Method of manufacturing reinforced concrete floor slabs using non-removable void formers

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The subject of the research

is a method of continuous production of reinforced concrete floor slabs with round voids based on the contour using non-removable void formers, their technical and economic efficiency of solutions to reduce the weight of monolithic floor slabs by reducing the resources for their production.

**Purpose and statement of the research problem**

The aim of the study is to select the most technically, economically and ecologically effective method of manufacturing reinforced concrete floor slabs based on the contour.

The objectives of the research are to reduce the weight and cost of floor slabs by choosing an inexpensive non-removable void former of the optimal shape, which provides maximum concrete replacement with voids, continuous concreting of the entire slab, in addition, the void former must have the necessary rigidity during concreting of floor slabs, be moisture resistant, be the least laborious, cost effective in manufacture and installation.
Figure 1. The plan of the slab fragment with the location of the non-removable void former.
1 - non-removable cardboard-polyethylene void former, 2 - cross reinforced concrete slab beams, \( L_1 \) and \( L_2 \) - outer dimensions of the void former, \( \delta \) - beam width (distance between void former).

Figure 2. Void former plan. \( L_1, L_2 \) – external dimensions of the void former; 4 – holes in the void former for placing concrete; 5 – round pipes (details) of the void former; 6 – caps in cut corners.
Figure 3. Section of a fragment of a slab A–A.
$L_1$ is the outer size of the void former; $\delta$ - beam width (distance between the pipes of the void former); $h$ is the thickness of the slab; 3 - concrete; 4 - holes in the void former for placing concrete, 5 - cardboard-polyethylene pipe of the void former.

Figure 4. Section F–F.
$L_1$ – outer size of the void former; $\phi$ - outer diameter of the void former pipe; 4 - holes between the pipes of the void former for placing concrete; 6 - covers at the cut corners of the void former.
CONCLUSIONS

Based on a comparison of various methods for the manufacture of monolithic reinforced concrete hollow-core floor slabs, it was revealed that a tubular circular cross-section, square or rectangular in plan (depending on the dimensions of the sides of the floor slab), a cardboard-polyethylene void former with a thickness of 0.045 mm. provides the greatest concrete substitution and a decrease in the consumption of reinforcement, which leads to a maximum reduction in the weight of floor slabs - 41.9% (for an estimated slab spans of 6 m), accordingly, it allows to reduce logistics, lifting and other costs, and also ensures continuous concreting.