Packed beds consisting of various types of filler particles (see Fig. 1) are of great importance both in the medical industry and in the broadly understood engineering industry. Their widespread use includes participation in heat exchange processes, mixing, drying and powder segregation, adsorption and absorption, filtration, gasification, providing adequate drainage and many other important practical applications. For this reason, it is necessary to thoroughly understand the properties of these deposits, mechanisms and parameters that may affect these properties. It should be remembered that although the arrangement of individual elements of the deposit is seemingly random, the individual character of this arrangement translates into statistical (global) parameters and properties of the packed bed. The aim of this project is to find correlations between the parameters of single filler particles (such as shape or size) on their global and local arrangement in the deposit, and ultimately on the properties of packed bed. To realize the project, it is planned to carry out a series of experiments that will include the use of filling elements of various shapes and sizes, the impact of the container size on the distribution of elements and the influence of external forces (eg in the form of vibrations brought to the entire system) on the properties of the packed bed. The measurements will be supported by numerical simulations on a model developed for this purpose, optimized during the experimental part. This model will allow in the future selection of appropriate particle parameters forming the deposit for specific requirements set by the type of application, which will ensure optimal working conditions of the deposit and reduce the costs associated with its production.

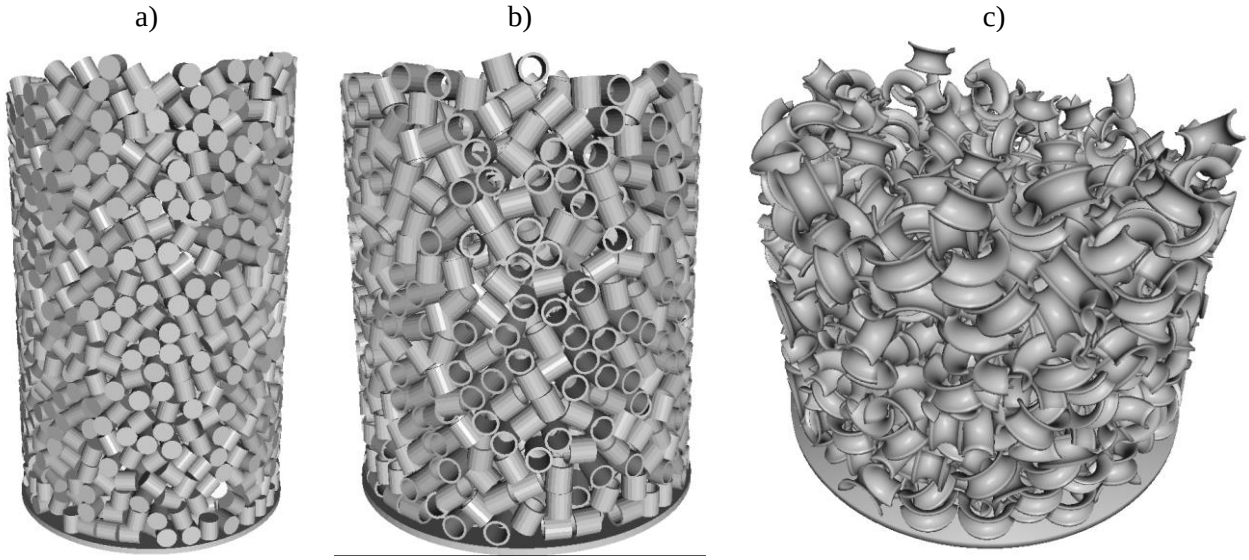

Fig. 1. Sample numerically generated bed structures: cylinders (a), Raschig rings (b) and Intalox saddles (c)