

Automation and remote control of lighting airfields systems modern civil aviation

One way to increase the level of safety of civil aviation aircraft is automation lighting airfields systems. Automation is provided by remote control lighting equipment to obtain the required warning about the system and its individual elements according to international specifications and technical documentation to the type of equipment.

Introduction. One of the links in the chain safety and regularity of flights is lighting airfields systems (LAS). It LAS is the only source of visual information to the crew at the most critical phase of flight. According to statistics most important stage is the stage of visual piloting. The most crucial stage of the flight crew is interaction with LAS and depends on the visibility range, depending on the weather near the airport. For this, the requirements for reliability LAS should reflect the ability to perform necessary functions within a specified period of time specified in terms of operation, maintenance, storage and transportation equipment items LAS. Reliability LAS regulated by GOST 2860-94 Ukraine «Reliability engineering and includes reliability, durability, maintainability and safety of or some combination of these properties». Quality lighting performance standards LSA regulated by a number of ICAO [1,2,3], which aim to ensure the necessary elektrosvetotekhnicheskikh characteristics (power consumption, brightness, color, strength and intensity of the light, and others. ICAO required level of safety and regularity of aircraft operations (PS) is one of the main challenges facing civil aviation.

Problem research. Remote control system SSA lights for large aerodromes are complex and proper management is determined by atmospheric conditions, time of day, and sometimes recommendations pilots maneuvering and a few aircraft and other types of held on the airfield operations. The biggest information regarding these conditions placed dispatchers air traffic control (ATC), and so most of the management of airport lights located on the remote control lights in the aerodrome control point and used by ATC controllers.

The main control panel is usually placed in the aerodrome control point on the dashboard or control panel lights. This remote is designed so that it operator were control switches governance indicator lights of the chain and controls the power light lights, and the relevant point elements are easily recognized for all the lighting conditions in paragraph control. For this purpose, it may be necessary to establish control switches with symbols and switch luminance control panel indicator lights. A standardized form layout of controls and indicators provides a number of advantages, and is currently a trend towards standard modular circuit control panels. It is necessary that switches and controls gave a clear indication of working position and were grouped according to the respective functions and circuits. Data type of controls should be selected so that the possibility of

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accidentally switching the light was reduced to a minimum [1-3].

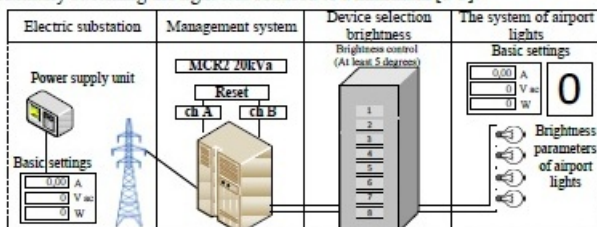


Fig. 1. Scheme of remote control of lighting airfields systems

The required amount of equipment remote control lighting equipment is determined for each airfield, leaving from the controlled process equipment. According normative and technical documentation control equipment lighting equipment must be:

- equipment items for lighting control means control dispatchers landing and taxiing;
- equipment items for lighting control means control dispatcher start;
- equipment controlled areas;
- mimic in sight controllers landing, taxiing that should not close other equipment;
- panel operational management consoles as controllers landing, taxiing, starting.

For power and adjust the brightness of lights depending on weather conditions using the brightness controls with microprocessor control. Active remote management of the entire light signal system, automatic control of all its elements with the software. The operator can control the switching, switching off lights and adjustable brightness depending on the brightness of the landing system.

For the implementation of the airfield lighting system control, monitoring and signaling functions required to implement such devices in the system:

- the level of equipment, devices and lighting equipment and safety devices zlitnospadkovykh ruliznykh bands (AGL); Brightness controls TCR; installation and radio navigation systems (ILS, DME, NDB); power systems; meteorological system; Safety Zone; backup power supply; distant objects; Interaction Communications (AFTN); Exact time; emergency power during emergency and emergency situations;
- at the level of working conditions for all categories of visibility ICAO: fire and alarm; image data with surrounding systems; data transfer into the surrounding system; data analysis for the purpose of CAT II and CAT III; archiving and emergency operating conditions [4,6].

Remote control airfield ground lighting equipment should ensure delivery of information on screen commands and visualization (indoors aerodrome control item in the room for maintenance and two indoor substations).

Specialized fiber optic network used to connect computers in a room

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aerodrome control point with computers in the building of the substation and interface racks containing programmable logic controllers that are installed at the substation. Consider using a remote radio control. Equipment can provide radio management intensity lights and lights switching networks. This method of control allows the pilot to select the intensity of the lights, and results in energy savings of energy, because the absence of necessary system lights are off. There are facilities for radio systems operating in the "air-land", "land-land" and the combination of "air-land" and "land-land." Most types of radio control network automatically switches the lights after 15-60 minutes after the last setting radio. Of radio control used to control the lights, simple approach lights systems, systems of visual glideslope indication as separate systems, and some combination of advance [5].

To work in the "air-land" at the airport set only receiver and decoder. Signal inclusion may consist of some short series of signals that are fed through a microphone transmitter aircraft.

Reliability of subsystems lights and remote subsystems characterized by the following factors: availability factor subsystems airfield lights of lighting airfields systems; availability factor of power supply subsystem airfield lights; unavailability factor of power supply subsystem airfield lights.

Conclusions

Automated remote control of lighting airfields systems is one of the main condition for a safe and regular flights during visual piloting in simple and adverse weather conditions on the ground of civil aviation. The level of equipment reliability, which is part of automated control systems Lighting systems airfields, implemented at the design and production of the main manufacturers of such equipment and compliance with regulatory and technical documentation ICAO. The analysis of modern automated lighting systems airfields using programmable logic controllers and control by means of radio control systems made it possible to identify key areas of operation of lighting systems airfields and flight safety in civil aviation airfields.

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