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V.V. Mykolaenko

Overview of structural solutions of exterior wall enclosures at adjacent structures

Vinnitsa National Technical University

Анотація

Досліджено конструктивні рішення на вузлові з'єднання і запропоновано енергоефективні рішення які дозволятимуть зменшити споживання енергії та ефективно використовувати енергетичні запаси.

Ключові слова : енергозбереження, вплив, енергоефективність, вузли, теплові втрати, конструкція, витрати,будівля.

Abstract

Design solutions for node connections have been investigated and energy-efficient solutions have been proposed that will reduce energy consumption and allow to use energy reserves efficiently.

Keywords: energy saving, impact, energy efficiency, nodes, heat losses, construction, costs, building.

Introduction

A characteristic feature of modern construction is the need to implement effective technologies that will reduce the cost of construction work, which contributes to the implementation of affordable housing. The problem for the state and for each person is the saving of energy resources, which puts the task of builders to apply energy-saving technologies for insulation of buildings and structures [1].

Exterior walls are the elements that cause the most heat loss in the building (about 30%). A weak element, in terms of heat loss to the exterior wall, is the junction and junction points. Therefore, the research focuses on this area.

Research results

Investigations of structural decisions of external wall enclosure structures at the adjacent structures at present have the following main directions [2]:

• Improvement of thermal protection properties of the enclosure structure and reduction of material consumption due to the fact that the ratio between the thickness of the main part of the wall and the thickness of the additional part of the wall is 2.1-12.0, and the ratio of the height and width of the additional part of the wall and the thickness of the supporting structures or, for example, floor slabs columns, is 1.0-5.0;

• Creation of a wall structure at interconnected joints with increased thermal resistance of load-bearing structures and increased energy efficiency of the building.

• the development of fencing structures whose effectiveness is to simplify the structure, increase the reliability of the joints and increase the load-bearing capacity and strength of the structure, and reduce the cost of material, labor and energy resources;

• creation of an energy-efficient enclosure structure of a multi-storey building without "bridges" of cold with high coefficient of thermal technical homogeneity, high durability, architectural expressiveness and environmentally safe;

• the inclusion of additional elements in the form of tabs in the construction of the wall, which allows to increase the efficiency of the building.

In the course of the analytical review were considered the works of the authors: Opekunova VV, Semko VA, Leshchenko MV, Krolenko Yu.Ya., Konyukhov OV, Ratushnyak GS, Ocheretny AM, Pryshchenko AM and others, for the period from 2005 to 2018, in which improvements were made to the thermal insulation design of the outer wall and interconnections. One of the most effective, in our opinion, is the proposal of the authors Prischenko AM, Prischenko MG, Timofeev MV [3] in which to increase the resistance of heat transfer and temperature in the inner corner was the installation of additional insulation, which overlaps the corner , increases the reduced heat transfer resistance and temperature in the inner corner and prevents condensation. Extra insulation material is foam board, and basalt cotton wool can be used. Due to this, an additional layer of insulation is installed in the space formed on the outer surface of the corner in cross section for bricks (small stones, precast and monolithic concrete structures) in the form of a G-shaped form. This method is intended for both new construction and reconstruction of buildings, if they use facade systems and it is possible to arrange appropriate recesses on the outer surface of the corner.

Conclusion

The paper analyzes the features of structural solutions of thermal insulation of buildings in adjacent areas. The directions of improvement of thermal technical parameters of walls and premises, increase of level of energy efficiency of buildings are determined.

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Вадим Валерійович Миколаєнко – аспірант кафедри інженерних систем у будівництві, Вінницький національний технічний університет, м. Вінниця: e-mail: vadim1996mvv0701@gmail.com;

Керівник: **Степанова Ірина Сергіївна**, завідувач кафедри іноземних мов Вінницького національного технічного університету, м. Вінниця, stepanova_is@i.ua

Vadym Mykolayenko - Postgraduate Student, Department of Engineering Systems in Construction, Vinnitsa National Technical University, Vinnitsa: e-mail: vadim1996mvv0701@gmail.com;

Supervisor: **Stepanova Iryna Sergiivna**, head of Foreign Languages Department, Vinnytsia National Technical University, Vinnytsia, stepanova_is@i.ua