. Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
8. ДСТУ-Н В Б.1.1-40:2016. (2017). *Настанова щодо проектування будівель і споруд на слібких грунтах*. Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
9. ДСТУ-Н В Б.1.1-44:2016. (2017). *Настанова щодо проектування будівель і споруд на просідаючих грунтах*. Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
10. EN 1990:2002, IDT .DSTU-N B V.1.2-13:2008. (2009). Єврокод 7. *Основи проектування конструкцій.* Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
11. EN-1997-1:2004, IDT DSTU-N B EN 1997-1:2010. (2011). Єврокод 7. *Геотехнічне проектування. Частина 1. Загальні правила.* Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
12. EN-1997-2:2010, IDN DSTU-N B EN 1997-2:2010. (2011). Єврокод 7. *Геотехнічне проектування. Частина 2. Дослідження й випробування грунту.* Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
13. ДБН А.2.1-1-2008. (2009). *Інженерні вишукування для будівництва*. Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
14. ДБН В.1.1-24:2009. (2009). *Захист від небезпечних геологічних процесів. Основні положення проектування.* Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».

15. ДБН В.1.1-25-2009. (2009). *Інженерний захист територій та споруд від підтоплення та затоплення*. Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
16. ДСТУ-Н Б В.1.1-38:2016. (2017). *Настанова щодо інженерного захисту територій, будівель і споруд від підтоплення та затоплення.* Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
17. СНиП 2.01.14-83. (1985). *Определение расчетных гидрологических характеристик*. Москва: Госстрой СССР.
18. ДБН А.2.2-1:2003. (2017). *Склад і зміст матеріалів оцінки впливу на навколишнє середовище (ОВНС) при проектуванні й будівництві підприємств, будівель і споруд.* Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
19. ДБН В.2.1-5:2007. (2009). *Науково-технічний супровід будівельних об'єктів*. Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».
20. ДСТУ-Н Б В.1.2-17:2016. (2017). *Настанова щодо науково-технічного моніторингу будівель і споруд.* Київ: Мінрегіонбуд України, ДП «Укрархбудінформ».