IMPLEMENTATION OF ENERGY SAVING MEASURES IN THE UNIVERSITY BUILDING

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Abstract: The article gives examples of implementation of energy saving measures in the building of educational building № 4 of Sumy NAU. The events are divided into three stages. At the first, preparatory stage, the problematic elements of the building design and communications that require the implementation of energy-saving measures with the help of a special device Fluke_Ti25 are identified. The problematic elements of the structure of the building were determined by a complete scan of the ceiling, walls and floor with a thermal imager. A large (more than 10%) difference between the indoor air temperature and the building element temperature indicated a problematic element. In the second stage of information processing, measures for reducing energy consumption are determined. In the third, phase of implementation of energy saving measures, measures are implemented that directly affect the energy consumption of the building and the effective functioning of communications.

The object of research and its temperature indicators is shown below

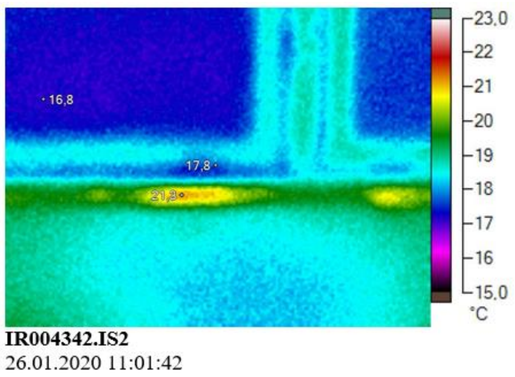


Fig. 1 Shows that the room temperature is 21,3°C.
The temperature of the double-glazed window is 16,8°C, the temperature at the junction of the double-glazed window to the frame is 17,8°C.
The temperature difference is **21%**.

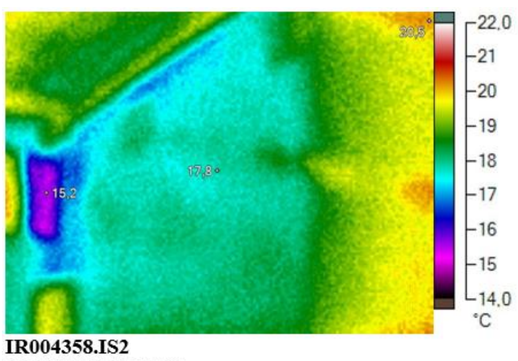


Fig.2 Shows that the maximum air temperature of the wall inside room 1 is 20,5°C.
The thermographic image of the Fluke Ti25: the first zone has a temperature of 17,8 °C,
where the temperature difference is **13%**, the second zone has a temperature of 15,2 °C, where the temperature difference is **25%**.

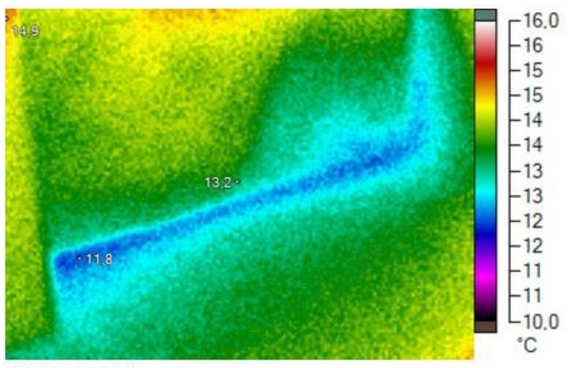
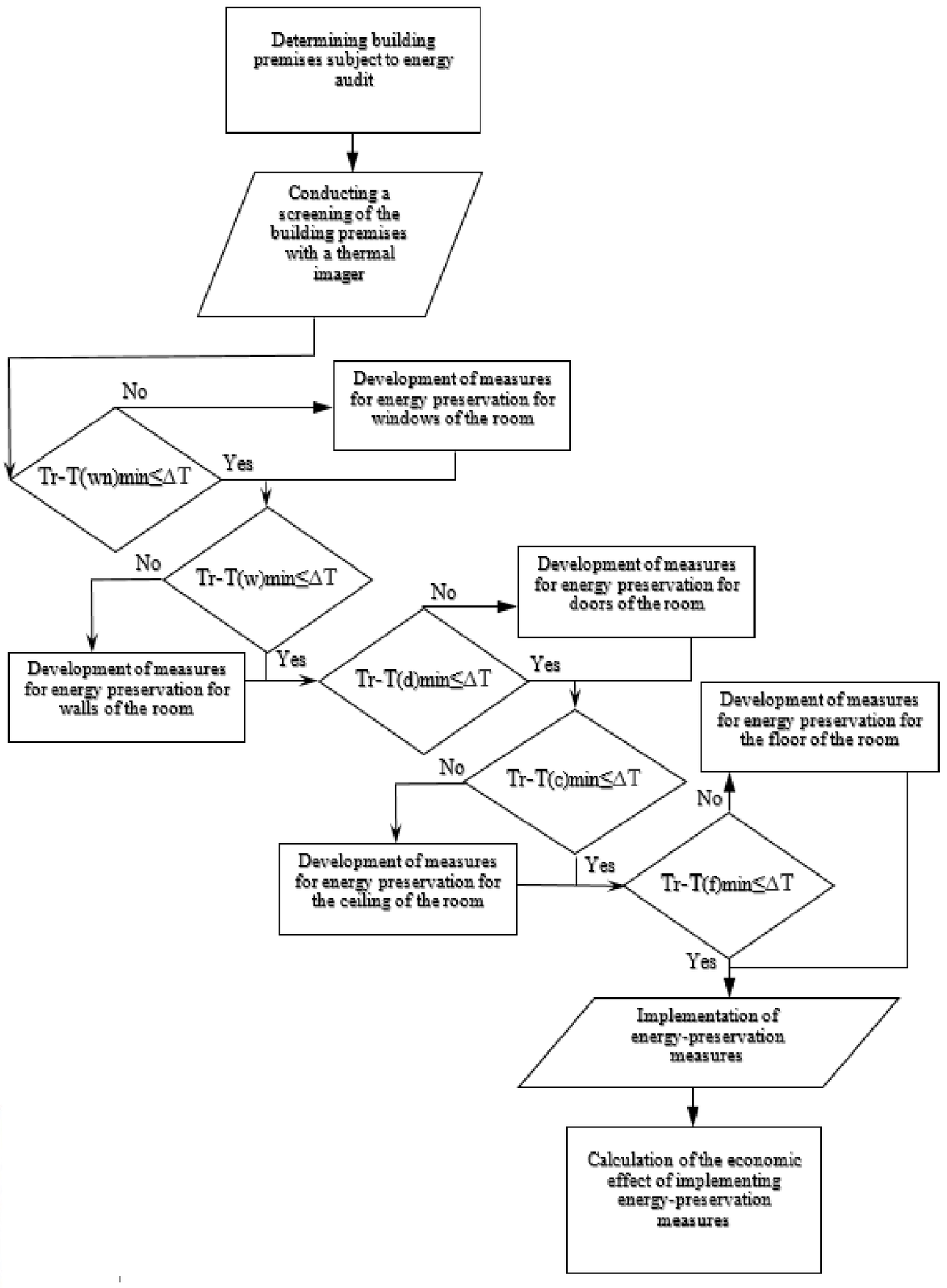


Fig. 3 Shows the thermographic image of the Fluke Ti25, where determine the area at the bottom of the door that has a temperature of 11,8 °C, which is **20%** lower than the room temperature, which is 14,9°C.

Algorithm for researching the entire building



The algorithm uses the following legend: Tr – the air temperature in the room; T (wn)min – the minimum temperature on the surface of the window; T(w)min – the minimum temperature on the surface of the walls; T(d)min - the minimum temperature on the surface of the doors; T(c)min - the minimum temperature on the surface of the ceiling; T (f)min - the minimum temperature on the floor surface; ΔT – the permissible deviation of the surface temperature from the air temperature in the room.

Conclusions

When measuring the temperature of the window, wall and ceiling, it was determined that the difference between the temperature of the room and the investigated objects exceeds 10%. This means that enterprises have large energy losses and must carry out energy saving measures depending on financial stability. We propose the above presented algorithm for considering the whole enterprise for energy losses.