– the impact of shrinkage of cast-in-situ concrete, including modified admixtures is being studied;
– the effect of load on the prefabricated structure, in particular reinforced by means of enlargement of the cross section of a construction is being examined.

Theoretical studies and experimental researches allowed assessing the percentage of reinforcement of precast and cast-in-situ constructions and the loading level of a precast unit, which influence the fracture strength of the system as a whole.

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UDC 72.05

THE DEVICE OF A WINTER GARDEN AND THE GLASS HOUSE

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Ways of building and prominent features of glass houses and winter gardens are considered and analysed. Stages of building of constructions of the given sort are presented.

All people like nature and its unusual "design", but let's think of it a little. If you suddenly wanted to have a slice of this nature at hand at any time you should reflect on such construction as a winter garden (fig. 1).

Fig. 1. A winter garden with a glass roof

It has been noticed that winter gardens, as well as glass houses, are most claimed by people who are interested in the nature and want to be closer to it.

Glass in such house or a garden can be transparent or matte, get effect of an easy misting or be partially decorated stained pattern. Now designers try to use actively glass in an interior. Interroom doors, tables, chairs, cases, regiments and so on are made of glass. Modern production techniques of glass allow

using transparent walls and roofs as the excellent building decision of a thermal insulation, sound insulation, protection against an ultraviolet, precipitations, at absolute reliability of a transparent design.

Installation demands the separate designing including difficult calculations of all design and each of its elements. Complexity of works will turn out extremely high, at comparison with usual civil work on facing of a facade of a building.

The installation principle does not differ. Panels are fixed on a standard purlin, or are straight on a wall. They screw component parts for fixture, using two variants, with visible system of fixture or hidden. If bracing elements are visible, heads screws, rivets, clamps, used for fixture, are decorated or painted.

Grooves from the interior of panels prepare for concealed fittings. Glass blocks are attached through them to load-carrying structural components.

Before starting to build such a construction it is necessary to think whether it will stand separately or will be attached to already constructed house.

If a winter garden is attached to a ready-made house, the main task - to avoid mutual motions of a building and an annex. A driving depth of the bases, as a rule, is made identical. Thus, it is useful to add a base design with the screw adjustable bearers necessary for elimination of shrinkable warps. Over the base necessarily stack a waterproof finish. Over the base necessarily stack a waterproof finish from two layers of the rolled material pasted on bitumen mastic. For designs of roofs this variant is not absolutely approaches. One of widespread ways of a waterproof finish is processing to isolating materials on the basis of a water glass.

Front systems are universal: for walls and a roof the same set of racks, beam heads and the angle units made of hollow profiles is provided. Steel and aluminum in a profile are of great popularity. The steel section has the highest durability and can bear the greatest area of a glassing. A profile lack is big enough mass of a framing and susceptibility of a steel (even processed by anticorrosive structures) rust. For this reason, steel constructions demand regular protective treatment. Aluminum in the profile provides high durability of a framing at a low mass. It reduces loading on load-carrying structures, increasing reliability of all system as a whole. An aluminum lack is its high heat conductivity that increases a thermal loss through a roof.

It is possible to enter a winter garden in architectonic shape of the building constructed in modern style. To achieve this it is possible to use a special type of a glassing on a roof (or in all design) - so-called structural. Special aluminum profiles and non-standard double pane units (their exterior glass more internal thanks to what the ledge closing a profile of a framing) are formed for this purpose. The usual plain glass for the design of roofs, open sheds or transparent walls impressing in the sizes does not approach – it is too fragile, heavy enough, and at the slightest blow breaks up into sharp-edged pieces (so being under such a roof is extremely unsafe). Besides it spends heat too much (that is in the summer it can be too hot indoors, and in the winter too cold), therefore use double pane units.

Double pane units mount by means of only cold-resistant joint sealant, doing without clamping laths. Result is the smooth glass surface which differs the original exterior and possesses one conclusive advantage: snowflakes and rain drops easily roll down from it. As alight-transmissive fill frames in the walls and roof of the winter garden mainly glazing is used. For walls use two-chamber with wide chambers and power saving up glass, for roofs - only single-chamber with low-emissivity glass (not to increase loading by a framing).

For security glazing for the roof must be made not of ordinary glass, and laminated glass (inner) and tempered (external). Experience shows that the most reliable framework system for conservatories is made of galvanized steel profiles closed section. This is evidenced by cases where the roofs on the adjacent conservatory goes wet spring snow with ice blocks, and these designs provide reliability. Need to focus attention on the triplex.

So, let's talk about the triplex. It does not impact crumbles, only crack: get a stone into it and it will crack, but pieces will not fall out of the glass roof. Secret triplex special gluing layer of polymer is sandwiched between two sheets of glass. Another advantage of triplex - good soundproofing. Lack of material - large and because of the thickness of said multilayer weight. So before using the triplex, it is necessary to strengthen a roof framing fairly. And here the tempered glass fairly approaches for sleeping rooms as it does not injure gallets at infringement of integrity of glass. The tempered glass has practically forced out usual as its application is safer for manufacturing of furniture, tables and cases. Besides advantages such glass has essential lacks. Drilling also it is sharp such material it is almost impossible so to give to glass the necessary form and to drill apertures it is desirable before spending its temper.

An excellent example is built in Singapore (fig. 2.).

Fig. 2. A winter garden in Singapore

Tempered glass use is not desirable at a glassing of roofs. Let it also will not wound, but, it is unpleasant, when on a head pours a glass medley. In addition, a few years later tempered glass with age cracks and crumbles on its own, without any external influence, according to professionals; this is a maximum of ten years.

That's how you build a conservatory its mast [1, 2].

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UDC 624.012.45

STRENGTH OF REINFORCED CONCRETE BEAMS, STRENGTHENED WITH ADDITIONAL PRESTRESSED TRANSVERSE REINFORCEMENT

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In this article the author gives the results of the experimental and theoretical studies of the strength of the reinforced concrete beams, strengthened with additional pre-stressed transverse reinforcement.

For obtaining new experimental data about the behavior of reinforced concrete beams, strengthened in shear zone, under load, experimental studies were conducted. The studies included testing of experimental beams that were strengthened in shear zone with the additional pre-stressed transverse reinforcement. The strengthening was at the initial stress-strain state and under the load action also.

Test Procedure [3]. The experimental studies were conducted on the test beams with the rectangular cross-section (175 mm (*b*) x 400 mm (*h*). The length of the test beams was 3m. As varied factors in the experiment, shear span (ranged from 1,5*d* to 2,5*d*) and the value of load under which strengthening occurred (from the initial load level (the dead weight and the weight of the test equipment) to the load value, corresponding to 71% of failure load).

During the experimental studies, three series of test beams were tested. Each series consisted of three beams. First test beams in each series were tested with different shear spans without strengthening as reference. The second and the third test beams were tested after their strengthening at the initial stress-strain state and under the load action respectively.

Test beams of the I series were tested with the shear span 1,5*d*, II – 2*d*, III – 2,5*d* respectively.

The actual cross-sectional dimensions of the test beams, transverse reinforcement characteristics before and after the strengthening, shear spans, the value of load, acting at the strengthening of the test beams are shown in Table 1.