reinforcement. In recommendations [2] estimated value of bending moment on support is taken equally to $M_{sup} = M_1 + M_2$, where M_1 is bending moment from vertical reaction on support, M_2 is bending moment from frictional forces reaction.

Experimental averages of negative bending moments in the platform joint zone in the moment of destruction of experimental samples of platform joint fragments PJ-1 and PJ-2 and also calculated by [1], [2] and [3] are presented in Table 1

Table 1 – Bending moments on support in the moment of destruction

Element	Bending moment on support (experimental average), kN·m	Bending moment on support [1], kN·m	Bending moment on support [2], kN·m	Bending moment on support [3], kN·m	Bending moment on support [4], kN·m
PJ-1	-30	-32,52	-6,08	-11,9	-21,1
PJ-2	-34,56	-33,9	-40,53	-11,9	-21,1
Ancorage	-45,8				
Swivel	0				

Comparison of experimental values of bending moment on supports of platform joint fragments with estimated values shows satisfactory convergence with proposals [1], which consider the influence of pressing on supports on the value of negative bending moment of support in the platform joint zone. Methods described in [3] and [4] evaluate bending moment on support more carefully and with low pressing in [2]. Method [2] with high pressing overestimates appearing negative bending moment on support in the platform joint zone.

Examined methods consider the value of negative bending moment on support only in critical strength state. Methods which consider the actual performance of precast prestressed hollow-core slabs in the platform joint zone and allow to define internal forces and respectively stress-strain state in hollow-core slabs in any time of its load including effective loading. The existence of negative bending moment in hollow-core slabs in the platform joint zone reduces span bending moment and deformations of the floor, enhances crack resistance. It enhances the value of critical force in critical strength state.

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RESTRUCTURING OF HEAT AND AIR SUPPLY SYSTEMS OF BUILDINGS WITH RECYCLING OF LOST HEAT

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The possible options and solutions of the efficient heat and air supply energy of multi-story buildings with exterior fences with increased thermal protection and impermeability in which it is possible to use energy resource efficiency techniques to reduce energy consumption due to the recovery of heat, the heat recovery of the removed ventilation air and the study of the natural heat of solar radiation.

In order to implement organized and comfortable thermal air treatment facilities it is necessary to exclude the influence of external factors and make manageable, and thus managed, the processes of heat transfer in buildings, which requires the following basic conditions:

- Make the room completely sealed;
- To ensure the continued removal of harmful emissions (carbon dioxide, excess heat and moisture) by means of local exhaust ventilation in volume of air current;
- To make technical means for the orderly admission of fresh outdoor air;
- Provide a comfortable indoor climate, corresponding to modern sanitary requirements.

In addition, all received constructive and technological solutions must meet the basic requirements of modern reliability, durability and economy of energy and raw materials.

To fulfill the first condition of sealing the premises, completely unorganized filtered air through the outer fence should be excluded.

Filtration through the exterior building envelope space is disorganized under the influence of pressure difference on both sides of the fence, created by gravity and wind, because of leaks in the construction and air permeability through the cracks, pores and cracked floor, ceiling and walls. Moistening of the material building envelope constructions is due to the effects of precipitation on the outside and the allocation of household and technology of indoor moisture, resulting in moisture exchange across barriers that reduce not only the heat-shielding properties, and in general durability of buildings.

To reduce heat loss irrecoverable, durability and efficiency in buildings is necessary to consider the dynamics of the formation of indoor climate, taking into account the laws of heat and mass transfer, since the action of connective and radiate heat transfer and mass transfer processes, the internal air temperature and internal surfaces offences are interdependent and have a significant impact on health-sanitary environmental conditions in the area of permanent or long-stay human.

The objective of this research is to study ways of creating a microclimate ventilated houses and public buildings with outdoor enclosures increased tightness. Protecting designs isolate buildings from external space weather impacts and allow you to create them artificially at the expense of specialized engineering of heating, ventilation and air conditioning desired microclimate.

On the thermal regime of the space in a building is influenced by multiple permanent and temporary factors and processes that form the thermal environment, which must be considered in close connection with each other, as their combined effect can repeatedly change the parameters of the microclimate. For example, filtering the air through the outer fence and hydration structures can be several fold increase in heat loss from the room.

The first condition of normalization of the microclimate associated with sealing exterior walling provides significant savings in thermal energy by reducing air flow through the building and connected with air filtration irretrievable loss of heat. At the same time a positive effect in terms of increased tightness of the outer fences in residential buildings and public facilities disturbed the normal mode of airspace.

Under the existing process flow ventilation hazard removal from the premises (household humidity, carbon dioxide from human and technological combustion of gaseous fuels in the pelvic plates) is carried out together with return air through the exhaust system of natural or forced ventilation.

In a closed volume sealed room ventilation effect creates a vacuum that will soon equalize the disposable pressure exhaust systems, after which the movement of indoor air is completely stopped, although the exhaust system continues to operate.

For violation of air space results in the accumulation of excess moisture and carbon dioxide in indoor air spaces of residential and public buildings by people and domestic use hot water and gas, which adversely affects human health, reduces the recovery function of the human body that affect productivity, and ultimately make the premises unfit for long-term and permanent residence in these people's medical and biological reasons.

In addition to these violations of sanitary requirements for buildings social housing and cultural life, the accumulation of moisture in the air space leads to waterlogging of building structures, which reduces not only their thermal insulation properties, but also the strength characteristics affecting the durability of structures and buildings in general.

To solve this major problem for modern urban planning it is necessary to create as soon as possible an industrial basis in large volumes of new construction and renovation of existing facilities of social housing and cultural life with latest technical means for the orderly flow of fresh outside air into the ventilated space enclosing structures of buildings with high air-tightness.

Researches in this direction are made by many research organizations, not only in our country but throughout the civilized world [1]. Similar studies in the framework of the state scientific and technical program

1.5.159 "Building Materials and Technologies" on the instructions of the Ministry of Architecture and Construction of Belarus 02/02/04, held in Polotsk State University, Department of heat and ventilation, Faculty of Civil Engineering [2].

The results of the investigations are designed, manufactured and tested experimental lots of technical means for the orderly flow of fresh outdoor air in ventilated rooms of residential and public buildings enclosing parts of high integrity.

The main advantages offered for the widespread introduction of ventilation supply unit in front of all the known world analogues is the ease of application design, efficiency in the manufacture, use standardized elements of conventional materials, the ability to preheat outside air through the heat recovery leaving the possibility of preliminary mechanical adjustment during commissioning work and the ability to automatically maintain the regime constant flow rate of supply air without additional specialized automation equipment.

In addition, the marked structural and technological advantages offered by the technical innovation meet the basic requirements of modern reliability, durability and economy of energy and raw materials, that is a world standard and make it competitive not only in domestic, but also foreign markets.

Apart from the previously mentioned technical and economic advantages, the offered technological innovation corresponds to the fourth condition, since under the current process of ventilation flow the outdoor air, passing through the slit porch of window frames and balcony doors, dramatically reduces the temperature of the indoor air, especially during windy days and because of the unmanageable processes of heat and mass exchange there is a discomfort zone near the outer walling.

Under the proposed technology of ventilation of residential and public buildings with high-seal structures for the supply of fresh outside air into the ventilated space there is a special multifunctional air supply device, which, first of all, does the recovery function of the heat exchanger in which the preheating of the outdoor air is done by an outgoing transmission heat flux through the complex and efficient heat transfer processes under construction device.

Secondly, in the construction of the proposed device air inlet there is a two-step mechanism of regulation of the used air flow and the rate of its release into the work area of the room, in which the mobility of air is regulated by norms to a strictly limited range - 0.1 + 0.3 m / s, for example, for premises [3].

Thirdly, the proposed innovation when installing it on the facades of buildings facing the noisy city highways provides insulation effect, because it reduces noise levels to acceptable standard limits.

The possibility of quantitative regulation of air flow through the air inlet device is also a very important advantage of the new ventilation technology of residential and public buildings, especially in high-rise design. In high-rise buildings at the existing technological scheme of ventilation much more fresh air goes in the room than in similar areas in terms of the upper floors because of the fact that the natural draft is created in the exhaust ducts due to gravitational forces, proportional to the difference in density between the indoor and outdoor air and a height of exhaust channels for different floors, which is variable. Although the project uses techniques to equalize the flow, by creating more resistance to the movement of air decreasing living section and ventilation channels (regulated) lattices, to take into account additional factors influence atmospheric (barometric pressure, wind, etc.) is not possible.

Methods of calculating the design parameters of the proposed device allows the air at the design stage to ensure a strictly normalized parameters on air consumption 3 m3/ch-m2 floor space, located on different floors of multistory buildings. In addition, the design of the device, an additional manual adjustment of air flows during start-up operations.

Thus, the proposed process of ventilation flow of buildings fully corresponds to the condition of normalization of microclimate on health and hygiene requirements, as the outside air is not only preheated, but also available in a ventilated room with low velocities and in the right quantity, without compromising the comfortable parameters and of insulation from external sources.

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UDC 624-2/-9

CALCULATION OF THIN-WALLED RODS BY NUMERICAL METHODS

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Thin-walled steel structures are used extensively in construction. They have become a common design solution for low-rise building, attics, walling multistory building.

When modeling thin-walled structures the integrated system SCAD Office is widely used.

SCAD Office is a suite of programs designed to perform the calculations of the strength and structural design of various kinds. The system, in particular, includes a program for creating spatial models, forum, formation and calculation of geometrical characteristics of sections, consul strength calculation of structures, SCAD. Modeling of thin-walled elements can be carried out easily in the Forum included in SCAD Office, or directly SCAD.

The main objective of this work was to develop a technique for constructing finite-element simulation models of such elements.

Building a profile to begin tracing its sectional cuts in AutoCAD (or other graphics program), the file is saved as dxf. Then dxf-file with the section profile import preprocessor program "Forum" (Fig. 1).

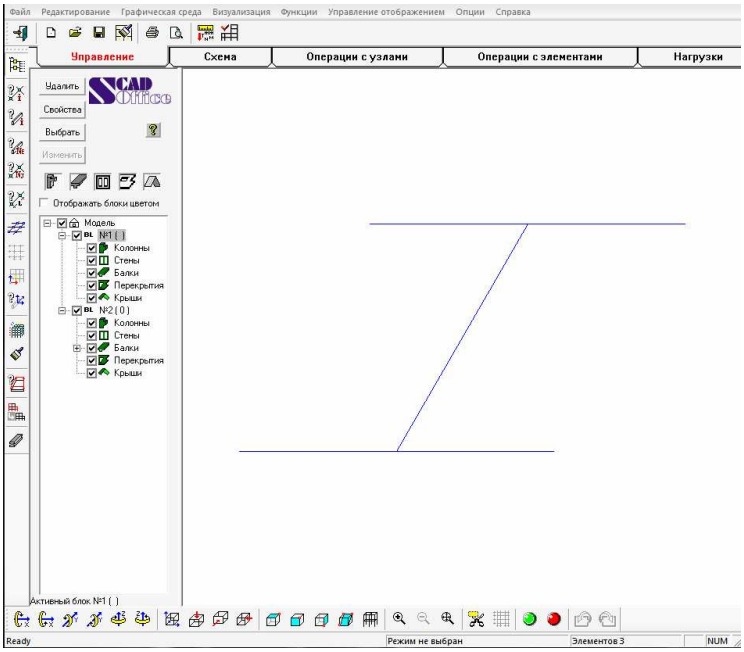

Fig. 1. Result of export dxf-file to the preprocessor "Forum"

Section on individual segments produce consistent formation shelves profile by selecting the function "wall" in the tab "scheme" with the job she needed parameters. Thus the length of the rod is set in "height of the wall". Passing successively from segment to segment, form the whole profile (Fig. 2).

If necessary to form a beam or a thin-walled element with perforations, choose the item in which to perform the holes. Further note the plane in which it is assumed the formation of holes in the left pane, select a function Forum "change". When this function is activated automatically switched to the program Consul.