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CONNECTION OF REINFORCEMENT FOR CONCRETE – TYPES AND DESCRIPTION

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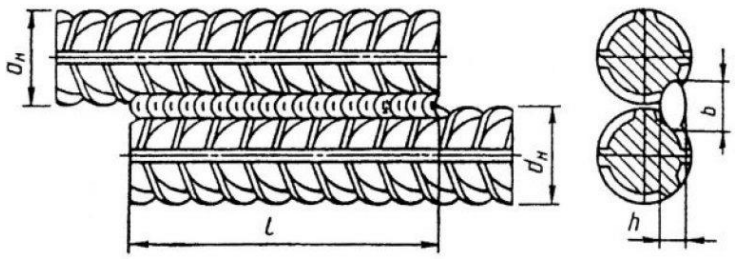
Abstract

Reinforcement is a method of strengthening a material and increasing its load-bearing properties with another building material, which has higher strength indicators relative to the base material [3]. This method is used in the manufacture of reinforced concrete and stone structures. The purpose of reinforcement is to increase the load-bearing capacity of the structure and reduce the likelihood of cracks caused by temperature changes. For this purpose, materials with increased strength characteristics, such as steel, are used. It is important to understand what reinforcement is in order to correctly apply it in construction and ensure the reliability of structures [2].

Keywords: construction, reinforcement, welding, coupling, overlapping reinforcement connection, connection with couplings.

Introduction

Reinforcement is one of the most important and critical stages of monolithic construction. All norms, tolerances and rules for reinforcement, as well as types of reinforcement connections are prescribed in the relevant SNiPs and GOSTs. And only strict adherence to these norms and rules can maximize the safety of the further operation of such structures and facilities [1].



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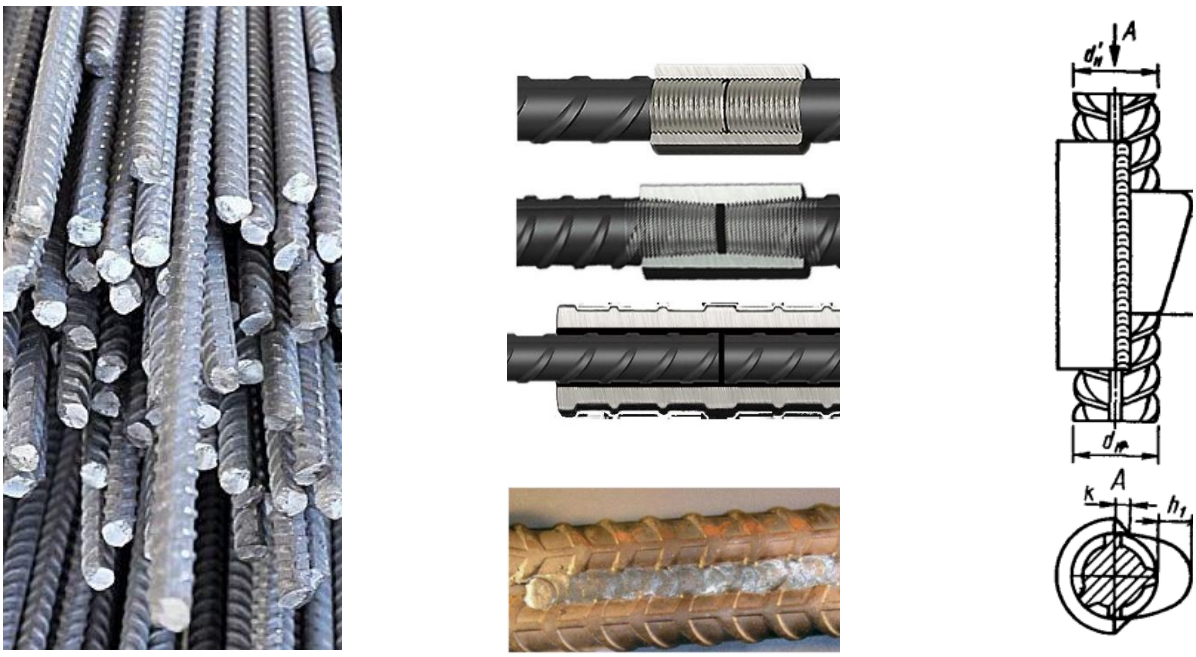

Types of reinforcement connections for concrete

1. Types of connection of metal reinforcement. Today, there are four main types of reinforcement connections: overlapping reinforcement, welded reinforcement, threaded reinforcement and crimped reinforcement. In turn, each of these methods can also be divided into various subtypes and methods, but we will consider the most common types of connection of building reinforcement [1].

2. Overlapping reinforcement connection without welding. Compared to the others, this is the most unreliable reinforcement connection. To join metal reinforcement with an overlap, various tools or devices with curved ends and knitting wire are used [1]. There are three options for linking reinforcement:

• Bonding with straight ends of a periodic profile;
• Bundle with straight ends of the transverse profile;
• Bundle with bend details at the ends.

Advantages of overlapping reinforcement:

• The only advantage that can be highlighted is the relative simplicity of this method [4].

Disadvantages of overlapping reinforcement:

• Connection speed;
• Overconsumption of reinforcement for concrete;
• Connection cost;

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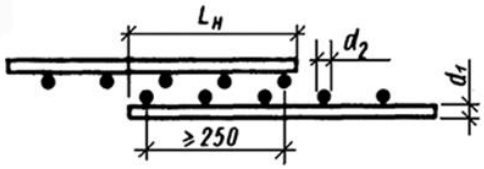
• Connection strength.



Overlapping reinforcement connection for concrete

3. Welding connection of reinforcement. The welded connection of reinforcement is one of the most durable and therefore widespread today [1]. As in the previous connection, several methods of welding reinforcement are also used here:

• Welding by semi-automatic method;
• Electric arc manual welding of reinforcement;
• Contact automatic welding of reinforcement.

At the same time, the reinforcement is also welded using different methods:

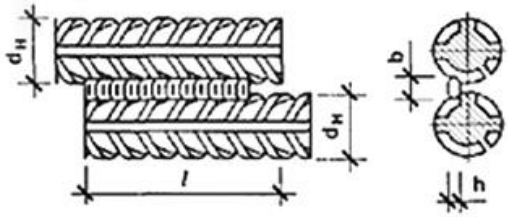
• Overlap welding is used in manual arc welding;
• Joining of reinforcement using a semi-automatic welding method;
• Tee method when using an automatic reinforcement welding line.

The advantages of welding reinforcement include:

• Relative strength and reliability of the connection [5]

The main disadvantages of welding reinforcement:

• Use of reinforcement only of certain brands (not all reinforcement can be welded) [6];
• Personnel licensing;
• Need for support staff
• Connection cost;
• Cost of equipment;
• Impossibility of application on certain objects;
• Connection speed.



Welding connection of reinforcement for concrete

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4. Connecting reinforcement with crimp couplings. The principle of this method is that specially made bushings with a larger diameter than the reinforcement being connected are taken, then the bushing is put on the reinforcement and crimped with a special press for crimping the reinforcement, resulting in a fairly equal-strength connection [1]. Today this is one of the most common methods of connecting reinforcement.

The advantages of connecting reinforcement with crimp couplings include:

• Relative connection speed;

• Relative equal strength of the connection (subject to all conditions of joining by this method);

Disadvantages of crimp connection of reinforcement:

• Heavy hydraulic equipment (press);

• Need for support staff;

• Quality control of compression of each joint;

• Cost of equipment

The speed of making one joint is at least 2 times less than when using threaded couplings with parallel threads and at least 3 times less than when using couplings with conical (conical) threads. It is worth noting the inconvenience plus the slow speed of installation in columns. If the distance between the reinforcement in the columns is less than 100 mm, then installation with a press becomes impossible. And in general, this type of joining of reinforcement cannot be called equally high-quality and safe, despite the different conditions and factors of using crimping equipment.

Connecting reinforcement for concrete with crimp couplings

5. Connecting reinforcement with threaded couplings with conical threads. Connecting reinforcement with couplings with conical threads is one of the most modern and durable connections. This connection can be used in almost all types of modern monolithic construction.

1. Tapered thread reinforcement couplings are suitable for connecting rods with a diameter of 12 to 58 mm.

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The process looks like this:

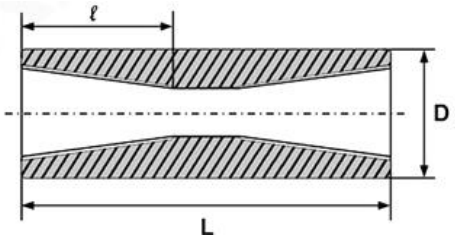
First, using a special thread-cutting machine, a conical thread is cut on the reinforcement rod. Next, using pre-purchased couplings with conical threads, the reinforcing bars are twisted with a special torque wrench.

2. Advantages of connecting reinforcement with couplings with tapered threads:

• Connection speed;
• Material saving;
• Guaranteed connection strength;
• No personnel licensing required;
• Suitable for all types of fittings.

Disadvantages of connecting reinforcement with couplings with tapered threads:

• Cost of a thread-cutting machine (the solution is to rent a thread-cutting machine);
• Cost of consumables (cutters);
• Tightening quality control;
• Cost of coupling.



Connecting concrete reinforcement with threaded couplings with tapered threads

6. Connecting reinforcement with threaded couplings with cylindrical threads. Like couplings with tapered threads, cylindrical couplings belong to the advanced technologies of monolithic construction. They are used in the construction of multi-storey residential and non-residential buildings, nuclear power plants, hydroelectric power stations, bridges, and even taking into account complex seismological indicators.

Couplings with cylindrical threads can also be used when connecting reinforcement with a diameter of 12 to 58 mm.

The process looks like this:

In the same way as for connecting couplings with tapered threads, first a cylindrical thread is rolled onto the reinforcement rod using a special thread rolling machine. Next, using pre-purchased couplings with cylindrical threads, the reinforcing bars are twisted with a special torque wrench.

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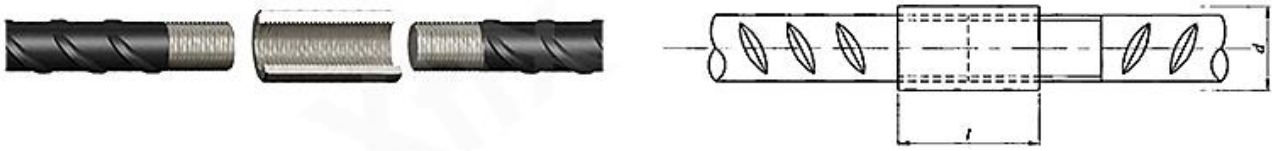
Advantages of connecting reinforcement with couplings with cylindrical threads:
• Connection speed;
• Material saving;
• Guaranteed connection strength;
• No personnel licensing required;
• Suitable for all types of fittings.

Disadvantages of connecting reinforcement with couplings with cylindrical threads:
• Cost of a thread rolling machine (the solution is to rent a thread rolling machine);
• Cost of consumables (rollers for thread rolling);
• Tightening quality control.



Connecting concrete reinforcement with threaded couplings with cylindrical threads

Couplings for connecting building reinforcement. Couplings are the most modern way of connecting reinforcement in construction. Couplings are used in the USA, Europe, China, Japan, and Russia. They are used in the construction of public and residential buildings, structures and structures. They allow you to connect any types of reinforcement, including heat-strengthened (AI, AIII, A500t, A500s, A800, etc.). The assembly time of a threaded coupling connection of fittings is up to 10 times faster than welding. Mechanical coupling connection of reinforcement is up to 2 times cheaper than welding. This method is recommended for construction in seismic zones.

Conclusion

The use of threaded couplings for connecting reinforcement made it possible to significantly reduce the time of construction of objects, reduce the consumption of reinforcement by up to 25%, and due to the strength of the connection, reduce the load on the foundation, thereby ensuring longer service life of the objects being built.

Foydalanilgan adabiyotlar ro‘yhati:

1. https://mufty-dlya-armatury.ru/soedinenie-armaturyi-blog-po-oborudovaniyu-i-sposobam-soedineniya-armaturyi/soedinenie-armaturyi-vidyi-opisanie
2. Chto takoye armirovaniye i dlya chego ono nujno?
URL: https://pobetony.ru/armirovanie/chto-eto-takoe
3. https://kartaslov.ru/значение-слова/армирование
4. V.F.Usmanov “Temirbeton va tosh konstruksiyalari” Darslik. Toshkent. “Sahhof” nashriyoti. 2022 yil.
5. B.A.Asqarov, Sh.R.Nizomov “Temirbeton va tosh-g‘isht konstruksiyalari” Darslik. Toshkent. “IQTISOD-MOLIYA” 2008 yil.
6. QMQ 2.03.01-96 «Beton va temirbeton konstruksiyalar»
7. QMQ 2.03.07-98 «Tosh va o‘zaktoshli qurilmalar»
8. Mirzayev, B. O., & Askarov, X. (2023). METHODS FOR CALCULATING BRICK CONSUMPTION WHEN BUILDING WALLS FROM SILICATE AND CERAMIC BRICKS. Ethiopian International Journal of Multidisciplinary Research, 10(08), 1-14.
9. Askarov, X., & Mirzayev, B. (2023). LEGO G ‘ISHT ISHLAB CHIQARISH TEXNOLOGIYASINI TADQIQ QILISH. GOLDEN BRAIN, 1(5), 4-8.
10. Mamajonova, N., & Mirzayev, B. (2023). MONITORING AND ANALYSIS OF GEODETIC VISUAL DEFORMATION. Theoretical aspects in the formation of pedagogical sciences, 2(5), 139-141.
11. B.O.Mirzayev “Bino va inshootlar qurilishida qurilish konstruksiyalarini geometrik o‘zgarmas yassi sistema sifatida hisoblash” AIQI Ilmiy axborotnomasi, 2-son, Andijon, 2023 dekabr, 36-38-betlar.
12. B.O.Mirzayev, D.I.o‘.Mamadaliyev “Temirbeton konstruksiyalarda betonning himoya qatlami va armatura sterjenlarining joylanishi” AIQI, Xalqaro ilmiy-amaliy anjuman Materiallar to‘plami, Andijon, 2023 dekabr, 314-317-betlar.
13. qizi Mirzayeva, U. M. (2023). ‘‘FIZIKA’’FANINI O ‘QITISHDA INTEGRATSION TA’LIM TEXNOLOGIYALARIDAN FOYDALANISH. GOLDEN BRAIN, 1(28), 109-111.
14. Nosirov, M. Z. (2023). LAZERLARDAN QISHLOQ XO’JALIGIDA FOYDALANISH. O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI, 2(18), 135-136.
15. Rafailovna, R. R. (2022). ‘’LAZER FIZIKASI’’FANINI O’QITISHDA ZAMONAVIY METODLARDAN FOYDALANISH. TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI, 2(11), 170-171.