

## Summary

In the thesis there has been analysed the impact of selected material, structural and technological solutions of a cold store for vegetables on the shaping of heat exchange with ground. As a reference object there was chosen a cold store for vegetables located in Sielec-Kolonia (Skalbmierz commune, Świętokrzyskie province), where, from the 1st of October to the 30th of June, there are stored carrots.

Theoretical calculations of heat exchange between the cold store and the ground in non-stationary conditions was carried out in the WUFI@plus program, in which a cold storage model was created in conjunction with the ground. The validation of the model was performed based on year-round measurements of indoor and outdoor air temperature, as well as ground temperature under the cold store and in its surroundings. The obtained validation results showed a very high correlation of measurement data with calculated data and no significant differences ( $\alpha = 0.05$ ).

There have been considered 9 variants for the analysis, taking into account selected technical and technological factors of the cold store, such as the level of the location of the floor relative to the ground surface, the use of zero-state insulation and the occurrence or absence of a technological break. Analysis of the results showed that elevation of the floor above the ground surface or its depression in the ground significantly affects the diversity of heat exchange with the ground. Application of thermal insulation of the floor, with a thermal resistance of  $2,5 \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$ , affects the reduction of the share of land in the range of 6-14% in the energy balance of a cold store, depending on the level of the location of the floor. The results of the analysis also showed that the use of a technological break from the 1<sup>st</sup> of July to the 30<sup>th</sup> of September may reduce the energy demand for cooling purposes by about 50%.

**Key words:** a cold store for vegetables, heat exchange, ground temperature, energy economy of a cold store, material and structural solutions

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