A.D. Zhukov, A.V. Chugunkov, A.O. Khimich, A.O. Eremenko, N.A. Kopylov

COMPREHENSIVE ANALYSIS OF THE AERATED CONCRETE TECHNOLOGY

The software package developed by Department of Technology of Finishing and Insulation Materials of Moscow State University of Civil Engineering is designated to improve the performance efficiency of experiments that consist in planning, implementation, and processing of findings of research projects, including solutions for their optimization. The software package assists researchers in planning and analyzing experimental findings that are influenced by versatile factors, especially if their number is different. The number of factors of impact may be set at 15, 30, 45, and 60. This software was tested in the context of the aerated concrete technology.

The first stage of the research consists in the preparation for an experiment with account for all factors characterizing the manufacturing process. The software assesses the relevance of the above factors and ranks them on the basis of their significance. As a result, three groups of factors are identified: factors of major significance (Group A), factors of secondary significance (Group B) and other factors.

The software package was applied in the context of the aerated concrete technology to determine the most important parameters of its production. As a result of the experiment, the group of most significant factors (group A) included foaming agent efficiency, foaming agent consumption rate, and mould filling degree, while less important factors (Group B) included modifier consumption rate, mixture temperature, exposure time and water consumption rate.

Key words: statistical model, comprehensive method, aerated concrete technology, software package, facade system.

References

1. Dolotova R.G., Vereshchagin V.I., Smirenska V.N. Opredelenie sostavov yacheistykh betonov razlichnoy plotnosti pri ispol'zovanii polevoshpatovo-kvartsevykh peskov metodom matematicheskogo planirovaniya [Using Method of Mathematical Planning to Identify Compositions of Cellular Concretes Having Different Density Values and Containing Feldspar Sands]. *Stroitel'nye materialy* [Construction Materials]. 2012, no. 12, pp. 16—19.

2. Zhukov A.D., Chugunkov A.V. Lokal'naya analiticheskaya optimizatsiya tekhnologicheskikh protsessov [Local Analytical Optimization of Manufacturing Processes]. *Vestnik MGSU* [Proceedings of Moscow State University of Civil Engineering]. 2011, no. 1, pp. 273—279.

3. Zhukov A.D., Chugunkov A.V., Gudkov P.K. *Sistema fasadnoy izolyatsii na osnove betonov yacheistoy struktury* [Façade Insulation System Based on Cellular Structure Concretes]. Utility Model Patent no. 121834 of 06.07.2012, 6 p.

4. Zhukov A.D., Chugunkov A.V., Rudnitskaya V.A. Zakonomernosti formirovaniya struktury materiala v usloviyakh variotropii davleniy [Regularities of Material Structure Formation under Variotropic Pressure Conditions]. Internet-Vestnik VolgGASU. 2012, no. 3. Available at: http://vestnik.vgasu.ru. Date of access: 05.02.2013.

5. Loskutov A.B., Gossen Ya.Ya., Gorbacheva O.Yu. Sovershenstvovanie tekhnologii proizvodstva silikatnykh blokov na ZAO «Kombinat stroitel'nykh materialov» [Improvement of Production Technology of Silicate Blocks by "Kombinat stroitel›nykh materialov" closed Joint Stock Company]. *Stroitel'nye materialy* [Construction Materials]. 2013, no. 5, pp. 52—54.

6. Sakharov G.P., Strebitskiy V.P., Voronin V.A. Novaya effektivnaya tekhnologiya neavtoklavnogo porobetona [New Effective Technology for Non-autoclaved Cellular Concrete]. *Stroitel'nye materialy, obrudovanie i tekhnologii XXI veka* [Construction Materials, Equipment and Technologies of the 21st Century]. 2002, no. 6, pp. 28—29.

7. Perekhozhentsev A.G. Modelirovanie temperaturno-vlazhnostnykh protsessov v poristykh stroitel'nykh materialakh [Modeling of Temperature and Moisture Processes in Porous Construction Materials]. Part 6. Energeticheskiy potentsial vlazhnosti kapillyarno-poristykh materialov [Energy Potential of the Moisture Content of Capillary-porous Materials]. *Stroitel'nye materialy* [Construction Materials]. 2013, no. 5, pp. 90—91.

8. Shmelev S.E. Puti vybora optimal'nogo nabora energosberegayushchikh meropriyatiy [Choice of the Optimal Set of Power-saving Actions]. *Stroitel'nye materialy* [Construction Materials]. 2013, no. 3, pp. 7—9.

9. Verarbeitungsanleitung. Xella-Daemmsysteme GmbH, 2007, 47 p.

10. Ytong Multipor Mineraldaemmplatte. Xella-Daemmsysteme GmbH, 2012, 24 p.

11. Waermedamm-Verbundsystem. Xella GmbH, 2009, 53 p.

About the authors: **Zhukov Aleksey Dmitrievich** — Candidate of Technical Sciences, Professor, Department of Technology of Finishing and Insulation Materials, **Moscow State University of Civil Engineering (MGSU)**, 26 Yaroslavskoe shosse, Moscow, 129337, Russian Federation; lj211@yandex.ru;

Chugunkov Aleksandr Viktorovich — Director, Department of Examination of Buildings, postgraduate student, Department of Technology of Finishing and Insulation Materials, **Moscow State University of Civil Engineering (MGSU)**, 26 Yaroslavskoe shosse, Moscow, 129337, Russian Federation; chugunkov@mail.ru;

Khimich Anastasiya Olegovna — student, Institute of Construction and Architecture, **Moscow State University of Civil Engineering (MGSU)**, 26 Yaroslavskoe shosse, Moscow, 129337, Russian Federation; Khimichanastasia@gmail.com;

Eremenko Aleksandr Andreevich — student, Institute of Economics, Management and Information Systems in Construction and Real Estate, **Moscow State University of Civil Engineering (MGSU)**, 26 Yaroslavskoe shosse, Moscow, 129337, Russian Federation; erema1661@yandex.ru;

Kopylov Nikita Andreevich — student, Institute of Economics, Management and Information Systems in Construction and Real Estate, **Moscow State University of Civil Engineering (MGSU)**, 26 Yaroslavskoe shosse, Moscow, 129337, Russian Federation; nik.kopiloff@yandex.ru.

For citation: Zhukov A.D., Chugunkov A.V., Khimich A.O., Eremenko A.O., Kopylov N.A. Kompleksnyy analiz v tekhnologii gazobetona [Comprehensive Analysis of the Aerated Concrete Technology]. *Vestnik MGSU* [Proceedings of Moscow State University of Civil Engineering]. 2012, no. 7, pp. 167—175.