

Identification of firefighting system configuration of rural settlements

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Abstract. The method of identifying the objects of the firefighting system configuration of rural settlements of administrative territories has been improved. It involves the implementation of four steps on the identification of firefighting system configuration objects based on the use of geometric, statistical and regulatory approaches to the study of components of fire extinguishing systems. The basic parameters of rural settlements of two characteristic territorial zones - the mountain formed on the basis of the fire part of the city of Turka and the flat, formed on the basis of the fire station of Mostyska town - are determined. The distribution of the area of the territories of two characteristic territorial zones and the number of inhabitants of their settlements, which are reflected by the theoretical law of Weibull, are established. This necessitates a detailed geometric modeling of the relationship between fire stations and settlements in order to establish their territorial membership in alternative elemental fire extinguishing systems. The identification of road conditions between fire stations and border areas for the ten largest firefighting systems of rural settlements of Lviv region has been completed. The rate of movement of fire and rescue units on different types of road sections is quantitatively determined. The duration of movement of fire and rescue units for fire extinguishing was determined. It was established that the duration of fire and rescue firefighting movements on fire extinguishing is described by the theoretical law of Weibull distribution with the following characteristics: estimation of the mathematical expectation is 33.3 min and the estimation of the coefficient of variation is 0.54.

1 Introduction

The current state of fire protection in rural regions of Ukraine, which arose as a result of the disbandment of a significant number of fire departments of former collective farms, can not be considered satisfactory. On the other hand, the lack of state financing of the industry does not allow to restore all structures in full. In view of this, it is necessary to find ways to maximize the level of fire protection. This, in particular, is intended to promote the "Integrated Program of Civil Protection of the Population and Territories of Lviv Oblast from Emergencies of Technogenic and Natural Characteristics for 2016-2018 years", according to which this work was carried out [1].

One of the most effective ways of high-quality implementation of the tasks set out in the program is to use a system approach and to take into account the characteristics of each fire extinguishing system [2].

The analysis of existing methods of identifying firefighting system configuration objects [3, 4, 5] is proved that they have a number of shortcomings. In particular, they do not take into account the interrelations between physical parameters and functional indicators of the objects of the configuration of fire extinguishing systems. In addition, it is not intended to take into account the specifics of the location of protection objects in rural settlements and the state of the network of roads between them and fire brigade formation. This testifies to the fact that during the design of fire extinguishing systems of rural settlements systemic features of influence of physical parameters on functional indicators of their configuration objects and characteristics of production conditions should be taken into account.

All of the above suggests the need to improve the method of identifying firefighting system configuration objects in certain administrative regions, which will increase the accuracy of determining the level of fire insecurity of rural settlements and ensure the appropriate quality of managerial decisions regarding the design of these systems.

Thus, the scientific and technical task that is solved in this work, namely the identification of the objects of configuration of fire extinguishing systems in certain administrative regions, is relevant both in applied and in scientific aspects.

2 Method of identification of the objects of configuration of fire extinguishing systems

The conceptual (descriptive) model of fire extinguishing systems of rural settlements of administrative areas developed in the paper [6] only conceptually defines the objects of configuration (components of fire extinguishing systems). This is not enough to design these systems, without disclosing the links between the parameters and indicators of the functioning of objects of their configuration, it is impossible to determine the effectiveness of both individual components and the entire fire-extinguishing system. Therefore, an integral part of the design of firefighting systems in rural settlements is the identification of their configuration objects.

The standard for project configuration management involves identifying the configuration objects in several steps: 1) identifying objects; 2) the establishment of their physical parameters; 3) the establishment of functional parameters of these objects [7]. The objects of the firefighting system configuration of rural settlements in administrative regions are actually defined during the