IMPROVEMENT OF THE TECHNOLOGY OF BODY PREPARATION FOR
FLOOR TILE PRODUCTION

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The substantial growth of floor tile production stipulated in the Sixth Five-Year Plan requires a considerable increase in the amount of body from which they are produced. It is therefore necessary to re-examine the technology of floor tile body production, as the properties of the body primarily determine the quality of the finished tiles.

Floor tiles are not only a structural but also a decorative material. The tile surface should be red or of some other color, very smooth, uniformly colored. It is sufficient, however, for only the face of the tile to have decorative properties.

The clays used for the production of tile body are far from having the exceptional homogeneity, constant composition, and lack of contamination which would ensure the required properties of the tile face. Even Nikolaev and Nildforova clays, which are considered to be the most homogeneous, differ greatly in different strata.

The very simple scheme for the preparation of a coarse ceramic body for tiles, which consists of grinding of the clay, drying to 7-9% moisture, fine roll grinding, and sifting through a sieve with 100 holes/cm², not only cannot guarantee the production of a high quality tile face with a fine ceramic structure without spots, faults, or blisters, but cannot result in the necessary qualities of the tile body itself—definite water absorption, mechanical strength, abradability, etc.

The paper by L. Ya. Mishulovich "An Improved Scheme for Body Preparation in Floor Tile Production"[1] notes correctly that the inclusion in the above technological scheme of an additional operation before drying — pug milling of the clay in a brick-making unit — considerably improves the quality of the body. The mechanical strength of products fired at the same temperature, 1180°, from a body made by the dry process followed by pug milling of the clay was twice as high, and water absorption twice as low, as those of materials made by the same scheme but without the additional pug milling.

A brick-making machine or merely a pug mill is a fairly simple, inexpensive and well-tried piece of equipment. There is not the slightest doubt that their introduction into the scheme for tile body preparation would be beneficial and would not disturb the continuity of the body preparation process. We must agree with Mishulovich that, for an improvement of the decorative qualities and mechanical strength of ceramic floor tiles, the inclusion of pug milling of clay in a brick-making unit in the technological scheme must be strongly recommended.

However, while the brick-making unit produces a maximum effect in improving the mechanical strength and lowering the water absorption of tiles, it cannot produce a similar improvement in the decorative qualities of the tile face.

Units are in existence which homogenize and mix the body incomparably better than the brick-making machine or the pug mill. These are Lancaster mixers, long used in the glass industry for mixing glass batch and later adapted for mixing and homogenization of ceramic bodies. It is reported in the literature that such a mixer, 0.25 m³ in capacity and with an output of 2 tons per hour, was used to produce in two minutes two pigmented cobalt-containing mixtures by the dry mix method. Water was added to these mixtures and
they were mixed again for 3 minutes. One of the resultant bodies contained 0.25%, and the other 0.50% cobalt pigment. In both cases the pigment was distributed quite evenly in the mass after firing.

It must be stressed that Lancaster mixers will have to be used for treatment not of the whole body, but only 10-15%, the quantity needed for the formation of the tile face. This part of the body can be colored as required. It is obviously unnecessary to color the whole body for the tiles. A fine ceramic structure of the whole tile is also unnecessary.

The crank presses presently available do not allow two-layer charging of the body, but this should not prevent the selection of a rational technological scheme of body preparation.

The addition of the facing body on top of the base has been practiced on hydraulic presses for decades. Undoubtedly it is possible to solve the problem of two-layer addition in a crank press also.

Thus the most rational scheme for the preparation of floor tile body is the one proposed by L. Ya. Mushulovich: coarse grinding, working in a brick-making machine, drying of the wads, fine grinding, and sifting, with the addition of mixing (in a Lancaster mixer) of 10-15% of the body, to be applied to the face of the tile. Until the feed of the existing crank presses is modified or a new press design introduced, the whole body will temporarily have to be passed through the mixer.

LITERATURE CITED