ABYLKAS SAGINOV KARAGANDA TECHNICAL UNIVERSITY

Academic Council
Protocol № 11
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PROGRAM
THE ENTRANCE EXAM
for applicants to the PhD program in the educational program
8D07301 «Construction»

Department: "Building materials and Technologies"
Compiled by:
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The doctoral entrance exam consists of writing an essay, passing a test for readiness to study in doctoral studies, an exam on the profile of an educational program and an interview.

Those who have a certificate (TOEFL IBT (Test of English as a Foreign Language Institutional Testing Program) take additional English language proficiency testing before the start of the doctoral entrance exam. The number of test tasks for additional English language proficiency testing is 100 questions. The maximum number of points is 100 points. Additional English proficiency testing is evaluated in the form of "admission" or "non-admission". To get the "admission" score, you must score at least 75 points.

Assessment of the doctoral entrance exam:

- interview - 20 points;
- essay - 10 points;
- passing the test for readiness to study in doctoral studies - 30 points;
- examination according to the profile of the group of educational programs - 40 points.

The passing score for admission to doctoral studies under the state educational order is 75 points, the passing score for admission to doctoral studies on a paid basis is 75 points.

The duration of the entrance exam is 4 hours, during which the applicant writes an essay, passes a test for readiness for doctoral studies, answers an electronic examination ticket consisting of 3 questions.

The exam on the profile of the educational program includes 3 questions, of which: the 1st question determines the level and consistency of theoretical knowledge; the 2nd question reveals the degree of formation of functional competencies; the 3rd question is aimed at determining systemic competencies.

When preparing for the exam, it is recommended to use the literature listed in the list, as well as modern periodical scientific and technical literature.

ESSAY

The essay is a reasoned written statement of the author's position on the problem on the basis of an independently conducted analysis using concepts and analytical tools of scientific knowledge.

The goal is to determine the level of analytical and creative abilities expressed in the ability to build their own arguments based on theoretical knowledge, social and personal experience.

The essay should not contain graphic objects, symbols and formulas. The recommended number of words in an essay is 250-300.

The topics of the essay for admission to doctoral studies in the educational program 8D07301 «Строительство»

№	Essay Topics
1.	Modern practice, problems and prospects of concreting technology development in winter conditions
2.	Features of reinforcement of reinforced concrete bearing structures of buildings and structures with composite materials
3.	Conducting operational monitoring of the technical condition of hydraulic structures using non-destructive testing methods
4.	The main provisions of the calculation and design of foundations
5.	Types of bent metal structures and their design features
6.	Modern practice, problems and prospects for the development of finishing technology
7.	Modern practice, problems and prospects of plastering technology development
8.	Problems and prospects for the development of roofing production
9.	Features of the development of pits and foundations of new buildings in conditions of dense urban development

10.	Features of the construction of high-rise buildings with multi-level underground floors in megacities

The list of subjects of the entrance exam for the educational program 8D07301 "Construction"

The questions for the exam on the profile of the educational program should assess the professional level of the examinee for his admission to doctoral studies and, in general, determine the competencies necessary for training in the scientific and pedagogical profile.

The program of the entrance exam for Module 1.
(list of exam questions)

1. Composition of soils: solid mineral particles (dimensions, mineralogical composition, properties), water (various types of water and their properties), gases – air (trapped, communicating with the atmosphere). Organic substances.

2. The main laws of soil mechanics are the law of compaction, the law of laminar filtration, the strength condition, the principle of linear deformability as additional dependencies to the laws and equations of continuum mechanics, which allow taking into account the features of soils and conditions for changing their properties from external influences.

3. The law of filtration. The initial gradient in clay soils. Effective and neutral pressure with the density of water-saturated soils.

4. The main provisions of the theory of stress distribution in soils. Determination of stresses in soils in the compaction phase according to the theory of linearly deformable bodies. The limits and conditions of application of this theory.

5. Conditions of the ultimate equilibrium at the considered point and in the entire loaded soil mass.

6. Critical ground pressures. Initial (marginal) and limit (for these loading conditions) pressures. Determination of the initial critical pressure by the Puzyrevsky-Frolich formulas.

7. Application of the theory of the ultimate stress state to the assessment of the stability of embankment slopes and recesses, soil masses during landslides. Active and passive soil pressure on fences (mathematically rigorous and approximate solutions).

8. Types of soil deformation and the physical causes that cause them. Elastic deformations of soils and their determination by methods of rigid and general elastic deformations.

9. Deformation of the seal. The differential equation of the theory of filtration consolidation of soils. Influence on the deformation of soils, their structure, initial pressure gradient and deformability of components.

10. Basic concepts of rheological processes in soils. Stress relaxation and long-term soil strength. Secondary consolidation of clay soils. De-formations of soil creep, methods of their description and accounting for the forecast of precipitation of foundations.

11. Basic concepts and definitions. Types of foundations of shallow and deep deposits. Their purpose and the requirements imposed on them. The variety of solutions in choosing the type of foundation and the type of foundations at each construction site. Technical and economic factors determining the choice of the type of foundations, type and depth of foundations.

12. The essence of reinforced concrete. Advantages and disadvantages. Areas of application. The concept of prestressed reinforced concrete.

13. Fundamentals of concrete strength. The influence of various factors on the strength of concrete.

14. The strength of concrete for axial compression. Cubic strength. Prismatic strength. The strength of concrete under prolonged load action.

15. Deformability of concrete. Types of deformations. Extreme deformations of concrete before destruction.

16. Fittings, their purpose and classification. Requirements for the use of reinforcement in reinforced concrete structures.

17. Mechanical properties of reinforcing steels.

18. Reinforcement products.

19. Types of tasks for the calculation of non-centrally compressed reinforced concrete elements of rectangular cross-section. Design requirements for the transverse reinforcement of externally compressed elements.

20. The construction plan of the complex – initial data, principles and sequence of development.

21. The nature of soil permeability.

22. Commissioning of finished construction projects.

23. Contracting and economic methods of construction. The functions of the customer and contractor.

24. The material and technical base of construction - the concept, types of enterprises, their classification.

25. Foundations on structurally unstable soils: silty, stagnant, swelling, ribbon clays, loess-like and permafrost.

26. Choosing the type of transport. Organizational forms of vehicle operation, directions for their improvement.

27. Joint work of reinforcement and concrete. Advantages and disadvantages of reinforced concrete

28. Basic physical and mechanical properties of concrete. Concrete strength, grades and grades

29. Shrinkage and creep of concrete. Modulus of elasticity and elasto-plasticity

30. Reinforcement for reinforced concrete structures. The purpose of the reinforcement, its classification. The main physical and mechanical properties of the reinforcement. Class and grades of reinforcing steels

31. Welded grids and frames. High-strength wire and products made from it: ropes, bundles. Reinforcement joints

32. Basic physical and mechanical properties of reinforced concrete. Shrinkage and creep of reinforced concrete

33. Corrosion of reinforced concrete and protection measures against it. A protective layer of concrete

34. Assignment of the pre-tension value. Pre-voltage losses

35. The main types of engineering surveys and their composition.

36. The purpose and objectives of engineering and geological surveys.

37. The purpose and objectives of engineering and geodetic surveys.

38. The purpose and objectives of engineering and hydrometeorological surveys.

39. Classification of soils according to GOST.

40. Conditions of application and classification of deep foundations: piles, shell piles, thin-walled shells, drilling spores, sinkholes, caissons. Their difference from shallow foundations.

41. Types of structures and classification of piles, pile grillings and pile foundations. Conditions for the use of various types of piles and pile foundations

42. Dangerous natural and geological processes and phenomena.

43. Types of foundations and the scope of their application.

44. Seismic resistance of foundations and foundations

45. General information about soils, foundations and foundations, underground structures. The concept of disciplines is "soil mechanics" and "Foundations and foundations, underground structures".

46. The importance of soil mechanics for the design of foundations and foundations of buildings and structures.

47. Internal connections, soil structure. The peculiarity of soils as fragmented dispersed bodies.

48. Types of deformations of buildings and structures. The division of buildings and structures depends on their rigidity and sensitivity to uneven precipitation.

49. Types and structures of foundations (precast concrete and reinforced concrete foundations of walls, columns and basements, monolithic strip foundations, solid slabs). The basic principles of the construction of various types of foundations. Protection of basements and underground structures from flooding by groundwater. Protection of foundations and walls from the aggressive action of groundwater.

50. The influence of engineering and geological conditions of the building site and soil properties of the foundations for choosing the type of foundations.

List of recommended literature

1. Механика грунтов, основания и фундаменты: учебник / Л. Н. Шутенко, А. Г. Рудь, О. В. Кичаева и др.; под. ред. Л. Н. Шутенко; Харьков. нац. ун-т гор. хоз-ва им. А. Н. Бекетова. – Харьков: ХНУГХ им. А. Н. Бекетова, 2015. – 501 с.

2. Далматов Б. И. Механика грунтов, основания и фундаменты (включая специальный курс инженерной геологии): Учебник. 3-е изд. Издат.: АСВ. 2012.

3. Кузнецов, В. С. Железобетонные и каменные конструкции. Основы сопротивления железобетона. Практическое проектирование. Примеры расчета. Учебное пособие / В.С. - Москва: Наука, 2014. - 304 с.

4. Дикман Л.Г.- Организация строительного производства: Учебник / М.: АСВ, 2012-512 с.

5. Далматов Б. И. Механика грунтов, основания и фундаменты (включая специальный курс инженерной геологии): Учебник. 3-е изд. Из-дат.: АСВ. 2012.

6. СП РК 1.02-105-2014. Инженерные изыскания для строительства. Основные положения. Утенов Е.С. Механика грунтов, основания и фундаменты: Учебник на казахском языке – Караганда.: Издательство КарГТУ, 2020. – 329 с.

7. Дикман Л.Г.- Организация строительного производства: Учебник / М.: АСВ, 2012-512 с.

8. Жакулин А.С., Жусупбеков А.Ж., Кропачев П.А, Жакулина А.А. Проектирование оснований и фундаментов (Геотехника). Учебник – Караганда: КарГТУ, 2019, 217 с., ISBN 978-601-315-697

9. Улицкий И. И., Ривкин С. А. Железобетонные конструкции: Расчет и конструирование / – М.: Книга по Требованию, 2012. –400 с.

10. Тихонов И.Н., Мешков В.З., Расторгуев Б.С. Проектирование армирования железобетона, Москва, 2015.- 276с.

11. Евстифеев В. Г. Железобетонные и каменные конструкции. В 2 ч.

12. Ч.1.Железобетонные конструкции: учебник для студ. учреждений высш. проф. образования / -М. : Издательский центр «Академия», 2011. — 432 с.

13. Бондарик Г.К. Инженерно-геологические изыскания: учебник. М.: КДУ, 2007. - 424с.

14. СП РК 1.02-105-2014. Инженерные изыскания для строительства. Основ-ные положения.

15. ГОСТ 25100-95 Грунты. Классификация.

16. СП РК 5.01-102-2013. Основания зданий и сооружений.

17. Бондарик Г.К. Инженерно-геологические изыскания: учебник. М.: КДУ, 2007. - 424с.

18. СП РК 1.02-105-2014. Инженерные изыскания для строительства. Основ-ные положения.

19. СП РК 5.01-102-2013. Свайные фундаменты.

20. СП РК 5.01-102-2013. Основания зданий и сооружений.

21. Далматов Б.И. Механика грунтов, основания и фундаменты: Учебник – Л.: Стройиздат, 1988. – 415 с.

22. Цытович Н.А. Механика грунтов. М: СИ 2011

23. Терцаги К. Теория механики грунтов. М: СИ 2011

The program of the entrance exam for Module 2.
(list of exam questions)

1. The main physical characteristics determined in the laboratory: specific and volumetric weight, weight humidity, yield and rolling boundaries.

2. Characteristics determined by calculation and classification indicators of soils. Material composition: (grain, water saturation, gas content, organic matter content); porosity and water saturation coefficients; relative density of loose soils; number of plasticity and relative consistency of clay soils.

3. Physical representations. The relationship between humidity, pressure and porosity coefficient.

4. Coefficients of compressibility and relative compressibility. The law of compaction. A common case of compression dependence. The coefficient of lateral pressure. Determination of soil compressibility in laboratory conditions.

5. The ultimate resistance of soils to shear during a straight cut. Coulomb's law. Various cases of shear stress limit diagrams, stress circles. Equations of equilibrium of loose and cohesive soils.

6. Stress from the soil's own weight – natural pressure – in homogeneous, layered foundations and in the presence of groundwater.

7. Ultimate pressures and ultimate deformations of foundations, foundations, structures. Establishment of maximum pressures on foundations based on the conditions of strength (bearing capacity) of the foundations. The establishment of limit values of deformations based on the conditions of limit deformations of buildings and structures.

8. Testing the strength of concrete for axial tension and shear. Classes and grades of concrete.

9. The strength of concrete under repeated loads. The dynamic strength of concrete.

10. Stages of the stress-strain state of reinforced concrete elements. Prerequisites for calculating the strength of normal cross sections.

11. Normative and design resistances of concrete. Regulatory and design resistances of the valve. General view of formulas for calculating reinforced concrete structures according to the first group of limit states

12. A protective layer of concrete. Design requirements for minimum and maximum distances between rebar rods.

13. Types of tasks for calculating normal sections of bent reinforced concrete elements of rectangular profile with double reinforcement.

14. Types of tasks for calculating the normal cross sections of bent reinforced concrete elements of a T-shaped profile.

15. Technological design of construction processes.

16. Technology and organization of installation of metal structures

17. Technology and organization of foundation works

18. Technology and organization of work on the installation of floors, roofs and roofs.

19. Technology and organization of work on the installation of hinged ventilated facades.

20. Technology and organization of work on the installation of finishing and protective coatings

21. Technology and organization of works on the construction of residential and public buildings and structures.

22. Technology and organization of work on the construction of industrial buildings and structures.

23. Technology and organization of repair of buildings and structures.

24. Technology and organization of reconstruction of buildings and structures

25. The essence of the prestressing of reinforced concrete. Ways to create a pre-voltage. Anchoring of the tensioned reinforcement.

26. Pre-compression force in concrete. The given sections. Stress in concrete during compression

27. Assessment of the engineering and geological conditions of the construction site.
28. Calculation of bases based on deformations.
29. Design of shallow foundations.
30. Design of pile foundations
31. Designing deep foundations.
32. Design of artificial foundations.
33. Designing machine foundations
34. The main provisions of the calculation of foundations, such as beams and slabs on a local elastic base.
35. Strengthening the foundations and strengthening the foundations.
36. Deformability of concrete. Stress – strain diagram (σi – eb) under short - term and long-term loads
37. Technology and organization of excavation works.
38. Technology and organization of stone work production.
39. Technology and organization of concrete works production.
40. Technology and organization of installation of reinforced concrete structures.
41. Protection of the foundation soils from freezing during and after the construction of foundations.
42. Replacement of weak soils in natural foundations. The device of sandy and gravelly pillows, pillows in tongue-and-groove fences.
43. Deformations of soils around piles, their types, sizes and development over time with various methods of pile sinking.
44. Anchor foundations. Features of their calculation and design.
45. Foundations on construction sites with unevenly compressible soils. The basic principles of design and conditions of work on the preparation of foundations, the installation of foundations and the aboveground part of structures in these areas.
46. Preliminary assessment of the building properties of soils according to classification indicators.
47. Working conditions of soils in the massif and the possibility of determining their strength and deformation properties on individual samples.
48. Assessment of the hydrogeological conditions of the construction site.
49. Assessment of the climatic conditions of the construction area.
50. Selection of normative and design loads and their combinations in the design of foundations according to limit conditions.

List of recommended literature

1. Механика грунтов, основания и фундаменты: учебник / Л. Н. Шутенко, А. Г. Рудь, О. В. Кичаева и др.; под. ред. Л. Н. Шутенко; Харьков. нац. ун-т гор. хоз-ва им. А. Н. Бекетова. – Харьков: ХНУГХ им. А. Н. Бекетова, 2015. – 501 с.
2. Далматов Б. И. Механика грунтов, основания и фундаменты (включая специальный курс инженерной геологии): Учебник. 3-е изд. Издат.: АСВ. 2012.
3. Кузнецов, В. С. Железобетонные и каменные конструкции. Основы сопротивления железобетона. Практическое проектирование. Примеры расчета. Учебное пособие / В.С. - Москва: Наука, 2014. - 304 с.
4. Кожас А.К. Технология строительного производства II: учебное пособие. - Караганда: КарГТУ, 2012.
5. Юдина А.Ф. Технологические процессы в строительстве: учебник. - М.: Академия, 2014.
6. Харитонов В.А. Основы организации и управления в строительстве: учебник. - М.: Академия, 2013.
7. Касимов А.Т., Пчельникова, Ю.Н. Технология реконструкции зданий: учебное пособие. - Алматы: Эверо, 2018.
8. Улицкий И. И., Ривкин С. А. Железобетонные конструкции: Расчет и конструирование / – М.: Книга по Требованию, 2012. –400 с.

9. Тихонов И.Н., Мешков В.З., Расторгуев Б.С. Проектирование армирования железобетона, Москва, 2015.- 276с
10. Евстифеев В. Г. Железобетонные и каменные конструкции. В 2 ч.
11. Ч.1.Железобетонные конструкции: учебник для студ. учреждений высш. проф. образования / -М. : Издательский центр «Академия», 2011. — 432 с.
12. Тихонов И.Н., Мешков В.З., Расторгуев Б.С. Проектирование армирования железобетона, Москва, 2015.- 276с
13. Бондарик Г.К. Инженерно-геологические изыскания: учебник. М.: КДУ, 2007. - 424с.
14. СП РК 1.02-105-2014. Инженерные изыскания для строительства. Основные положения.
15. СП РК 5.01-102-2013. Основания зданий и сооружений.
16. СП РК 5.01-102-2013. Свайные фундаменты.
17. Жакулин А.С., Жусупбеков А.Ж., Кропачев П.А, Жакулина А.А. Проектирование оснований и фундаментов (Геотехника). Учебник – Караганда: КарГТУ, 2019, 217 с., ISBN 978-601-315-697-2
18. Евстифеев В. Г. Железобетонные и каменные конструкции. В 2 ч.
19. Юдина А.Ф. Технологические процессы в строительстве: учебник. - М.: Академия, 2014.
20. Справочник по строительно-монтажным работам /под ред. Ж.С. Нугужинова. - Караганда: КарГТУ, 2018.
21. Цытович Н.А. Механика грунтов. М: СИ 2011
22. Терцаги К. Теория механики грунтов. М: СИ 2011
23. Жакулин А.С., Жусупбеков А.Ж., Кропачев П.А, Жакулина А.А. Проектирование оснований и фундаментов (Геотехника). Учебник – Караганда: КарГТУ, 2019, 217 с., ISBN 978-601-315-697-2
24. Жакулин А.С. Жакулина А.А. Основы геотехнического проектирования (монография) Редакционно – издательский отдел КарГТУ, 2015 г.
25. Жакулин А.С., Жусупбеков А.Ж., Кропачев П.А, Жакулина А.А. Проектирование оснований и фундаментов (Геотехника). Учебник – Караганда: КарГТУ, 2019, 217 с., ISBN 978-601-315-697-2
26. Бондарик Г.К. Инженерно-геологические изыскания: учебник. М.: КДУ, 2007. - 424с.
27. СП РК 1.02-105-2014. Инженерные изыскания для строительства. Основные положения.

The program of the entrance exam for Module 3.
(list of exam questions)

1. Problems of soil mechanics and methods of their solution. The relationship of soil mechanics with engineering geology, hydrogeology, soil science, as well as with foundation engineering and other construction disciplines.

2. Determination of compressibility characteristics according to statistical load tests with stamps and pressiometers. Determination of shear characteristics according to the test data by bladed instruments and statistical load by a ball stamp. Determination of these characteristics based on the results of statistical and dynamic forecasting.

3. Stress distribution from the concentrated force applied on the surface and inside the half-space, from the action of a local uniformly distributed load (mathematically rigorous and approximate solutions). Determination of stresses by the method of angular points.

4. Stress plots and lines of identical stresses. Stress distribution in a layer of limited thickness on a rigid base. The distribution of contact pressures under the sole of the foundation in the case of spatial and flat problems.

5. Methods for determining the limiting pressure: mathematically rigorous (based on solving differential equations of soil equilibrium in the limiting state) and approximate methods (based on pre-accepted sliding surfaces). The influence of soil properties, the size of the foundation and the depth of laying on the maximum load of the soil foundations.

6. Calculation of foundation sediments using the method of elementary summation and the method of the equivalent soil layer by N.A. Cytovich on homogeneous and layered soil layers. Construction of the damping curve of foundation sediments over time.

7. Comparison of calculated foundation sediments with actual ones (according to direct observations). Practical conclusions.

8. The latest trends in the development of methods for improving foundations.

9. Strength calculation based on normal sections of bent reinforced concrete elements of rectangular profile with double reinforcement.

10. Calculation of strength according to normal sections of bent reinforced concrete elements of the T-shaped profile. Two calculated cases.

11. Calculation of the strength of reinforced concrete elements in inclined sections. Possible forms of destruction under the combined action of bending moments and transverse forces.

12. Calculation of the strength of sections of centrally stretched reinforced concrete elements. Calculation of the strength of rectangular sections of out-of-center stretched reinforced concrete elements.

13. Calculation of reinforced concrete elements for the formation of cracks.

14. Calculation of reinforced concrete elements by deflections. Determination of the curvature of reinforced concrete elements for areas without cracks and with cracks in the stretched zone. Determination of the rigidity of reinforced concrete elements in a section without cracks and with cracks in a stretched zone.

15. Methods of laboratory determination of soil compressibility characteristics.

16. Methods of field determination of soil compressibility characteristics.

17. Methods of laboratory determination of soil strength characteristics.

18. Methods of field determination of soil strength characteristics.

19. The main directions of improving quality management.

20. Construction quality and quality management - concept, content

21. Occupational health and safety in the production of construction works.

22. The main provisions of the methods of calculation of reinforced concrete

23. Calculation of the strength of the bent elements of a rectangular profile with single and double fittings in normal sections

24. Calculation of the strength of the bent elements of the T-profile according to normal values.

25. Calculation of the strength of bent elements along inclined sections for the action of transverse force. Calculation of transverse reinforcement.

26. The main technogenic processes of built-up urban areas.

27. Using the achievements of soil mechanics and foundation engineering in order to industrialize, accelerate, reduce the cost and improve the quality of construction. Scientific and technical progress in foundation building.

28. The place of soil mechanics among other sections of continuum mechanics; the use of solutions of theoretical mechanics, theory of elasticity, plasticity, fluidity.

29. Determination of the minimum depth of foundation laying depending on geological conditions, seasonal soil freezing, structural and operational features of structures. Selection of the type and material of foundations.

30. Calculation of foundations on a compressible soil layer of limited thickness.

31. Mechanical methods for improving the soils of the bases. Compaction of soils by surface ramming, deep vibration and sand piles, pre-loading and lowering of the groundwater level (the effect of hydrodynamic pressure). Compaction of weak clay soils by vertical drainage. The processes occurring in soils when using these methods.

32. Environmental protection during construction work

33. The structure of design management in construction.

34. Deformability of soils as dispersed bodies. The general case of the relationship between deformations and stresses. The principle of linear deformability.

35. Strength calculation based on normal sections of bent reinforced concrete elements of rectangular profile with single reinforcement.

36. Calculation of reinforced concrete elements by inclined sections on the action of river forces.

37. Calculation of reinforced concrete elements by inclined sections for the action of moments.

38. Calculation of reinforced concrete elements along the strip between inclined sections. Design requirements for transverse reinforcement of bendable elements.

39. Calculation of the strength of rectangular sections of compressed elements with a small amount of eccentricity ($e0 \leq h/30$) and flexibility ($l0/h \leq 20$).

40. Calculation of the strength of rectangular sections of non-centrally compressed ferrous elements. Consideration of the effect of longitudinal bending. Two calculation cases depending on the magnitude of the eccentricity of the longitudinal force.

41. Shear tests for straight cut, simple and triaxial compression. Determination of shear characteristics according to test data. Other methods for determining the characteristics of shear in the laboratory (ball stamp, penetration, etc.).

42. Operating conditions of the foundation soils under various loading conditions. The boundaries of the dependence of sediment on pressure for different loading cases (according to experimental data). Phases of the stressed state of soils with a continuous increase in pressure. The sealing phases and the shear phase. The possibility of applying a linear relationship between pressure and precipitation to soils in the compaction phase.

43. Stress distribution in the case of a planar problem. The main stresses in the ground at a band-shaped load.

44. On the limits of applicability of individual methods for calculating the total precipitation of the foundations and their rate of flow over time.

45. The method of calculation of reinforced concrete structures by limiting conditions. Classification of loads. Normative and calculated values of loads.

46. Design of construction technology – construction organization project (PIC).

47. Design of construction technology – a work production project (PPR).

48. Tasks for calculating the normal cross-sections of bent reinforced concrete elements of a rectangular profile with a single reinforcement.

49. Calculation of the bases by bearing capacity.

50. Materials of engineering and geological surveys necessary for the selection of the building site and the type of foundation. The use of laboratory and field tests to assess the properties of the soils of the bases.

List of recommended literature

1. Механика грунтов, основания и фундаменты: учебник / Л. Н. Шутенко, А. Г. Рудь, О. В. Кичаева и др.; под. ред. Л. Н. Шутенко; Харьков. нац. ун-т гор. хоз-ва им. А. Н. Бекетова. – Харьков: ХНУГХ им. А. Н. Бекетова, 2015. – 501 с.

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