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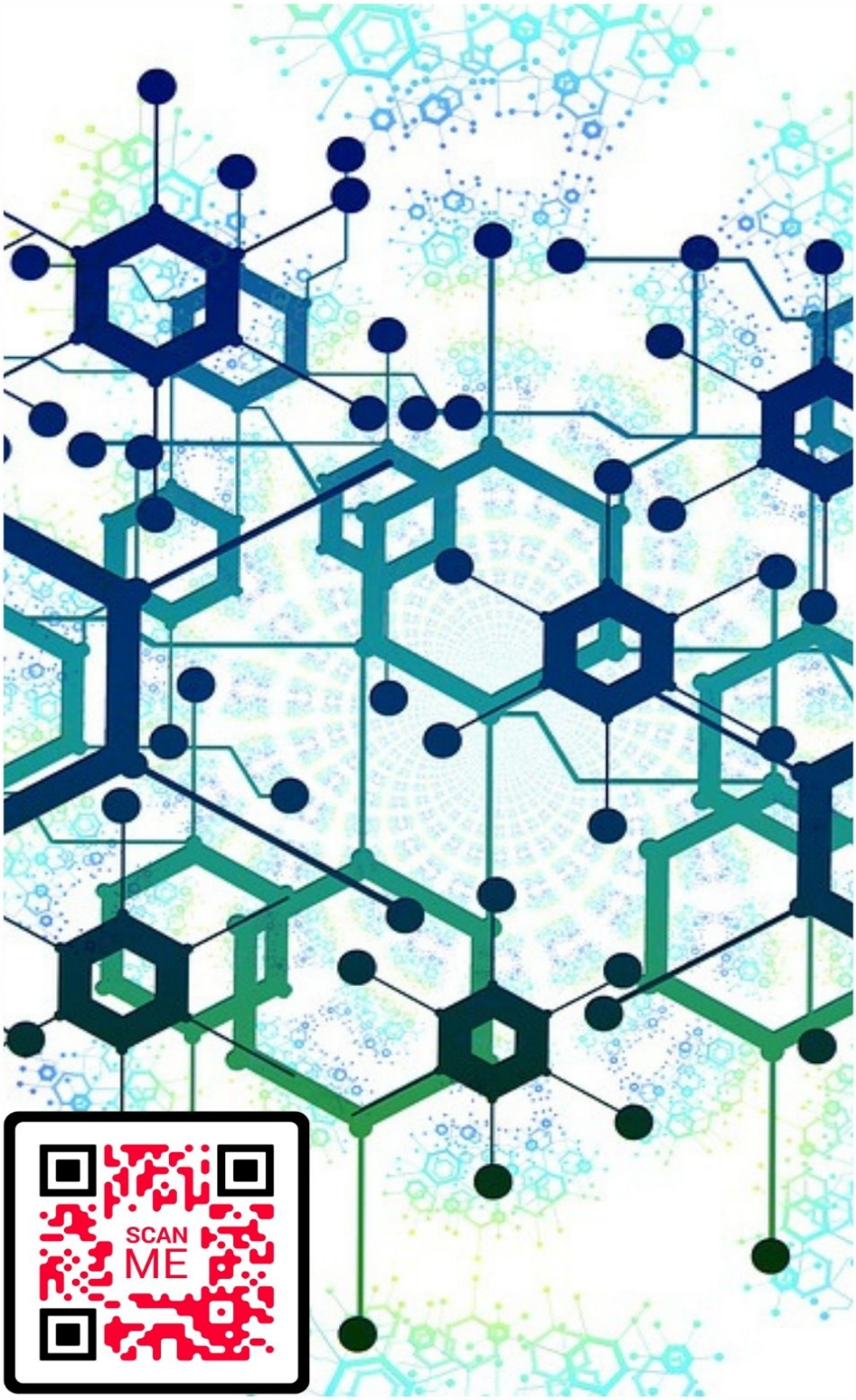

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Constructive Solutions of Foundations and Foundations of Buildings

Solusi Konstruktif untuk Pondasi dan Fondasi Bangunan

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Abstract

This study systematically examines various types of building foundations to elucidate their structural characteristics and performance. Through a comprehensive review and categorization, we identify key typologies including shallow foundations, deep foundations, and specialized variants such as mat foundations and pile foundations. Employing a combination of literature review and empirical analysis, we elucidate the distinct advantages and limitations of each foundation type in terms of load-bearing capacity, stability, and resilience against environmental factors. Results underscore the importance of selecting foundation types tailored to specific soil conditions, structural requirements, and geographical contexts, highlighting implications for enhancing building resilience, minimizing construction costs, and promoting sustainable urban development.

Highlights:

- Various types of building foundations are systematically examined to elucidate their structural characteristics and performance.
- The study identifies key typologies including shallow foundations, deep foundations, and specialized variants such as mat and pile foundations.
- Results underscore the importance of selecting foundation types tailored to specific soil conditions, structural requirements, and geographical contexts for promoting sustainable urban development.

Keywords: Building Foundation, Foundations, Types Foundation, Soil, Foundation Quality.

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Introduction

The article provides information about the foundations of buildings, their types, structure and appearance. Understanding the foundation of the building. The foundation is a layer of soil located under the foundations and carrying the load from the building or structure through them. Loads create a state of tension in the base, and when this tension reaches a certain level, it causes deformation (settlement) both in the base itself and in the foundations [1].

A imperceptible and uniform deformation is not very dangerous for the building. Excessive subsidence and mainly non-uniform deformation are dangerous and can cause cracks, damage to structures, and catastrophic situations in buildings and structures.

The layer of the soil in its natural state serves as the basis, since the use of buildings and structures depends on the condition of the basis, strict requirements are imposed on them in design and construction [2]. The foundation should be able to carry a sufficient load, the material should be homogeneous, non-multiplying, resistant to the effects of flowing and seeping waters, dangerous biological factors. The surface layer of the soil cannot be the basis, because it is weakened by the influence of organic waste and other factors. It is also impossible to install foundations on the frozen soil layer.

Method

Soil as a base can be natural or artificial. There are stone and non-stone types of soil as a natural basis. Rocks are igneous, metamorphic and sedimentary.

According to the temporary compressive strength, it is very strong (Rs > 120 MPa), strong (120 R> 5>0 MPa), medium strong (50 R> 1>5 MPa), weak strength (15 R> 5>MPa) and semi-rock (Rs 5<MPa) are divided into types [3].

The non-rocky soil is coarse, sandy and silty, with a size of 2 mm in the largest particle. from, there are crystalline and sedimentary rocks with a weight of more than 50 percent. Depending on the softness index of clay soil, loam (supes, 0.01 <i u < 0.07), sandy loam, 0.07 i < <0.17) and clay (iyu> 0.17), according to the softening coefficient There are different non-coagulable (Ki 0>.75) and coagulable (Ki < 0.75) types [4].

Result and Discussion

A. Groundwater and soil freezing must be taken into account when choosing a natural foundation.

Artificial foundations. If the soil does not have sufficient load-bearing capacity in its natural state, it should be strengthened by artificial means. Artificial foundations are strengthened by using soil compaction, hardening or replacement methods [5].

One of the methods such as cementation, silicification, tarification, bituminization is used for deep or surface compaction of the soil [6]. In addition, thermal methods can be used. If any of the above-mentioned methods cannot be used or the application is ineffective, the soil is replaced.

B. General information about the foundation.

The foundation is the part of the building located below the ground level, which transfers all the loads from the building to the base.

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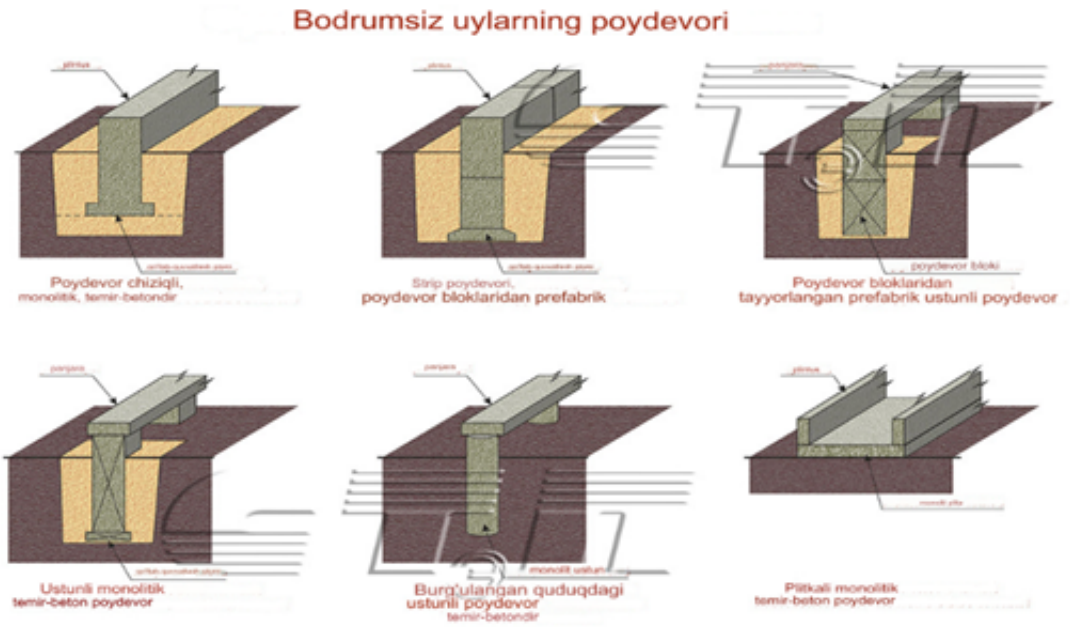

Figure 1. *1.1-Picture*

Various external factors affect the foundation and wall. These effects may or may not be under force (Picture 1.2).

According to the methods of construction and restoration, foundations are divided into industrial and non-industrial types, and wood, natural stone, aerated concrete, concrete and reinforced concrete are used as materials for their construction [7].

According to the structural scheme, strip-shaped, free-standing, solid and pile-type foundations are distinguished (Picture. 1.2).

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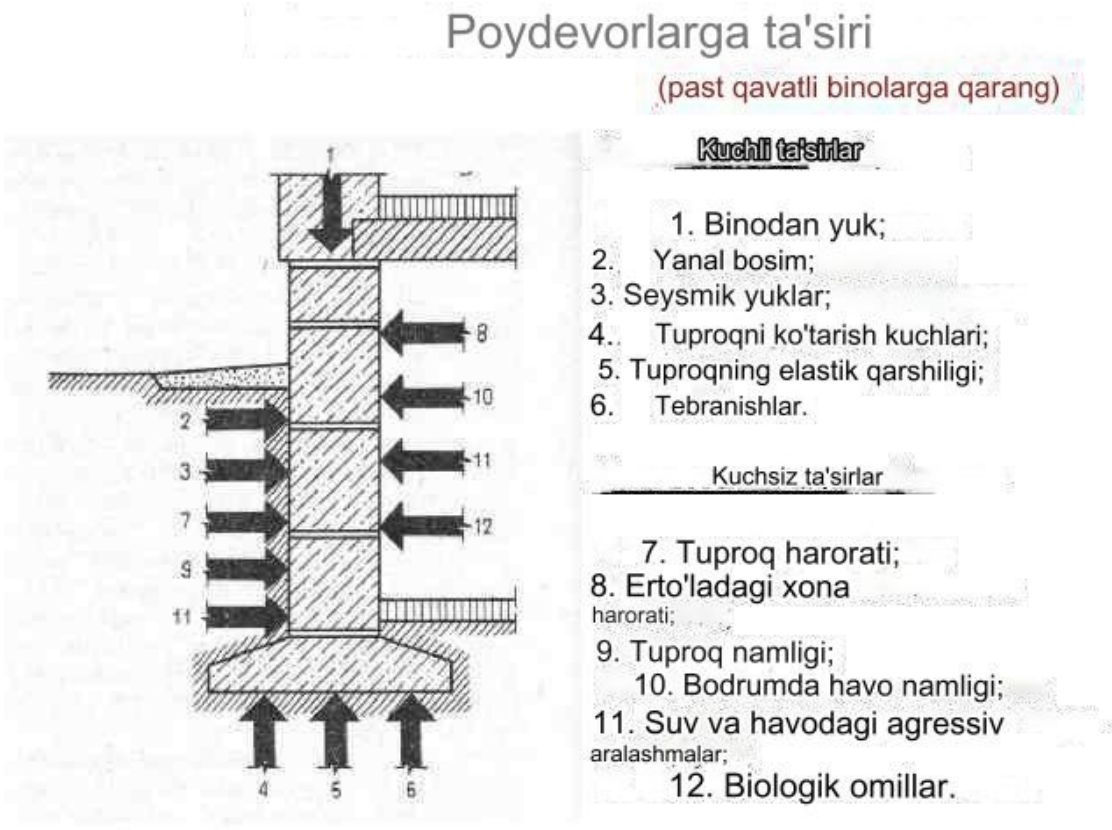

Figure 2. *Factors affecting the foundation*

C. Factors affecting the foundation:

Impacts under force: 1 - load falling from the building; 2 – lateral pressure of soil; 3 – seismic loads; 4 - the tensile strength of the soil; 5 – flexural resistance of the soil; 6 – vibrations. Non-powerful effects: 7 - the temperature of the soil; 8 - the temperature of the basement glass; 9 – soil moisture; 10 - humidity of the basement air; 11 - aggressive mixtures in water and air; 12 – biological factors [8].

The choice of one or another type of foundation depends on its material, structural solution of the building, description of the load, the type of foundation and local conditions, and the shape and size of the installation depth, which is considered an important parameter. It is determined based on many factors: the function of the building, its size-plan and structural solutions, description of the load; the quality of the basis; surrounding buildings; relief; the accepted construction of the foundation, its construction methods, etc [9]. But, first of all, when determining the installation depth, the quality of the soil, the level of groundwater and the freezing of the soil are taken into account. Foundations are poured into the soil surface (less than 5 m) and deep (more than 5 m). In heated buildings, the minimum installation depth of foundations is generally accepted as 0.7 m for external walls and 0.5 m for internal walls.

Capillaries are covered with horizontal or vertical waterproofing by plastering (with cement, asphalt, liquid asphalt), gluing (using wrapping materials) or covering (using metal) the bases to protect them from moisture (Picture. 1.3).

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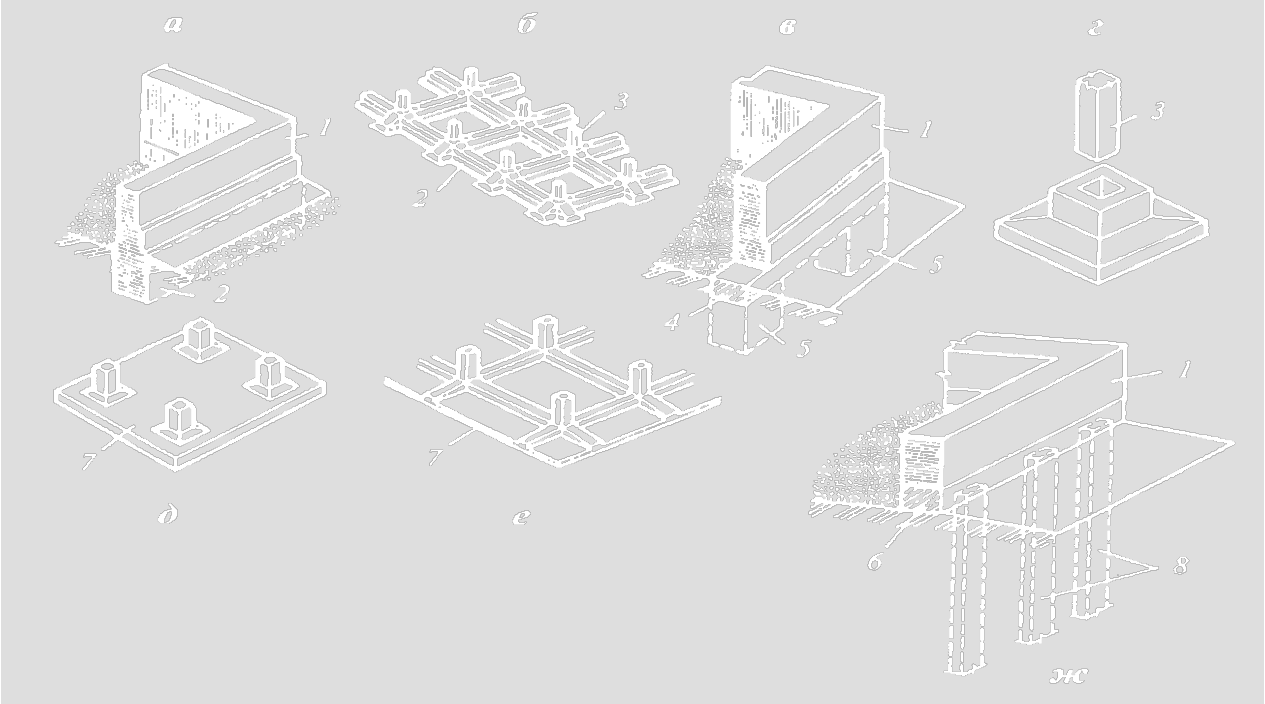

Figure 3. ***Structural schemes of the foundation:***

D. Structural schemes of the foundation:

a – band-shaped; b - individual; v – yarlite ; g- column, d- column base, j- pile.

The strip foundation is not only a load-bearing structure, but in many cases it serves as a protective wall of the basement [10].

Usually, strip foundations are raised from precast concrete and reinforced concrete elements [11]. Industrial prefabricated strip foundations are assembled from two types of prefabricated elements - foundation block (base) and basement wall blocks (Picture. 1.4).

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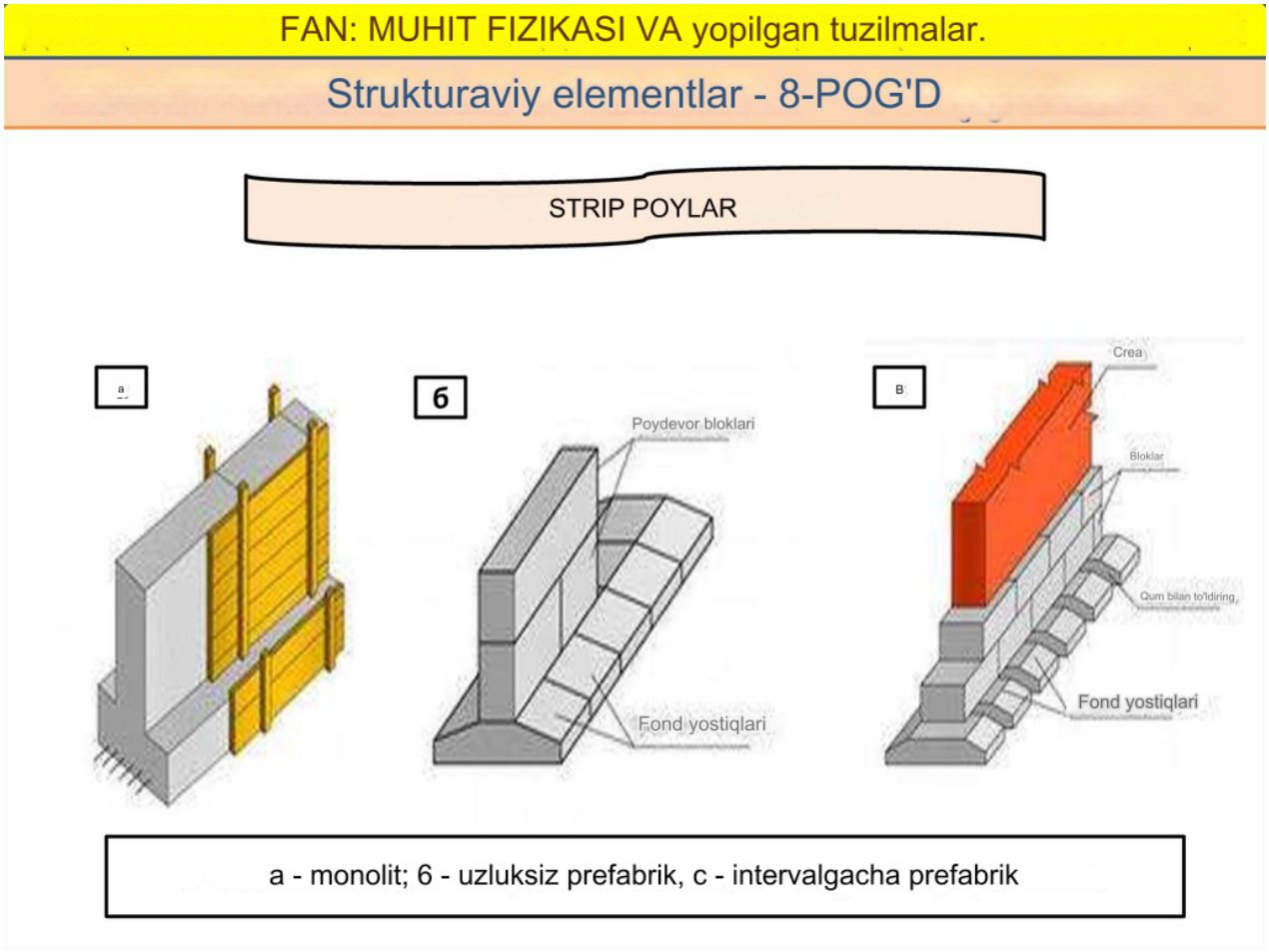

Figure 4. *1.4- Picture*

A free-standing (columnar) foundation is installed in low-rise (thick and unthick) and multi-story (thick) buildings. It is designed using prefabricated elements and made of precast concrete (Picture. 1.5) [12].

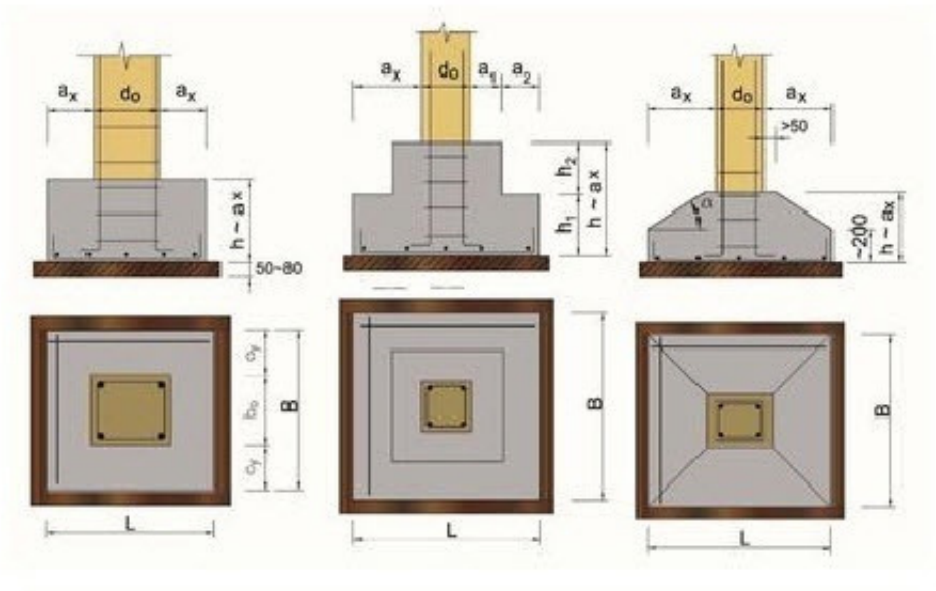

Figure 5. *1.5-Picture*

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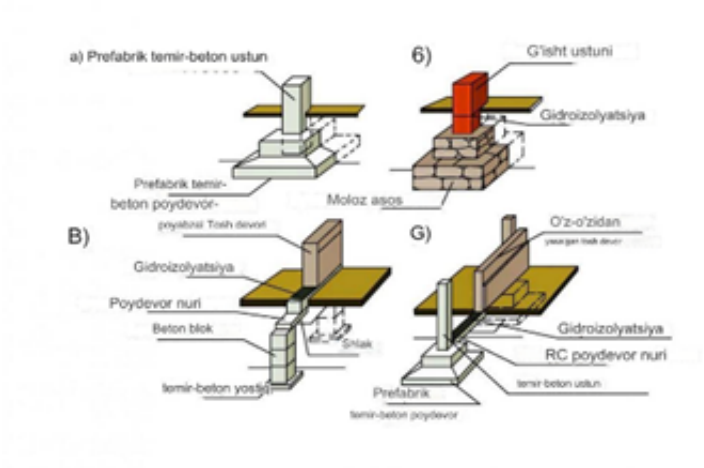

Figure 6. *1.5-Picture*

The integrated foundation is designed in the form of slabs with or without beams, with or without concrete. The ribs of the girder plate can be directed up or down. It is planned to install columns at the intersection of the ribs. Figure 1.6 shows different options for solid foundation walls [13].

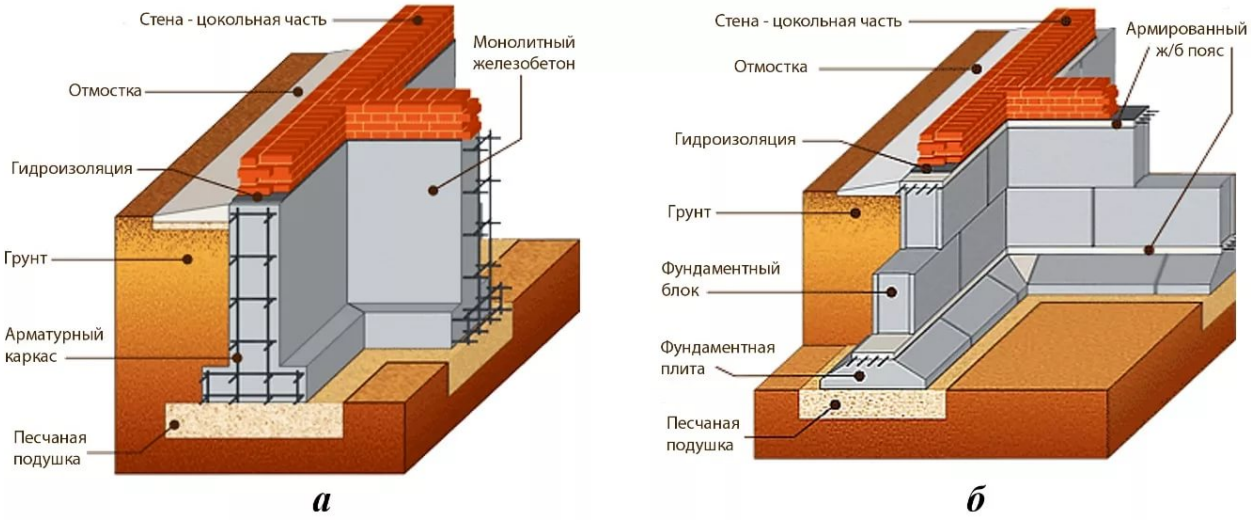

Figure 7. *1.6-Picture*

Conclusion

In conclusion, it can be said that what kind of building is the main building is important when choosing foundation structures. If one type of construction is used for low-rise buildings, another solution is sought for high-rise buildings.

References

1. M. M. Vohidov, "Industrial Constructions," T., FDTKDIT, 2003.
2. M. M. Vohidov and Sh. R. Mirzayev, "Buildings and Structures Constructions," T., "Mehnat," 2003.
3. M. M. Vohidov, "Building and Structure Construction," Textbook for Vocational Colleges (4th edition), T., "ILM ZIYO", 2017.
4. A. Abdurakhmanov, Sh. Egamberdieva, and U. Mahsudov, "METAL CONSTRUCTION," Textbook Number One, 2023.
5. A. Abdurahmanov, "Technology of Building and Structures Construction" (textbook), GLOBE EDIT, 2023.
6. T. M. Pezold and V. V. Tura, "Reinforced Concrete Structures: Fundamentals of Calculation and Design Theory," Tutorial for Students, BSTU, 2003.

ISSN 2598-9936 (online), https://ijins.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

7. Y. V. Zaitsev and V. F. Promyslov, "Construction Structures," Stroyizdat, 1985.
8. A. N. Dobromyslov, "Examples of Constructive Textbooks for Reinforced Concrete Engineering Structures," Publishing House of the Construction Higher Educational Institutions Association, 2010.
9. V. N. Baykov and E. E. Sigalov, "Reinforced Concrete Structures: General Course," Stroyizdat, 1991.
10. N. N. Popov and A. V. Zabegaev, "Design and Calculation of Reinforced Concrete and Stone Structures," Higher School, 1989.
11. V. M. Bondarenko and D. G. Suvorkin, "Reinforced Concrete and Stone Structures," "Graduation Night and Civilian Building", Higher School, 1987.
12. A. P. Kudzis, "Reinforced Concrete and Stone Structures: Materials, Design, Theory and Calculation," High School, 1988.
13. A. P. Kudzis, "Reinforced Concrete and Stone Structures: Textbook," High School. 1986.

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