Summary

The paper presents the results of tests on the wear of materials made with various technologies in the soil abrasive mass.

As part of the work, the current state of the issue of material consumption, methods of wear assessment and wear forecasting models were reviewed in the soil abrasive mass.

The aim of the work was to develop a method for predicting the wear of working elements in the soil abrasive mass using the actual friction surface. In order to achieve the assumed goal, it was necessary to determine the physico–chemical properties of the test objects. Then, two tribological experiments were carried out: the first in laboratory conditions, the second in natural conditions. The work uses the 3D scanning technique to determine the actual friction surface. By means of discretization, decomposition and determination of wear zones, new characteristics of volumetric wear were developed to enable determination of local wear on the surface of the working element. The scanned real friction surfaces were divided into zones in order to distinguish zones of intensive wear. Locating the zones of intensive wear will make it possible to apply local reinforcement in the place most exposed to wear.

Based on the obtained data from the experiment in natural conditions, discrete element method (DEM) of the interaction of the working element with the soil was carried out. The modelling results using the real friction surface showed a high correlation with the results obtained from the experiment in natural conditions.

Keywords: friction surface, soil abrasive mass, 3D scanning, volume wear, discrete element method