https://doi.org/10.52340/building.2024.01.69.20

ROOFING MOLD

Archil Chikovani, Marina Javakhishvili, Givi Dolidze
Georgian Technical University, M. Kostava St. 77, 0160, Georgia

Abstract. Construction is mainly carried out with reinforced concrete structures. The construction by the mentioned method is carried out in the sequence of the following main processes - arrangement of the formwork, reinforcement works, packing of the concrete mixture in the prepared structure.

The article presents the types of coil roofing molds, modern technological processes of their arrangement. Also, the article discusses the advantages of different types and different leading companies of roofing molds.

Key words. Coil roof; Reinforcement; Roofing Mold; Reinforcement frame; Folding frame; Horizontal clamp; Protective fence stand; Electrical equipment.

Introduction. Mold as a temporary form has been used in construction since ancient times. Steel, aluminum alloys, polypropylene with high-density fillers, plastic, wooden tiles, waterproof plywood, etc. are used as mold materials in construction today. The mold should have high tensile strength and great resistance to deformation. It must meet certain conditions, namely: - the guarantee of the exact dimensions of the construction to be used, the density and hermetic. of the forming shields, the invariance of the shape and size during the period of use. Also, the calculation of the mold elements for strength and deformability is an important condition. Molds for roofs, walls, elevator shafts, foundations, columns and other building structures are distinguished by purpose.

Mane part. The sequence of work for making a formwork for coil roofing is as follows. At first, the framework of the reinforcement of the columns is placed, on it the formwork of the columns reinforced with Iribans at 2...3 levels. Column reinforcement should be 40...50 cm higher than the formwork to match the above structure. Further columns are concreted. After that, the engine of coils or shields is placed near the formwork of the columns, and under it are supporting stands or spatial supports. Spatial rigidity stands stand on tripods. After installing the side shields of the mold, they are joined by horizontal clamps. At the next stage, wooden coils are placed under the roof, which is placed on a stand or on spatial supports, and a platform made of moisture-resistant plywood is placed on it. After stacking the reinforcement frame and grid, concreting is done. It is recommended that the formwork be dismantled when the concrete has obtained its strength and in the reverse order of construction.

Roofing mold "Compact" by "Thiessen" company. It allows us to arrange a roofing mold of any length and thickness. This is achieved by ensuring that all components of the mold are aligned with each other. Mold elements have sufficient strength and durability. In general, the mold consists of the following elements: a compact coil H_2O, which can be used for any overlap, an extendable tripod with a steel stand, a light spreader for forming, and a "swinging" head for placing the pulling coil on it.

The installation of the mold is carried out in the following order. The "falling" head is placed on top of the stand, and the stand is fixed in the design position. With an extendable tripod, it gets the necessary spatial stability. In the head of the stand, the load-bearing longitudinal coils are placed, on which transverse coils are arranged, on which shields or mold sheets are arranged. For molding, the "falling" head descends 6 cm, and with it the entire molding system. The peculiarity of the molding system is that the "swinging" head can accommodate two coils at once, which can be easily moved on this head. Therefore, the construction is useful for all outline forms. The tripods are self-supporting and the longitudinal and transverse coils on them are spaced to withstand the load. At high loads, the distance should be less.

Wood coils are used in this molding system. It is made of high-strength wood, has an ortes cut with a fairly wide and durable belt. Such a compact shape makes the coil strong and durable, and the five-layer adhesive increases the overall strength. Anvil does not break from nails. If necessary, it can be fixed anywhere, even obliquely, which does not reduce its strength. When falling, the anvil does not deform, it wears less, and the coating protects it from rotting. Wood flooring is relatively light and can be installed manually by two people. The cross-section of the coil allows us to easily move it and place it in the required place.

Forming system "Mevadeka". Its purpose is horizontal constructions and roofing. The main advantage of this system is that it uses all known horizontal molding systems, which allows us to create four different mold systems.

The combination of this system allows us to

minimize the surface in each specific case, and the falling heads of the stands allow us to leave only single intermediate stands during the accelerated formation option.

A wood glued H_2O coil is used in the mold, the purpose of which is to assemble coils with metal drop heads. Standard coil sizes (at 20 cm height) are 25, 33, 39 and 40 cm. "PASCHAL DEK" roof formwork systems (Fig. 1).

The mold consists of three main components: mold lining; coils H_2O and structural supports. The adaptability of the mold to different spatial dimensions is ensured by the face-to-face connection of the H_2O coils

Fig. 1. „PASCHAL DEK" roof formwork systems

The system consists of two-cap head cambers that prevent the H_2O coils from tipping over. The intermediate support is attached to the H_2O support head of the support spool. Mold removal is accomplished by lowering the structural supports, tilting them, and pulling out the H_2O coils. The technological sequence of roofing mold installation is presented in Figure 2.

"PASCHAL" heating mold with folding "stellMAX" frame (Fig. 3, 4). The mold consists of a folding frame with built-in legs. Two frames are united by a single hanging device, forming a square or triangle. Frame supports are placed in the corners.

The table stand slab consists of H_2O coils holding the mold seam. The stand and the rollers of the hinged support are connected by clamping details, as a result of which the table can be moved as a whole (Fig. 4, a).

The construction of the mold allows us to extend the platform, which reduces the work

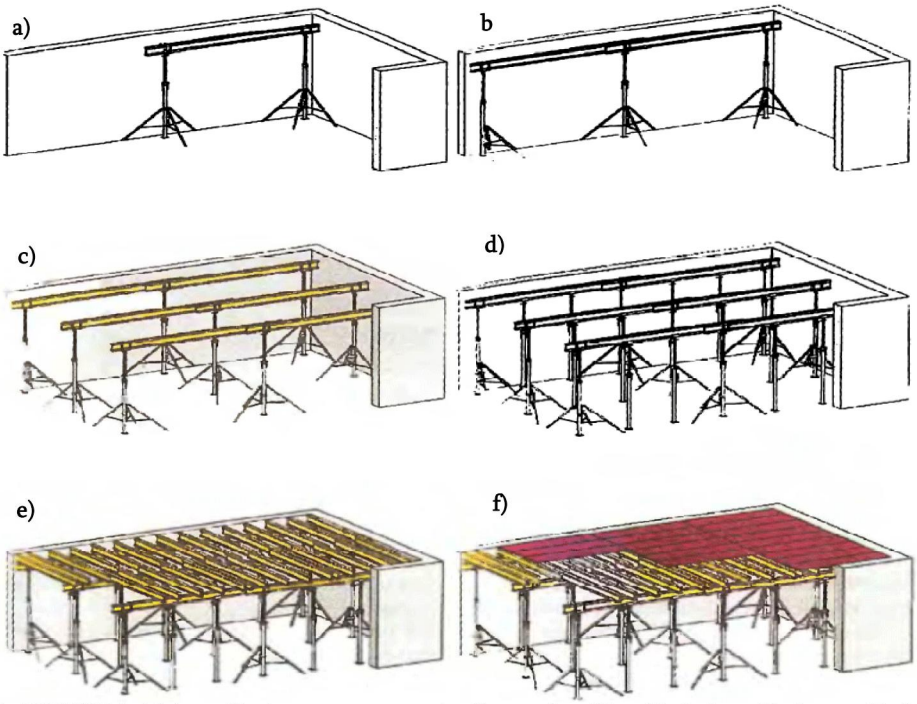

Fig. 2. „PASCHAL DEK" Mold installation sequence: A Operation No. № 1; b – № 2; c – № 3; d – № 4; e – № 5; f – № 6

Fig 3. „RASCHAL" A view of the folding frame mold

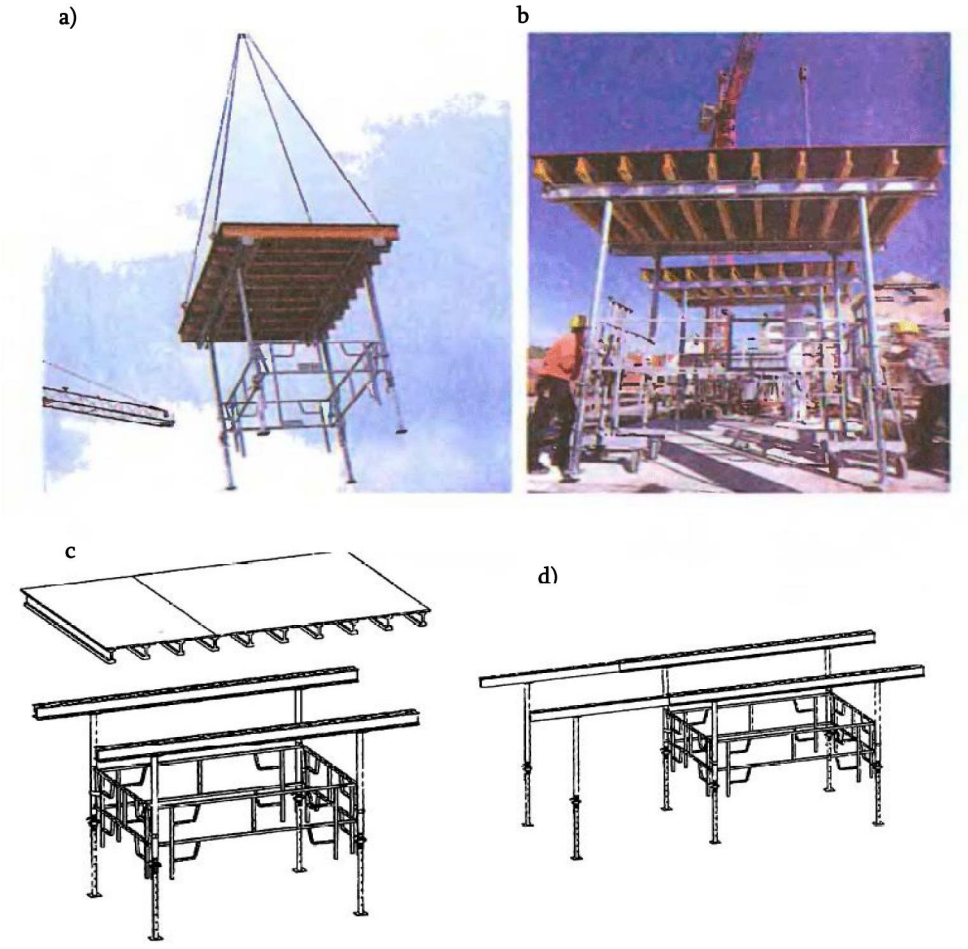

Fig. 4. „RASCHAL" "stellMAX" mold with folding frame:A - mold transportation by crane; b - moving the mold with a cart c - installation and dismantling of the platform; d – mold Extension of the table

The extension of the roofing table is done by means of an insertable miniMAX coil, which is a hinged support coil (Fig. 4, f). As a result, the table becomes telescopic and adapted to existing dimensions.

Roofing mold of "Noah" system. It consists of main coils and mold shields

. The system is assembled from drop-head stands, ceiling coils, and formwork shields (Fig. 5).

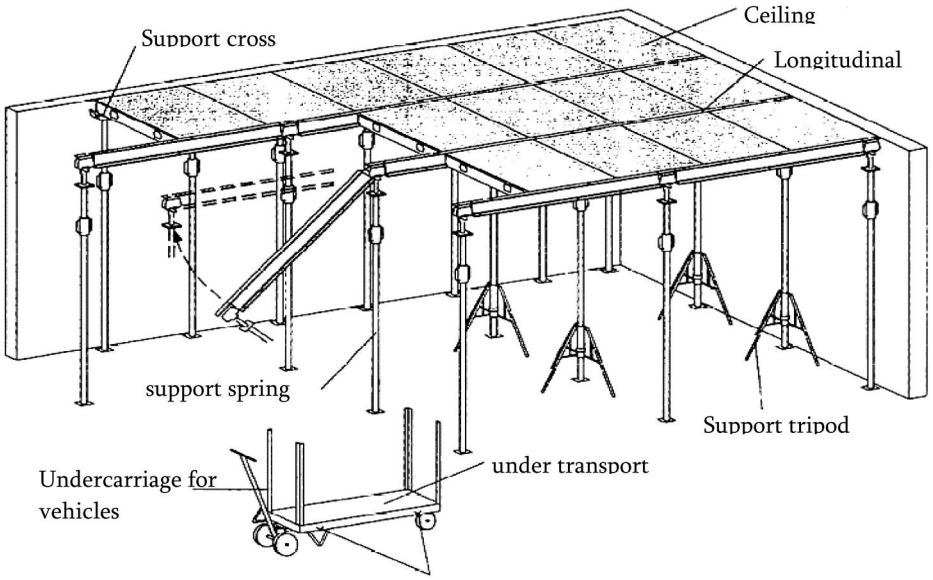

fig. 5. Firm "Noes" with roof pulling elements

Aluminum alloy mold

The length of the shields of the mold is 1.50 and 1.2, width - from 0.90 to 0.30 m, with a diameter of 15 cm. Longitudinal coils of the ceiling on the axis of the support can have dimensions: 3.00; 2.10; 1.80; 1.50 and 1.20 m. The falling head is galvanized at a height of 36 cm, the falling heads are at 17 cm.

Installation of the mold can be done manually, including indoors.

Longitudinal coils are arranged on standard stands or rotating heads near the rolling head, and transverse rails are arranged on the lower plane.

Depending on how the transverse coils are installed, the formwork (form sheets or shields) can be placed both on the transverse coils and above them.

Formwork with expandable secondary coils, the Noe ceiling molding system (Fig. 6), compatible with aluminum formwork, represents its further development and perfection. The support receives the load from the roof shield only centrally, without the bending moment of the support. Secondary expansion coils are 1.0 to 1.5 in length, telescopic type. As an option, a large-sized fairing system is adopted, which rests directly on the main coil rack, which allows us to carry out an easy installation of the fairings.

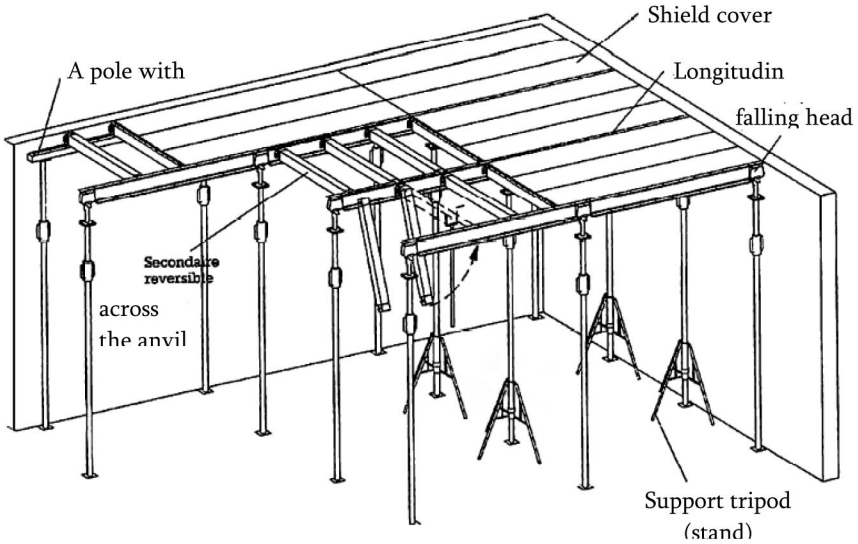

fig. 6. "Noes" roofing mold, expandable With telescopic spools and "swivel heads"

The range of shields has 15 and 30 cm diameter, which allows to arrange the mold over the entire area of the building. The constructive solution allows us to have a tight attachment to the walls and a reliable attachment to it. If necessary, it is permissible to use a 3 m long longitudinal coil, which significantly reduces the number of supports and simplifies its installation at the bottom of the formwork.

Ceiling molding with drop heads. This solution is universal, it includes a ceiling mold with drop heads and a supporting system of longitudinal coils and ceiling panels (Fig. 7).

The spools are hung on drop heads, which are pre-attached to the heads of the support stands.

Formwork panels are arranged in the assembled supporting structure. The advantage of this solution is the possibility of early formation. At the same time, the stands with their falling heads are constantly holding the formed ceiling. The removed ceiling mold can be installed in the adjacent area at this time.

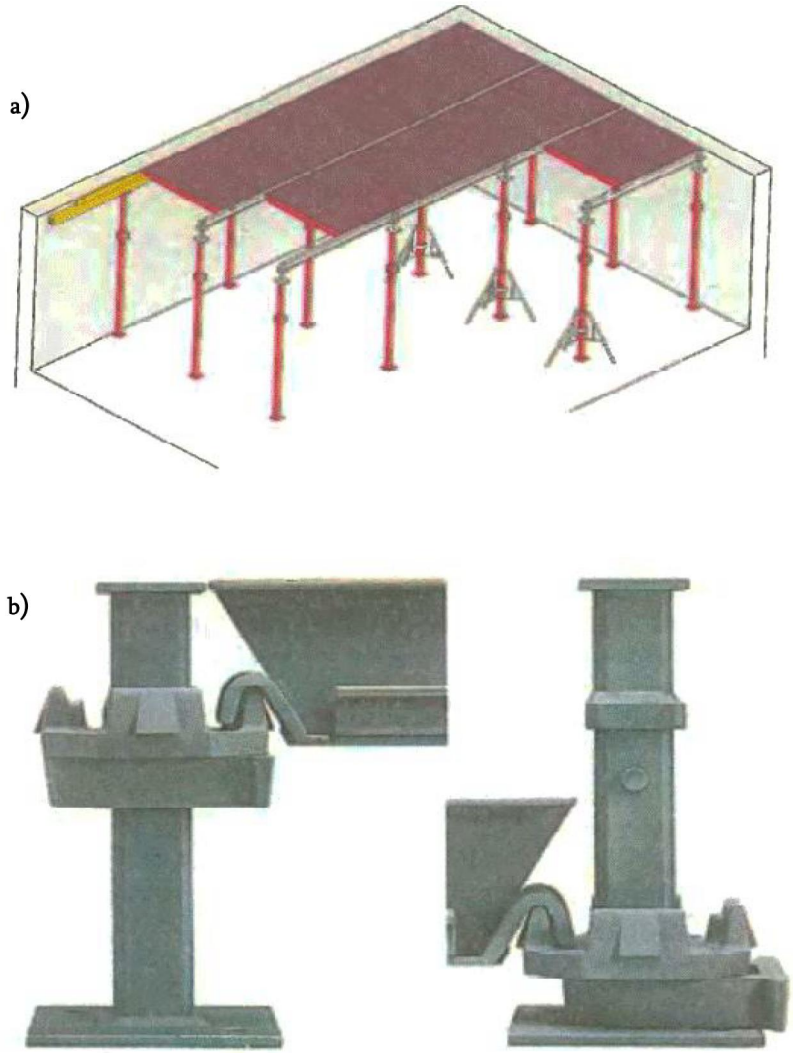

fig. 7. "Noes" roofing mold with falling heads: A - ceiling mold with falling heads; b - longitudinal Anvil with a falling head

Mold with H20 coils. Wood H20 coils have found wide use in Noah's mold systems. The whole system consists of wooden coils, two-cap head, standard supports, a tripod and a shield or multi-layer plywood cover (Fig. 8). The mold is made by hand. It is especially useful for closed buildings.

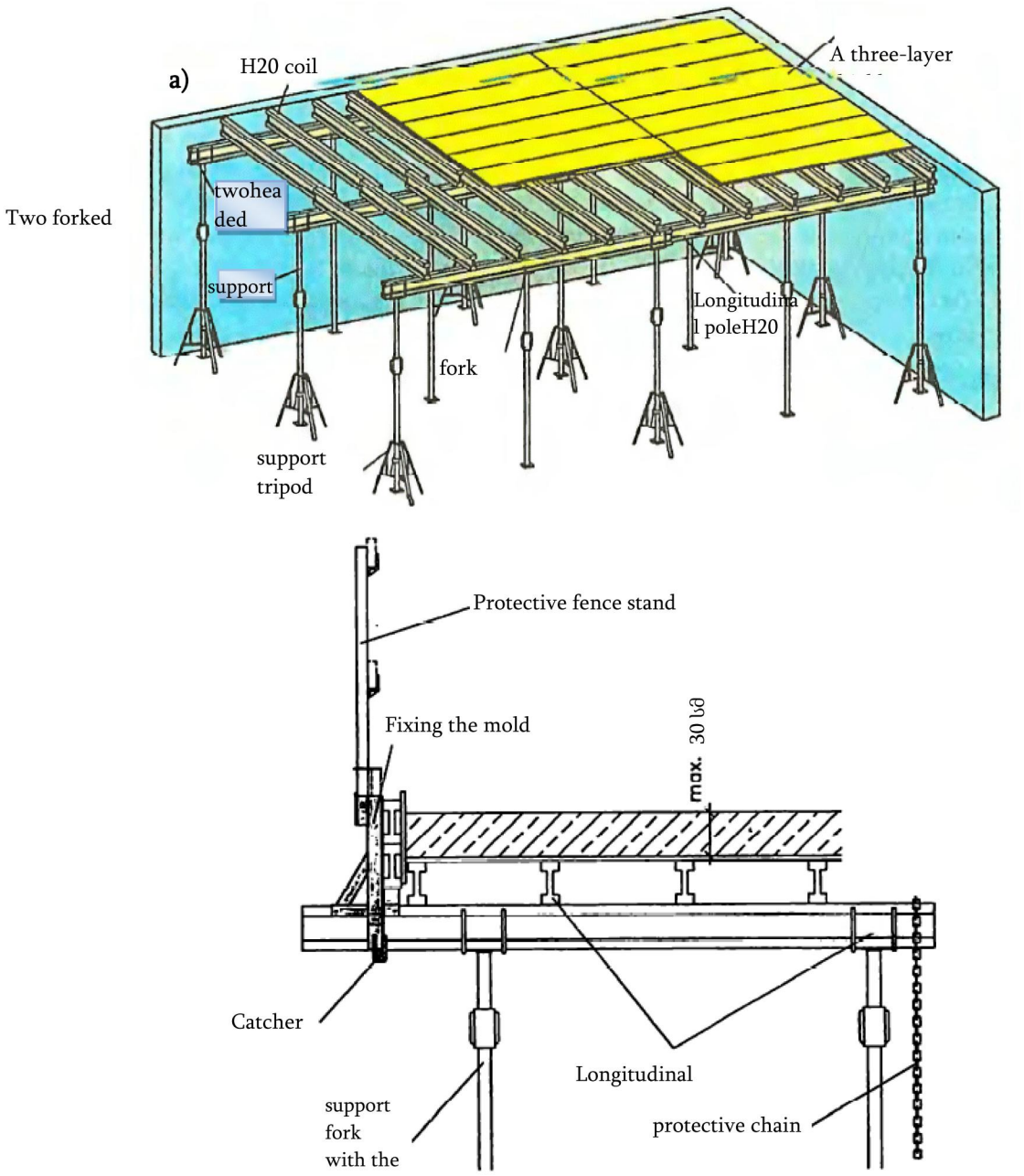

fig. 8. "Noes" roofing mold with H20 coils:
A - general view; b - corner node of the mold

The disadvantage of this system is less rotation of coils (up to 50) and shields (up to 20).

"Dali" roofing mold. The constructive solution of the formwork is traditional - extendable supports, H20 coils glued to wood, on the upper shelf of which form shields for the wall are arranged, as well as special shields of analog size (only 1.31 and 0.81 m in length).

There are three types of stands, 1.15...3.0 m, 2.0...3.5 m and 2.3...4.1 m long, with H20 standard spools, and for forming, a U-shaped spool holder with a drop head is placed on the movable stands. .

"Utinor" roofing mold. "Utinor" company offers three independent form options for concreting: a non-removable form made of self-supporting elements, which can hold not only its own mass, but also the mass of the placed concrete mixture; Thin-walled mold for manual setting and mold tables.

The slimline mold consists of three main

elements: a standard stand with a top-mounted big head, a profiled metal coil, and shields consisting of a frame and laminated plywood. Retractable shields allow us to use the formwork for a building with a height of 2 to 5.2 m, and 1.0 and 1.6 m long lifting coils allow us to increase it within 0.6...0.9 m if necessary. Shields are 0.3 and 0.6 m wide and 0.9 to 1.5 m long. After dismantling the shields and coils of the concrete slab, they are held by standard standsStandard molding table of "Utinor" company. The constructive solution of the table allows us to use it in a building with a height of 2.0 to 2.5 m, with a height of 1.9 to 6.0 m. The working surface is made of 3 mm thick metal sheet or 18...20 mm thick plywood. The table consists of extendable transverse coils mounted on the longitudinal coils of the frame. The metal cover is attached to the rolling coils by welding, plywood forks and bolts.

U-shaped lattice longitudinal and transverse coils have a length of 1.2 to 5.4 m, with a diameter of 60 cm, which allows us to get a platform up to 6 m long. The V-shaped support legs are bolted to the bottom shelf of the longitudinal coils, and through Iriban □ to the transverse coils, each support leg is equipped with a screw-lever jack, 69 cm stroke and a 20 cm diameter wheel, to move the mold lengthwise.

First, a table is placed on the support legs and rapier markings in the upper part of the wall with the help of screw jacks, next to the pillars of the side section, then the vacuum generators and electrical equipment are installed, the necessary communications are divided and the reinforcement grids are assembled. The tables are equipped with forming posts located on all sides of the table. They allow us to select the gap that is created between the table and the surrounding walls and easily allow the forming table after the concrete is set. The table is formed by the action of gravity and only by means of its supporting legs and a jack. After the jack is lowered, the table rests on rings or wooden supports and can be easily rolled to the edge of the slab for further movement. At the same time, temporary supports are placed in the vacated warehouse to support the still unhardened concrete slab.

During the concreting of the second floor roof, we must use a platform or a cantilever scaffold to remove the tables, from which the load is transferred to the concrete roof slab of the first floor with sufficient strength. There are several options for lifting tables. The table can be rolled onto the scaffolding and lifted from there with a crane. The table can also be lifted by crane without scaffolding, with a special traverse or distribution device.

Conclusion. Incorrect arrangement of the roofing mold leads to undesirable results. It is important to choose the formwork material accurately and correctly, taking into account the advantages of materials produced by different companies. The arrangement of the roofing mold in the correct technological sequence is the basis for obtaining a high-strength construction defined by the project.

Reference

1. A. Chikovani. Concrete technology. Stu. 2015.
2. L. Klimiashvili, D. Gurgenidze, A. Chikovani. concrete science. Stu, 2021.
3. Z. Ezugbaya, sh. Bakanidze, I. Kviraia, I. Iremashvili. Technology of construction processes. Stu, 2016.
4. Anpilov S.M. Technology of construction of buildings made of monolithic reinforced concrete. M. DIA, 2014. (Russia)
5. Bazhenov Yu.M., Saidumov S.M., Murtazaev S.Yu. Technology of concrete, building products and structures. M. Infra-engineering, 2022. (Russia)