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THE COMPATIVE ANALYSYS OF REINFORCEMENT STEEL USE IN REINFORCED CONCRETE STRUCTURES IN RUSSIA AND ABROAD

Reinforced concrete is uninterruptedly developing progressive type of building materials. One of the most important advantages of reinforced concrete is the possibility of using it with reinforcing steel or composite materials of increased and high strength.

As a result occurs substantial permanent growth in production, increase in strength and other service characteristics of steel rolling used for reinforcing concrete.

Production and application of the modern types of reinforcement in our country started not long ago, much later, than in the USA and European countries. Until 1950 deformed reinforcement was not produced and used in our country; the production of hot-rolling reinforcement of the A400 (A-III) class started only in 1956.

But already in 1960 the application of this reinforcement was 1.0 million tons a year, and in 1970 — 3.4 million tons a year.

Up to the year 2012, the production and application of the deformed reinforcement of the classes A-400, A-500C and A-600C of all kinds exceeded 8.0 million tons.

In order to ensure economic efficiency and competitive ability of national construction, the process of increasing the strength and workability of domestic reinforcing bar is continuously taking place. The results of this process in respect of the common untensioned reinforcement of reinforced concrete structures are discussed in the present article.

We suggest to consider the mechanical and service characteristics of deformed reinforcement, which is manufactured according to the standards of our country GOST P 52544, classes A500C and B500C, GOST 5781, class A400, and Technical specifications 14-1-5596—2010, class Ан600С, grade 20Г2СФБА.

For the comparative analysis we use the standard data for similar reinforcement established by EN 10080-2005 and Eurocode 2, as well as by standards ÖNORM B-420 of Austria, BC 4449/2005 of Great Britain, DIN 488 of Germany, A706M of the USA and G3142 of Japan.

The standards of the above-mentioned countries slightly differ from the standards EN 10080 and Eurocode 2, and from the Russian standards.

We consider the statistical data of the real properties of hot-rolling, cold-rolling and thermo mechanically strengthened deformed reinforcement manufactured and certified according to GOST R 52544 and GOST 5781, produced in Russia, Byelorussia, Moldavia, Latvia, Poland, Turkey and Egypt.

The fundamental difference of modern European standards from Russian standards and the standards of other countries considered in this article is that the requirements of EN 10080 and Eurocode 2 are unified for all reinforcement with the yield point of 400 to 600 H/mm^2 regardless of its production method.

At the same time it is stated, that the actual properties of reinforcement of all groups according to EN 10080, differ essentially from those specified by this Standard and they better correspond to the Russian, Austrian and German standards.

The Standard EN 10080 in the version of the year 2005 is inconvenient, because it does not determine technical classes. As a result, many European countries use their own, but not the European standards.

Conclusion.

The comparative analysis of our national and foreign standards of deformed rolled steel used for reinforcing concrete demonstrates that the physical and mechanical properties of the Russian and European reinforcing steel are almost the same, but for the following facts:

- Standard requirements established according to GOST 5781, GOST 10884 and GOST R 52544 are a bit higher than the standards of EN 10080;
- Reinforcement of the classes A400, A500 B500C and A600C, manufactured according to the Russian standards, can be used without recounting instead of reinforcement of the same strength classes according to EN 10080 and to the standards of other countries all over the world.

Key words: reinforcement steel, tensile strength, yield point, yielding, norms of design, Eurocode, reinforced concrete structures.

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