**APPLICATION OF REGULATIONS AND RULEBOOKS IN CONDUCTING CONSTRUCTION WORKS**

When performing all phases of concrete works, apply the provisions of the "Rulebook on technical standards for concrete and reinforced concrete" Official Gazette of the SFRY No. 11 / 23.2.1987."

**1. CONCRETE WORKS**

**1.1. Cement**

Cement in bulk delivered by a factory must meet the conditions according to SRPS, for which the factory also delivers a certificate. Conditions of storage and use, as well as the necessary testing of cement on the construction site are regulated by the following SRPS:

SRPS B.C1.012 -1967 Method of packaging, delivery, storage and sampling of cement.

SRPS B.C1.009, SRPS B.C1.011, SRPS B.C1.013 and SRPS B.C1.014 quality of cement for concrete

SRPS B.C8.020 -1966 Portland cement sampling and chemical testing methods.

SRPS B.C8.022 -1963 Testing the type of cement.

SRPS B.C8.024 -1963 Determination of specific surface area of portland cement.

**1.2. Concrete preparation water**

Ordinary drinking water may only be used for the preparation of concrete if its usability has been proven in accordance with the applicable regulations.

SRPS U.M1.058 – concrete preparation water

SRPS U.M1.035 – concrete admixtures

**1.3. Aggregate**

The aggregate for making concrete can be made of crushed stone and sifted gravel. The aggregate must be fractionated into four fractions, solid, clean and as regular a grain shape as possible. The fractions must be stored and dosed in boxes separately in weight ratios. In winter concreting conditions, heat the unit with steam. In addition to the provisions in the "Rulebook", the concrete preparation unit should be approved and controlled by the following SRPS standards.:

SRPS B.B3.100 and SRPS B.B2.010 - aggregate quality

SRPS U.M1. 057 and SRPS B.B8.029 - granulometric composition of aggregate for concrete

SRPS B.B8.035 - aggregate moisture

SRPS B.B8.036 – clay and dust particles

SRPS B.B8.030 from BB 8032

SRPS U.M8.02

SRPS B.B8.034 from BB 8044 and SRPS U.M.8.021

SRPS B.B8.047 from BB 8048

The dosing of aggregates by fractions is given and controlled by the construction site laboratory, which also obtains certificates from the manufacturer of concrete aggregates within the legal deadlines.

**1.3. Concrete preparation**

Concrete preparation must be done mechanically. The concrete must be prepared according to the dosage obtained from the laboratory that controls the accuracy of the procedure. Concrete components are dosed in weight ratios. Immediately after the concrete is made, it needs to be transported and installed. For accurate dosing, it is necessary to calibrate all scales once in 6 months. Pay special attention to the dosage of water and cement, i.e. V / C-factor. It is forbidden to add water after the concrete has been finished.

SRPS B.C8.023 - standard consistency of concrete mass

**1.4. Concrete transport**

After preparation, the concrete must be transported to the construction site immediately. Transport must be done in such a way as to prevent segregation of concrete components and loss of water from the concrete mass. Transport of concrete must not take longer than half the time required to start setting the cement if fresh mass is transported. No additives may be added to the concrete mass during transport. Mixers that transport the dry mixture for adding water must be supplied with water meters.

**1.5. Installation of concrete**

Concrete must be prepared in such a way (V / C factor and consistency) that it can be installed correctly. Concrete must be installed by mechanical means (perivibrators, plat vibrators, vibrating tables, etc.). The vibration time and the vibration layer depend on the vibrating means, and are given by the manufacturer.

Test the consistency of concrete suitable for installation according to SRPS:

SRPS U.M.8050, SRPS U.M.8052 or SRPS U.M.8054

The use of any concrete admixtures (plasticizers, aerators, setting accelerators, anti-freeze for concrete, etc.) is prohibited, unless their safety with regards to concrete and reinforcement is previously experimentally proven. This is especially true of chlorine-based preparations. When installing concrete, care must be taken to properly spread the concrete and uniformly vibrate the entire mass of concrete. Too much vibration is also detrimental to concrete (coarse grain segregation).

**1.6. Concrete care and concrete quality**

Particular attention should be paid to the care of concrete elements, in order to achieve the appropriate quality and reduce the negative effects of shrinkage of concrete.

If the elements are steamed, the heating and cooling cycle of concrete should be strictly carried out according to the laboratory program. If the concrete is heated, in winter working conditions, it should be protected by electric power or warm air against sudden loss of moisture. Take and nurture control cubes according to the regulations from the "Rulebook" as well as the following standards:

SRPS U.M1.005, SRPS U.M1.020 - quality control of concrete cubes

SRPS U.M.1.010, SRPS U.M1.011, SRPS U.M1.022 od 1957. - proof of tension of the concrete cube

SRPS U.M1.015 - watertightness of concrete

SRPS U.M1.016 - frost resistance

SRPS U.M1.055 - resistance to frost and salts

SRPS U.B.B8.015 - wear resistance

SRPS U.M8.054 - Vebe apparatus for testing the consistency of fresh concrete mass

SRPS U.M8.050 - settling of fresh concrete

SRPS U.M8.052 - spreading of fresh concrete

SRPS U.M8.056 - vibration settlement

SRPS B.C8.020, SRPS U.M1.039 and SRPS U.M1.058 - for checking chlorine ions in concrete

SRPS U.M1.029 and SRPS U.M1.027 - dependence of shrinkage and flow of concrete.

For prestressed concrete, pay attention to the quality of the concrete, at the beginning of the tightening of the elements (from the moment of concreting), and especially for the protection of cables and the preparation of injection mass.

**1.7. Other regulations**

SRPS U.E3.050 - Prefabricated concrete elements

**2. REINFORCEMENT**

**2.1. Preparation of reinforcement**

The reinforcement must be cut, bent and shaped exactly as the project envisages.

Reinforcement should not be greasy, dirty or too rusty (it should not flake).

The rulebook that regulates the way of working with reinforcement is:

"Rulebook on technical norms for concrete and reinforced concrete Official Gazette of SFRY No. 11/1987"

**2.2. Installing reinforcement**

Reinforcement in reinforced concrete structures must be placed exactly according to the project and so fastened and tied that under no circumstances can it be moved from the designed position during concreting.

In order to provide the designed protective layer, it is necessary to use a distancer mat.

Everything else about the structural details of the reinforcement is regulated by the "Rulebook"

When laying cables, special care should be taken to maintain the position of the cables, the tightness of the protection of the cables for cement laitance, and the reinforcement of the concrete in the area of the cable head.

**2.3. Reinforcement and reinforcement mesh**

a) Reinforcement:

* SRPS C.K6.020, (ICS 77.140.60 Hot rolled steels-concrete steels-Technical conditions)
* SRPS C.K6.020, (ICS 77.140.60 Hot rolled steel-concrete steels-Shape and dimensions)
* SRPS EN 10002-1:1996, (ICS 77.040.10 Metallic materials - Tensile testing - Part 1: Method (room temperature test - identical to EN 10002-1: 1990 + amd 19990)
* SRPS C.B6.013.(ICS 77.140.65 Steel wire for welded reinforcement - Technical requirements)
* SRPS U.M1.091 Construction welded reinforcing mesh (1986).

b.) Welding

* SRPS C.A4.001, SRPS C.A4.002, SRPS C.A4.005, SRPS C.T3.051

**3. FORMWORK**

The formwork and scaffolding for the construction of concrete structures must be of quality material, placed in the position as provided by the project. The formwork must be sealed so that cement laitance cannot leak out during vibration.

The formwork must be strong and stable so as to ensure that the concrete rests during bonding. Also, the dismantling of the formwork must be ensured so that the concrete is not damaged.

The formwork must not be removed before reaching the concrete grade or earlier if the designer is consulted.

Formwork may only be coated with agents that have been shown not to be harmful to concrete and reinforcement.