nykh elementiv (MSE) dlya modelyuvannya roboty systemy «osnova-inzhenerna sporuda» [Application programs based on the finite element method (FEM) for the simulation of the system "foundation - engineering construction"] / R.O. Timchenko, D.A. Krishko, V.O. Savenko // Stroytel'stvo, materyalovedenye, mashynostroenye. – Dnipropetrovsk, HVUZ PHASA, 2016. – pp. 143-148.

Volodymyr Savenko
***R.O. Timchenko**, PhD, prof., research supervisor*
***S.A. Popov**, PhD, prof., research supervisor*
***D.A. Krishko**, PhD, senior teacher, research supervisor*
***N.O. Holiver**, PhD, assoc. prof., language adviser*
SIHE "Kryvyi Rih National University"

USING A LINEAR REGRESSION MODEL FOR OPTIMIZATION OF CONSTRUCTIVE SOLUTIONS OF THE RETAINING WALL OF A SPECIAL TYPE

Designing the best constructive solutions of engineering structures under the specific operating conditions is one of the main engineering challenges. As for the retaining walls of a special type (RWST), applied on undermined territories with horizontal and vertical movements of the ground, this problem is particularly important. The experimental results showed that the stress-strain state of the base is largely determined by the characteristics of the structure. In this case there is a need to develop methodology for assessing the effect of these characteristics depending on the ground conditions and design parameters. Methods of experimental design were used for the implementation of this task.

Experimental Design is the precise organization of a pilot research that allows to collect the necessary data to apply for their analysis and statistical techniques to make accurate and objective conclusions. Optimizing is carried out using a mathematical model, represents a response function (maximum load on the ground, held RWST).

The subject of this study is RWST, namely monolithic angular type retaining wall which has vertical and horizontal elements on the surface, the contact side bearings has voids in the form of truncated pyramids of the same size and the smaller base directed vertical and

in depth of the foundation elements.

To select the optimal design solution of the retaining wall of a special type several factors are taken into account that have a significant impact on the stress-strain state of the structure and foundation.

Considered factors are divided into two groups: static associated with the geometric parameters of RWST and geological, that are appropriate to the soil conditions at the construction of the frame: the contact area of the supporting prismatic sections (S), m^2; cavity volume (V), m^3; cutting angle (α), degree; type of soil (in a specific adhesion kPa); base bearing capacity (R), MPa.

Regression model was obtained after the processing of the experimental results. The resulting linear regression model solves the problem, which will reduce the number of experiments and to determine the maximum load on the ground retaining structures (response function), considering the optimal combination of significant factors.

References

1. Timchenko R.A. Rabota plitnyh fundamentov-samoreguljatorov (PFS) na neravnomerno-deformiruemom osnovanii [Work of slab foundation itself regulators on uneven deformable foundation] / R.A. Timchenko, D.A. Krishko // Sovremennye problemy stroitel'stva [Current problems in construction]. – Donetsk, 2010. – № 8 – pp. 34-38.

2. Ershova N.M. Obrabotka dannyh sredstvami Exel pri planirovanii jeksperimenta [Data processing by means of Excel when planning the experiment] / N.M. Ershova, V.N. Derevyanko, R.A.Timchenko, O.V. Shapovalova. – Dnepropetrovsk: PGASA, 2012. – 351 p.

3. Timchenko R.A. Obg'runtuvannja vyboru linijnoi' modeli regresii' u planuvanni eksperymentu dlja vyrishennja postavlenogo eksperymental'nogo zavdannja [Justification of the choice of the linear regression model in planning experiments to solve the experimental task] / R.O. Timchenko, D.A. Krishko, L.V. Kadol, V.O. Savenko // Urban and territorial planning – Kyiv: KNUBA, 2016. – V. 59 – pp. 425-431.