УДК 692.41

R. R. FAKHERLEGAYANOV, I. S. MALTSEV, master, Department of technical information support for the design and functioning of the electric power industry of consumers, Institute of Electric Power and Electronics,
G. Z. GILYAZIEVA Candidate of Philological Sciences, Associate Professor, Department of Foreign Languages
FGBOU VO "KSPEU", Kazan, Republic of Tatarstan

DESIGN OF DE-ICING SYSTEMS ROOFS OF BUILDINGS

Abstact: A number of issues related to the design of de-icing systems of roofs of buildings using heating cables are considered, various types of cables and technologies of their application are briefly described.

Key words and phrases: heating cable, de-icing system, roof, gutters, cable heating

In winter, significant masses of snow often accumulate on the roofs of buildings, which later form ice growths in the form of blocks of ice and icicles as a result of temperature fluctuations. Periodically cleaning (most often using manual labor) of the roof from snow and ice accumulations is usually difficult and dangerous. [1] Often, in the process of rolling down the ice coating and its subsequent fall, damage occurs to the roof covering itself, gutters and plumbing, and individual elements of the facade of the house. As practice has shown, an effective and safe way to combat icing of roofs and drains is the use of special electric heating cables. [2]

Heating elements, temperature and humidity sensors are needed as a module for creating a project. It is necessary that the temperature and humidity sensor (Fig. 1) should be located in the coldest and wettest place on the roof of the house [3].

Fig.1. Digital temperature and humidity sensor

As an element of the heater, self-regulating heating cables of the SRL 40-2 brand will be used, which can change the heat transfer in several places. The power of the heater cable is from 20 to 40 watts. [5]

Fig.2. Heating cable

The temperature and humidity sensor and the heating cable are configured so that when snow accumulates on the roof of buildings, structures, as well as when icicles and ice form, the electric current supply to the heating cable will automatically turn on. An Atmel AVR microcontroller was selected as the control component.{4]

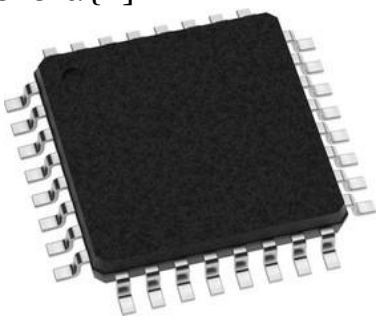

Fig. 3 Atmel AVR microcontroller

Thus, a properly designed and calculated cable de-icing system allows you to completely remove melt water from the entire roof surface and eliminate the formation of ice on the roof and in the gutters, which will ensure constant monitoring, and most importantly, the safety of human life.[6]

Literature:

1) Coverings and roofs of civil and industrial buildings // Eropov L.A., — M.: Construction, 2004-248 p.

2) Heating cable. website. URL: http://stopled.com.ua/ru/posts/11.

3) Marzoeva, I. V. Advantages of the chromatographic method in the diagnosis of oil-filled electrical equipment in electric power systems / I. V. Marzoeva, A. R. Miftakhov // Английский язык в сфере профессиональной коммуникации : Материалы VIII Всероссийской молодежной научной конференции, Казань, 10 ноября 2022 года. – Казань: ИП Сагиев А.Р., 2022. – P. 242-243. – EDN SRBOPY.

4) Parts of buildings. Civil architecture//Statsenko M.V., — M.: Civil architecture, 1930-656 p.

5) Roof de-icing system. website. URL: http://stopled.com.ua/ru/items/

6) "Bulletin of the KSEU" https://vkgeu.ru/