Unlike the first variant in which having heated up external inflow air it is made at the expense of a thermal overload of system of water heating, in the third variant ventilating supply air overheats to settlement values and moves in a heated premise, compensating it heat loss and maintaining temperature of internal air in normalized limits. At such combined technological scheme of the combined heating and ventilations the scheme of automatic maintenance of the set temperature mode of a building by installation of gages of temperature in control premises and the automatic regulators of the expense established before heaters of air. As a result, installations of heating supply centers are greatly simplified. .It will allow changing almost instantly parameters of air with changing of weather conditions (intensive solar radiation, wind, overcast, etc.) with considerable economy of thermal energy.

Along with economy of thermal energy the simple scheme of regulation will allow to exclude dependence of internal parameters of a microclimate from weather conditions, to create stable conditions of the air environment in ventilated premises and thus it raises the social importance of such technical decision [2, 3].

An extensive introduction in scales of town-planning of technology of ventilation of buildings of inhabited and public appointment under the schemes combined with heating assumes to all national economy of the country considerable economic benefit.

For this purpose it is enough to imagine that in new construction building there will be no necessity to lay a too much of pipes of miscellaneous diameter, expensive multipurpose armatures, numerous heating devices, various on a design. In buildings will not be installed circulation pumps that move huge masses of water heating systems and consume significant energy in the operation of hot-water heating systems of buildings. Reducing costs through the implementation of short-term introduction of new technologies of heating and ventilation in accordance with the proposed scheme, there is undeniable economic benefits and their weights for the country, the national economy. If all these expenses sharply to reduce at the expense of realization of short-term introduction of new technology of heating and ventilation under the offered scheme of the combined operating mode there are indisputable economic gains and their scales for a national economy.

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UDC 624-2/-9

THE ANCHORAGE OF UNTENSIONED REINFORCEMENT

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The article concerns the main factors that influence the anchorage of untensioned reinforcement and it also presents the analysis of the effect of web and confinement reinforcement in welded reinforcements made by resistance spot welding, on the anchorage of longitudinal reinforcement EN 1992-1-1-2009.

Anchorage is the process of fixing reinforcement in concrete, which is achieved by putting the reinforcement behind design section to the length necessary for putting a bar into work (straight embedment of anchorage) or by taking special building measures. The nature of detensioning in reinforced-concrete structures depends on many different parameters. For examples, for the mechanism of straight anchorage they are:

1) the properties of concrete – mix proportions, consistency, shrinkage, a direction of concreting, concrete strength and so on [1, 2];

2) the properties of reinforcement – mechanical characteristics, profile, diameter, depth of concrete cover, arrangement of H-bars and so on [3, 4, 5, 6];

3) stress strain behavior of enveloping concrete. It is known that the increase of concrete compression intensity within 0,1 – 0,4 f_{ck} leads to the gain of adhesional strength during the pulling out. And conversely, the existence of force leading to web reinforcement decreases the effectiveness of anchorage greatly.

Structural anchorage (used to plain reinforcing bars) is done by fixing hooks, offsets, anchoring loops of wire at the ends of bars. When grip anchorage or anchorage with the help of hooks or loops of wire is not enough special anchorage devices are used, such as anchor washers , buttenheads, short bars and bars welded to base tables and so on [7] (Fig. 1).

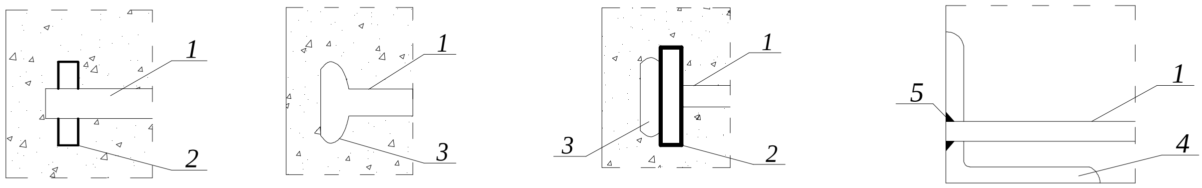
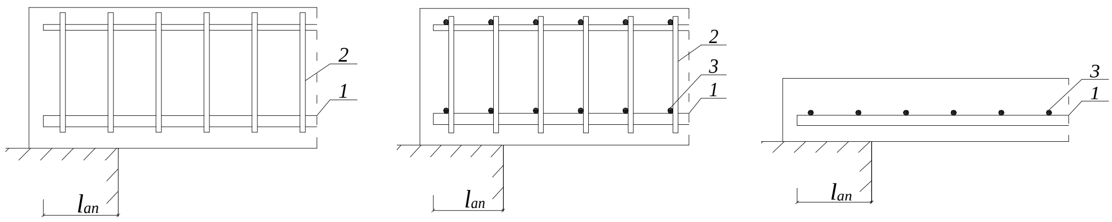


Fig. 1. The examples of the anchorage of a longitudinal bar by the means of special devices:
1 – bar; *2* – anchor washer; *3* – buttenhead; *4* – angle seat; *5* – welding

By using in reinforced-concrete structures welded reinforcement units (welded wire fabric, bar-mat reinforcement, space frame) that are made by the means of resistance spot welding, a bearing rod obtains additional factor that increases the properties of the anchorage of longitudinal reinforcement – welded cross and distribution bars, some of which will be in the transfer zone of prestress (Fig. 2).



a) *b)* *c)*

Fig. 2. The anchorage of welded longitudinal reinforcement bars on free end supports of flexural members:
a) – in beams with welded reinforcement, *b)* – in beams with space welded frame, *c)* – in fabric-reinforced slabs
(*1* – longitudinal reinforcement, *2* – cross reinforcement, *3* – distribution reinforcement)

In such elements one of the main factors that changes the nature of the anchorage of longitudinal reinforcement in a cross joint is the weld shrinkage of bars - quantitative characteristic of bars pressing into in the place heated during resistance welding to the plastic condition (Fig. 3).

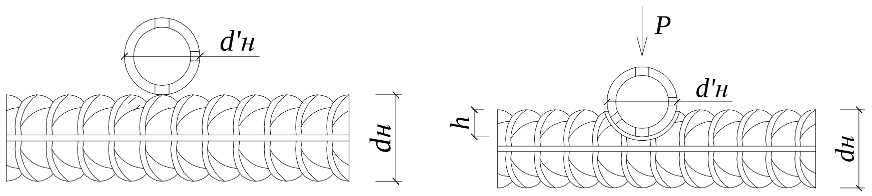


Fig. 3. Weld shrinkage of bars

In technical conditions the minimum quantity of the weld pressing of bars in cross joints with standard and non standard strength is fixed on welded reinforcement units for reinforced-concrete structures (table 1).

Table 1 – Relative value of the weld pressing of bars

Type of welding	Class of reinforcement	$d_н$	Value of $h/d_н'$ for joints with diametre ratio $d_н'/d_н$				Minimum value of $h/d_н'$, providing nonstandard strength
			1	0,5	0,33	0,25	
К1-Кт	S500	4-5,5	0,35-0,5	0,28-0,45	0,24-0,4	0,22-0,35	0,17
	S240	6-40	0,33-0,6	0,28-0,52	0,24-0,46	0,22-0,42	0,17
	S400	6-40	0,4-0,6	0,35-0,7	0,3-0,62	0,28-0,55	0,17
	S500	6-32	0,4-0,6	0,35-0,46	0,3-0,46	0,28-0,42	0,20

But, the calculation procedure in [9] provides for the possibility to increase the load-carrying ability of anchorage by taking into account available welded cross bars, only for reinforcement with similar nominal diameters – only cross bars with $Ø_t \geq 0{,}6Ø$ should be taken into account (Fig. 4). So, in the standard [8] there are formulas for the calculation of anchoring capacity of cross bars with the diameters 14 – 32 mm or ≤12 mm with the bar diameter ≤ 12 mm.

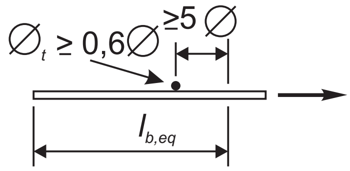


Fig. 4. Equivalent length of anchorage for welded cross bar according to EN 1992-1-1-2009

From practical design experience it is known that in the manufacture of welded reinforcements and welded fabrics (especially in cases when cross reinforcement is placed for reasons of design) the ratio of diameters of welded cross and longitudinal bars is usually ≥ 0,25. So, in the standard the decrease of anchorage effective length for such welded reinforcement units isn't taken into consideration. That's why, it's necessary to find out the generalized coefficient of a welded cross bar influence on the anchorage of a longitudinal bar so that it should include the maximum possible amount of factors: the ratio of reinforcement diameters, shearing strength class, amount of shrinkage, the amount of cross and distribution bars in the zone of anchorage and so on.

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UDC 666.972

STUDY OF THE EFFECT OF PLASTICIZER ON THE PHYSICAL AND MECHANICAL PROPERTIES OF CONCRETE MIXTURE AND CONCRETE IN ACCORDANCE TO THE INTERNATIONAL TEST METHODS

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This article is devoted to the methods in preparation of concrete, corporation between the American and the European methods, climates in the Middle East countries, the effect of weather on the concrete: heat, moisture and curing of concrete,

Concrete is the most widely used construction material through the world and has gained a unique place in the construction industry, it is used more than any other man-made material in the world. As of 2006 around 7.5 cubic kilometers of concrete are made each year, more than one cubic meter for every person on Earth [1].

Concrete is a hardened building material created by combining a chemically inert mineral aggregate (usually sand, gravel, or crushed stone), a binder (natural or synthetic cement), chemical additives, and water.

During hot weather conditions, a number of on-site factors can work against deriving optimal performance from concrete. When combined with low relative humidity and strong winds placing and finishing requires special care. Recently this problem have been more effect on the construction business in the Gulf Arab States such as Qatar and Saudi Arabia according with the hot weather, the water scarcity and the cost of extracting. The coastal cities environment in Saudi Arabia and the Gulf states are classified globally as one of the high-risk on the concrete structures because they contain the highest percentage in the world of ultraviolet and infrared rays