

TEST RESULTS OF SAMPLES MADE BY THE INSTALLATION FOR THE PREPARATION OF AERATED CONCRETE

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Increasing the efficiency of manufacturing building materials in modern conditions should be ensured mainly by increasing labor productivity, reducing construction times, reducing the volume and cost of manual work, and improving the quality of construction.

The solution of these problems can be significantly facilitated by increasing productivity in construction. Despite the fact that in recent years a large number of new building materials have appeared, various brands of aerated concrete are widely used in the construction of new buildings and structures.

Aerated concrete is produced by mixing prepared sand, cement, powder and other additives in a certain proportion in compliance with the established technology. These technological operations are provided by mixing devices.

Analysis of the design features of mixing devices [1] shows that the mechanics of mixing processes are determined, on the one hand, by the arrangement of working elements in space and their geometric parameters, and on the other hand, by the relative motion of mortar particles, which is provided by the kinematics of the mixing process.

The mechanics of mixing processes [2] are mainly influenced by kinematic factors that determine the nature of the relative motion of particles of the moving solution mixture. Analysis of the kinematics of mixing processes during the design of mixing devices allows you to choose the optimal layout of the working elements in space, which, to the greatest extent, will meet the basic requirements for this equipment. Namely: creating complex intensive movements of solution particles during the mixing process; ensuring maximum homogeneity of the solution mixture by evenly distributing the starting materials among themselves; preventing the formation of individual, insufficiently mixed, inclusions in the form of lumps and voids in order to maintain the constancy of the granulometric composition.

Using a concrete mixer (Fig. 1), we poured the forms for aerated concrete. To check the quality of the obtained aerated concrete, cube specimens measuring 100×100×100 mm were tested. According to this recipe: water at a temperature of 70 °C - 27.3%, cement - 36.05%, sand - 36.05, caustic soda - 0.11%, aluminum powder PAP-2 - 0.06%. An important factor in the experiment is also that the surface of the cube sample was flat, which was achieved using a building level and a grinding machine.



Fig. 1 - Mixer for preparing aerated concrete

During the compressive strength test, aerated concrete samples are compressed until they fail [3]. The maximum load before the sample fails is recorded. The result of the failure is shown in fig. 2.



Fig. 2 - Destruction of aerated concrete sample

We also determined the weight of each cube individually to find their density and compared them with the tabulated values [4]. Based on the tabulated values, all samples correspond to the average density grade D-700, and these strength test data are shown in fig. 3.

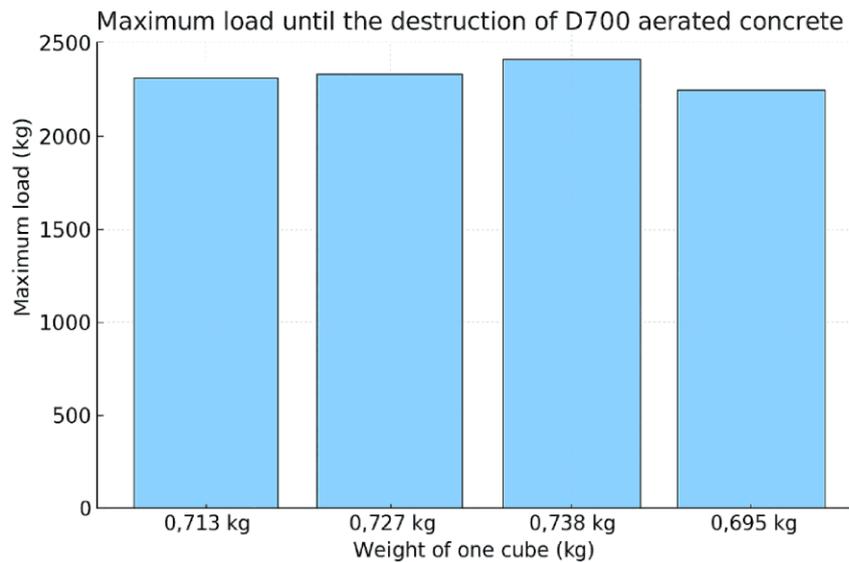


Fig. 3 - Histogram of maximum load before failure of aerated concrete product

Conclusions

According to the results of the experiments, all manufactured samples of aerated concrete meet the requirements of DSTU B V.2.7-45:2010 for concrete of grade D 700 and strength class B 1.5, which is confirmed by the obtained tabular values. It was also found that the sample, which is the lightest, has a tensile strength of 2.17 MPa, which is the minimum requirement for strength class B 1.5 according to DSTU. In view of the above, it can be stated that with a lower density of aerated concrete, the sample will be destroyed under a higher load.

References

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