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AUTOMATION AND DISPATCHING OF ENGINEERING SYSTEMS

Author – Andriy Podlesny[1], Stud. of gr. TGPV-22mp
Scientific supervisor – Oleksandr Adehov[2], Cand. Sc. (Tech.), Assoc. Prof.
Language consultant – Liliia Druzhinina[3], Assoc. Prof.
[1]*andreypodlesniy21@gmail.com*, [2]*adehov.oleksandr@pgasa.dp.ua*,
[3]*druzhinina.liliya@pgasa.dp.ua*
Prydniprovska State Academy of Civil Engineering and Architecture

Automation of engineering systems of buildings is a software and hardware complex that provides completely independent management of engineering systems and protection of engineering equipment [1]. The automated system for monitoring and managing buildings and structures (ASMM) is shown in the following figure.

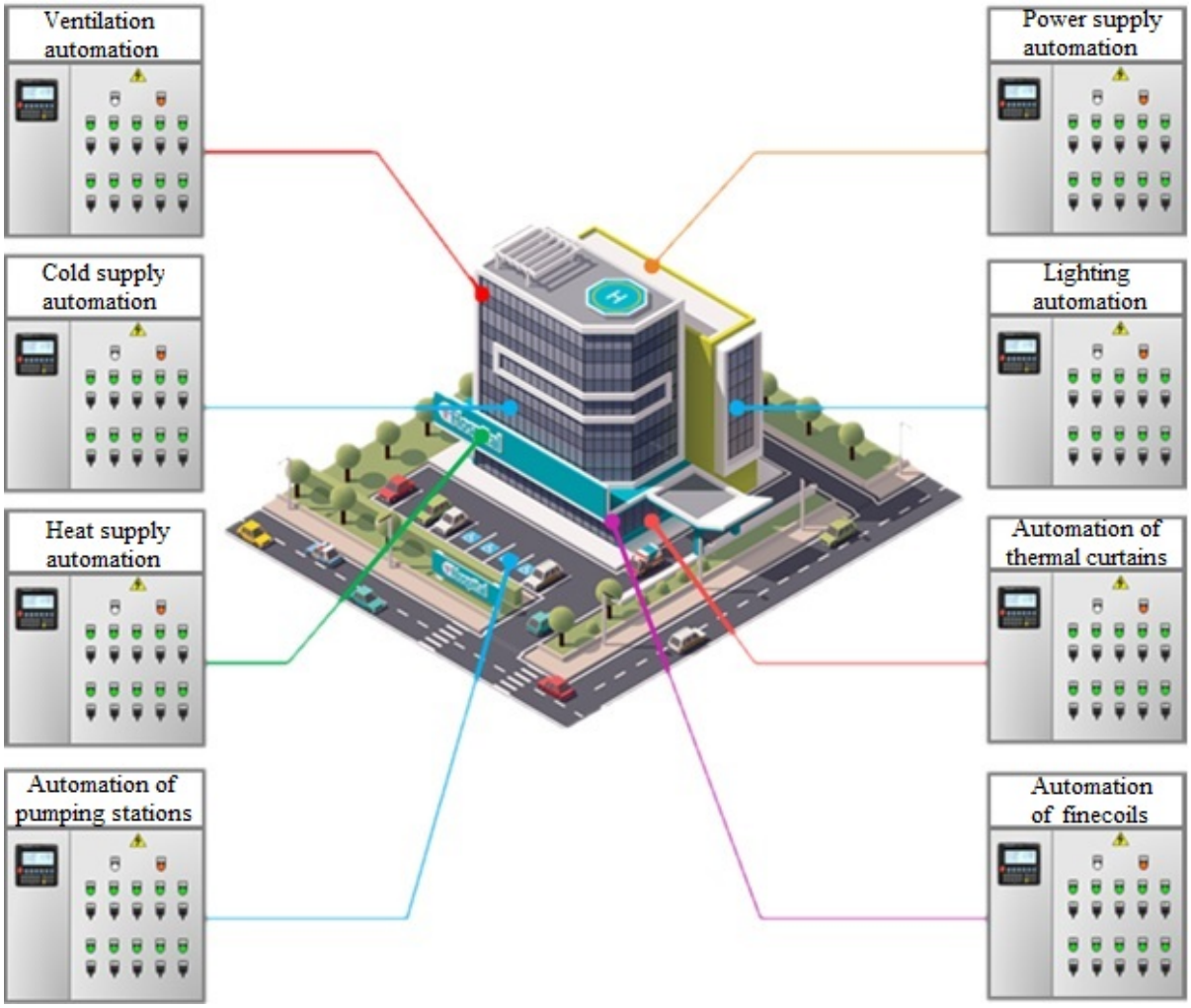


Fig. 1. Objects of ASMM control and management

Automation of life support engineering systems (ventilation, cooling, heating, water supply and drainage pumping stations, lighting, etc. – Fig. 1) makes it possible to significantly reduce building operating costs due to coordinated process management, as well as to increase safety, preventing emergency situations and avoiding the influence of the "human factor" [2].

The automation cabinet, thanks to the controller, control program, sensors and executive mechanisms, controls the separately taken engineering equipment. A group of these cabinets is called Automation and Control System (ACS).

The dispatch system is used for the centralized control and management of engineering systems. Information about all connected equipment is displayed in real time on the control panel (personal computer) (Fig. 2).

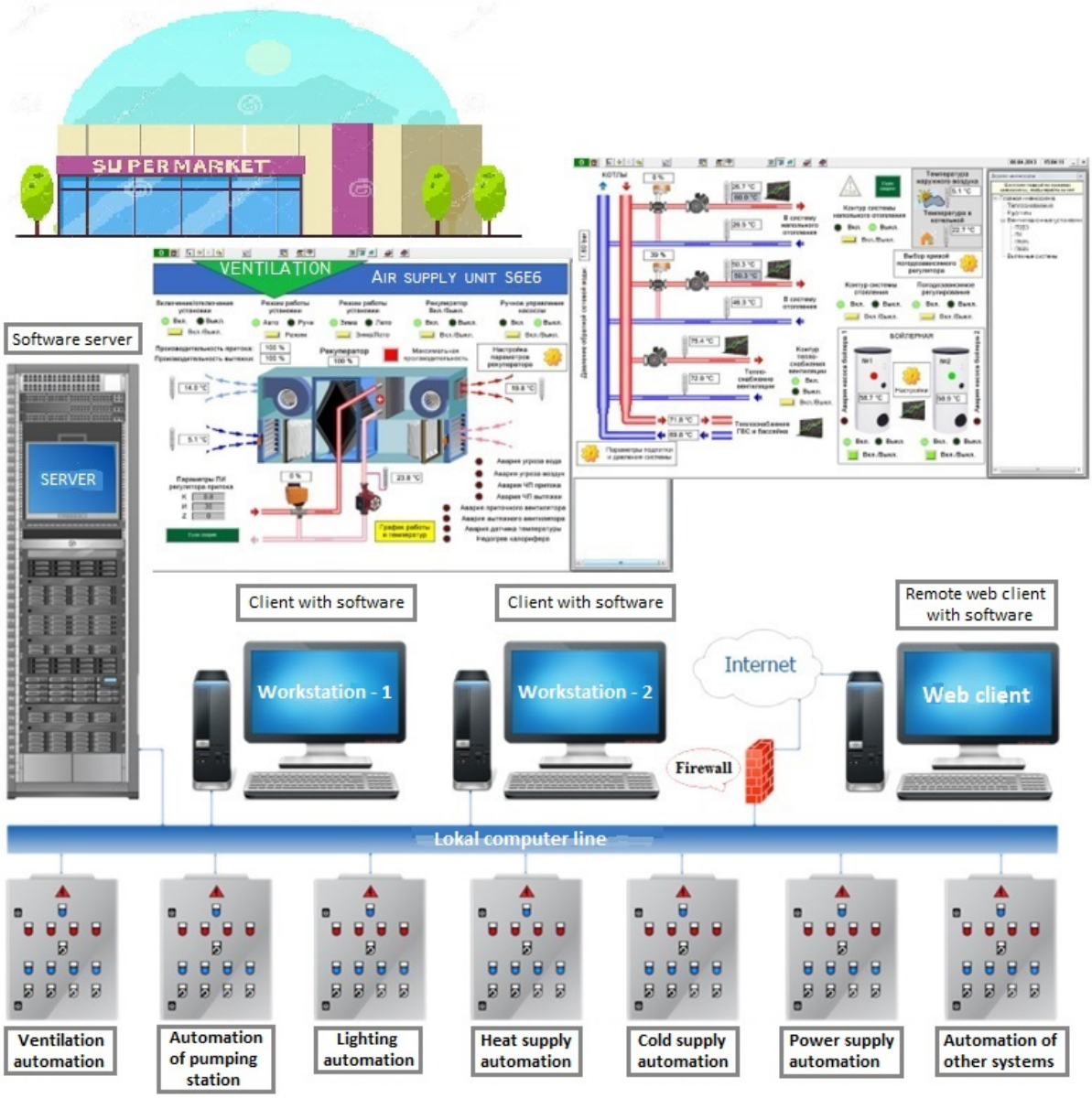


Fig. 2. Block diagram of a building's dispatching

Dispatching allows to control various processes taking place at objects and

to change the parameters of devices that serve these objects. Programmable controllers supporting various data transmission standards are used for data collection and further processing.

The construction of dispatch system usually begins with local tasks, but gradually it reaches the scale of the entire enterprise. As a result, management can have a number of problems caused by the fact that early decisions create obstacles to the implementation of later ones. In order to prevent this one should approach dispatching systematically, carrying it out with the help of SCADA (Supervisory Control And Data Acquisition - supervisory control and data collection).

SCADA systems are highly integrated systems that allow monitoring, managing and maintaining an archive of events occurring with equipment from anywhere in the world where Internet is present [3].

The implementation of a dispatch system at the facility allows to achieve the following features:

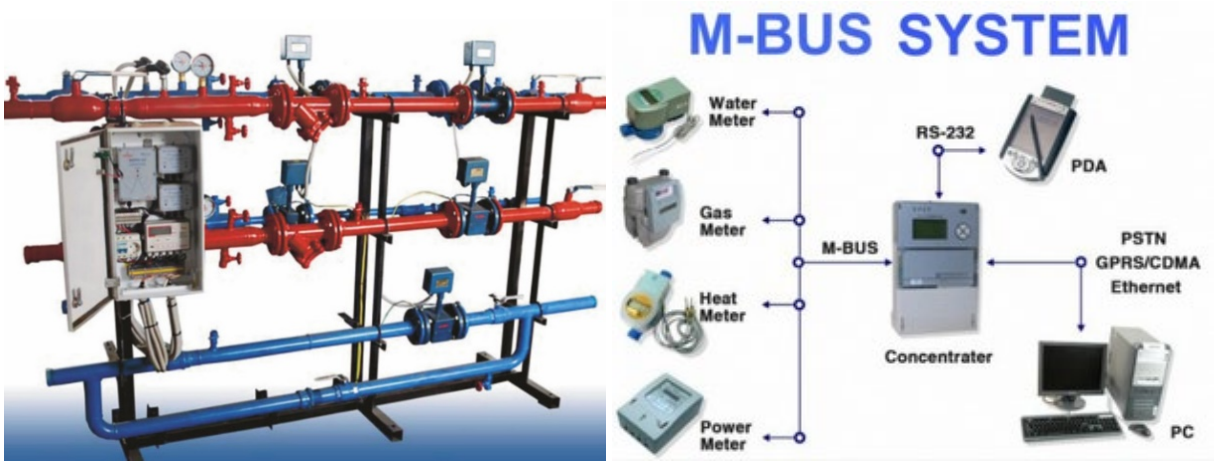
- transfer of information about the current state of the equipment;
- transmission to the dispatching console (PC) of alarms and output of parameters for limit values;
- automatic data collection and formation of a message log;
- change of operation modes provided by the programmed algorithm;
- equipment control from the control room;
- equipment control from anywhere in the world with Internet access.

As a result of the introduction of the dispatch system and the implementation of the above-mentioned capabilities, the following results are achieved:

- ensuring uninterrupted operation of the equipment due to the timely response of maintenance personnel to situations requiring intervention;
- partial reduction in heat carrier costs due to optimal regulation of parameters;
- provision of necessary microclimate conditions in real time;
- documenting the flow of technological processes, the operation of engineering systems and the actions of maintenance personnel;
- quick and adequate response to an emergency or emergency situation;
- quick and accurate response to changes in the external environment;
- collection of statistical information and forecasting of systems operation.

The dispatch system can also be implemented in relation to centralized communications (heating and cooling supply, water supply and drainage, electricity supply, gas supply and other systems) through special input/output modules, which are designed for data exchange between the dispatch system and between various meters installed in the accounting nodes (Fig. 3 *a*).

Counters are supported by various interfaces such as RS485, M-Bus, LonWork, RS232, etc. (Fig. 3 *b*).



a *b*

Fig. 3. Dispatching centralized communications
(a − accounting node; b − M-Bus system)

These modules allow to do the following: to read current data from meters with a given survey period and to use this data by other modules of the system; to read meter archives and to create settlement documents for settlements with the supplier according to the form specified by them; to inform about unauthorized penetration into the meter device, etc.

Dispatching makes the operation of life support systems extremely efficient, practically reducing the percentage of irrational use of resources to zero. In addition, the detailed control of technological areas is carried out and it allows to reduce significantly the resource costs, while obtaining additional profit.

The effect of implementing a complex dispatching system is not long in coming. It manifests itself as a decrease in the consumption of energy and heat resources and in operating costs, as well as a significant increase in the productivity of the company's employees due to the creation of a high level of comfort and excellent working conditions.

References

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