



Article

Analysis of Fires: National and International Experience

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Abstract: This article describes the theoretical foundations of state fire control activities, the research conducted by scientists on existing problems in the field, the analysis of fires, and the results of scientific research on the integration of local and national experience.

Keywords: *fire, state fire control, fire prevention, safe neighborhood.*

1. Introduction

The number of fires recorded annually worldwide reaches 10-12 million, with the number of victims reaching 100-120 thousand people, and the number of injured reaching 350-400 thousand. In our country, an average of more than 11,000 fires are recorded annually. Fires injure an average of more than 300 people each year and, most tragically, lead to the premature death of about 130 people. During the research, the important experiences of developed countries in the world, such as the USA, Germany, France, Great Britain, Japan, Australia, South Korea, China, India, and the Russian Federation, in the field of fire prevention were studied. Regarding scientific research in the direction of state fire supervision, a number of scientists and researchers have been working and presenting their scientific works, mainly in areas focused on ensuring fire safety, preventing fires, improving firefighting equipment and technologies, and developing the regulatory and legal framework.

In terms of improving the activities of state fire supervision bodies, N.V. Baranov, V.D. Vereshchagin, O.M. Popova, Yu.A. Vorobyov, A.M. Sukhanov, G.I. Shelekhov, V.N. Butkov, D. Watson, P. Watson, T. Vanders, and other researchers have made their contributions abroad. Below is a brief overview of world-renowned researchers and their works. N.V. Baranov (RF) - one of the main researchers in the field of fire safety and the state fire supervision system during the Soviet Union (USSR). He made a great contribution to the development of the legislative framework aimed at fire prevention. O. Popova (RF) - studied fire supervision systems in countries around the world and achieved a comparative analysis of them. She has conducted research on the creation of international fire safety standards. G.I. Shelekhov (RF) - developed a management concept for the state

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fire supervision system. His research focuses on the analysis of the economic and social consequences of fires. D. Watson (USA) - is a specialist at the NFPA (National Fire Protection Association) and has conducted research in the direction of creating scientifically based guidelines and standards for reducing fire risk. T. Vanders (Germany) - has conducted research on the development of regulatory documents related to fire safety in European countries. He has also conducted research on various firefighting systems.

At the same time, in Uzbekistan, the scientific works of Sh.M. Azizov, B.E. Kasimov, B. Homidov, R.H. Normurodov, Sh.I. Karimov, I.Yu. Umarov, R.M. Abdullaev, D.Ya. Irgasheva, E.Sh. Nazirova, J.D. Muqimov, A.I. Musaev, L.A. Kamolov, and I.M. Boynazarov have detailed the improvement of state fire supervision activities and have achieved some positive results. Some of them can be examined below. Sh.M. Azizov – conducted research on the legal foundations and practices of state fire supervision in Uzbekistan. He developed several recommendations for improving the fire prevention system in our country. B.E. Kasimov – conducted research in the field of management organization in the fire protection service. B. Homidov – conducted research in the direction of improving state fire supervision in Uzbekistan based on local characteristics and international experience. Scientists such as R.H. Normurodov and Sh.I. Karimov have also conducted a number of studies in the field of fire safety. They paid special attention to work on safety systems, the effectiveness of fire equipment, or fire prevention strategies.

I.Yu. Umarov – conducted scientific work on technical safety and fire risk analysis. R.M. Abdullaev – conducted research in the direction of fire protection equipment and their development. In this scientific research work, we found it necessary to divide the analysis of fires into two parts. First, we will look at the analysis of fires that have occurred in the world, and second, we will look at the analysis of fires that have occurred in Uzbekistan. Approximately 3-4 million or more fires occur annually worldwide.

The largest share of fires is attributed to forest fires. Their number reaches an average of 300,000 to 500,000 per year. The financial damage from fires worldwide exceeds \$50 billion annually. Approximately 30,000 or more people die every year due to fires, and more than 250,000 people are injured. If we look at the ranking of countries by fire risk, more than 1.3 million fires occur annually in the USA, with the amount of damage caused exceeding \$6 billion. More than 300,000 fires occur annually in Russia, and the financial damage from them amounts to \$9 billion. More than 25,000 fires occur annually in Australia (most of them are forest fires), and the amount of material damage caused by them amounts to \$5 billion. An average of about 250,000 fires occur annually in the countries of the European Union. Let's look at the fire statistics for several countries within this union. In Greece, 1200 fires occurred in 2022 and 1000 in 2023; in Spain, 6100/5500; in Italy, 6000/5000; in Portugal, 6000/4000; and in France, 10000/10000. According to the data of the Center for Fire Statistics (CTIF), an average of 1000 fires occur per hour in the world, and 17 per minute. As a result of fires, an average of 10 people die every hour, and 1 death occurs for every 100 fires.

In Uzbekistan, the analysis of fires is carried out by the Ministry of Emergency Situations. According to statistics, an average of 11,231 fires occur annually in our republic, with 273 cases of people being injured and 119 deaths. On average, 31 fires occur per day, and 1 person dies for every 94 fires that occur. On average, 8,229 fires occur annually in residential houses, which is 73.2% of the total number of fires. At this point, let's focus on the fires that occurred in the republic between 1990 and 2023 and their details. Through analytical data, we can compare the trends in the number of fires that occurred every 10 years, the number of injuries, the number of deaths, and the number of fires in residential areas, which account for the largest part of fires (Figure 1).m

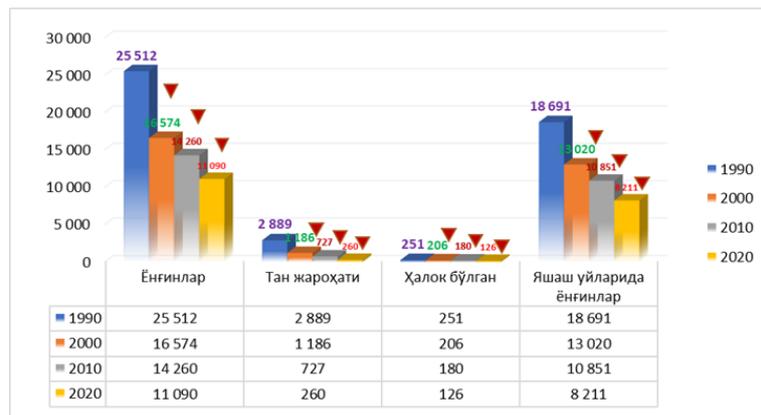


Figure 1. Indicators of changes in the analysis of fires every 10 years since 1990.

In 1990, the number of fires was 25,512, the number of injured was 2,889, and the number of deaths was 251. During this period, the number of fires in residential houses was 18,691. By 2000, the number of fires was 16,574, which is a difference of -8,938 (-65%) compared to 1990, the number of injured was 1,186, a difference of -1,703 (-59%), and the number of deaths was 206, a difference of -45 (-82%) decrease. During this period, the number of fires in residential houses was 10,851. This is a decrease of -7,840 (-58%) compared to 1990.

In 2020, the number of fires was 11,090, which is a difference of -14,422 (-43.5%) compared to 1990, the number of injured was 260, a difference of -2,629 (-91%), and the number of deaths was 126, a difference of -125 (-50.2%) decrease. As can be seen from the analysis, the number of fires and their consequences are showing a decreasing dynamic year by year.

Today, the population of Uzbekistan is growing, and at the same time, modern buildings and structures are being built in cities. If we look at last year's figures, in 2023, the population was 35,644,900 people, the number of private houses was 6,211,169, apartments 1,391,346, households 7,602,515, the number of fires 10,204, the number of fires per 10,000 population 2.86, the number of deaths 79, the number of deaths in fires per 10,000 population 0.02, the number of injured 172, and the number of injured in fires per 10,000 population 0.05.

The number of fires is decreasing year by year, but the amount of material damage is showing an increasing dynamic, as can be seen in the following table (Table 1).

Table 1

Annual Average Rate of Total Fires (2017-2023)

Indicators	2017	2018	2019	2020	2021	2022	2023	Average per year
Fires	12,705	11,979	11,722	11,083	10,667	10,260	10,204	11,231
Injured	373	401	288	260	240	177	172	273
Deaths	165	135	111	126	112	107	79	119
Material Damage (million UZS)	68,854.3	88,072.8	95,781.2	146,385.1	209,650.7	214,656.0	270,405.9	156,258.0

The data for 2023 shows that the majority of fires occurred not in residential buildings, but in state-owned facilities (Figure 2).

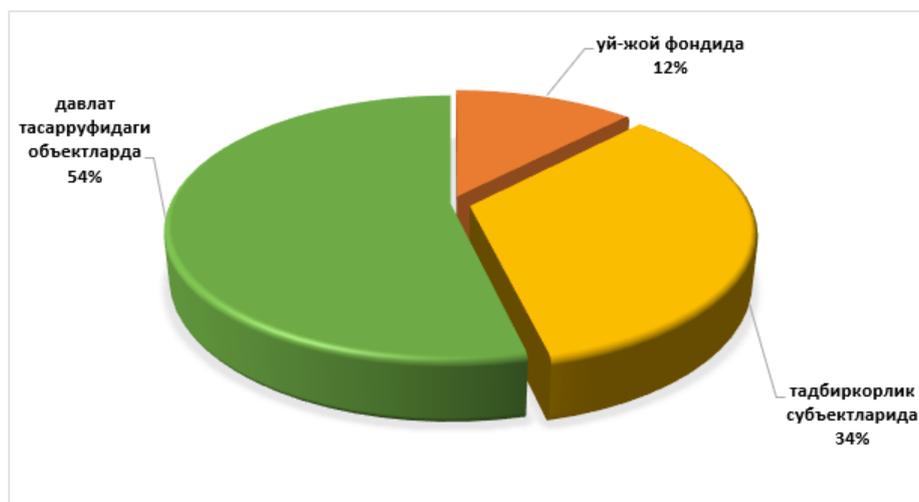


Figure 2. Share of fires that occurred in 2023.

As a result of the analysis, it was found that the majority of fires occur not in residential houses, but in state-owned facilities.

Another important issue is related to the integration of national and international experience in state fire supervision. The organization of fire supervision varies from country to country and depends on different foundations. For example, in Uzbekistan, there are special laws and regulations to ensure fire safety, and the Law “On Fire Safety” is the main document regulating relations in this area. In addition, the legal foundations for ensuring fire safety consist of a number of laws, regulatory legal acts, and international treaties, which define the joint responsibility of the state and society for protecting human life and health, preventing and combating natural disasters, and protecting the economy.

In the Russian Federation, the use of international standards in fire supervision, including ISO and NFPA (National Fire Protection Association) standards, is well-established. In addition, the Law “On Fire Safety” (1994), the Law “On Emergency Situations” (1994), the Law “On Technical Control” (2008), and the State Standards for Fire Safety (GOST) serve as a legal basis for ensuring fire safety.

In the United States, fire supervision is carried out by federal and state levels, each with different control mechanisms. Here, effective measures are established by expert organizations such as NFPA and Underwriters Laboratories (UL). The NFPA (National Fire Protection Association) is one of the largest fire safety organizations in the United States, and its main goal is to develop fire safety standards and participate in their development.

Japan has professional systems focused on high-risk natural disasters (earthquakes, typhoons, and fire suppression). In this country, mechanisms for adhering to unified standards in every field are used. In Japan, a large volume of education, systematic explanation, and preventive work related to fire safety is well established.

Australia also has considerable experience in fighting fires. In Australia, there are national standards requirements, and it is established that each region and city of the “Federal Fire Safety Agency” organization must develop its own relationships in the field of fire safety separately. **In Germany**, the fire safety system works on the basis of the requirements of the European Union. Germany is responsible for ensuring the full implementation of these standards. The EC Fire Safety Directive standard applies to high-risk construction in Europe.

A number of cooperation programs and relevant laws have been developed among the countries of the **European Union** regarding ensuring fire safety. For example, many countries in Europe accept NFPA, ISO 9001, and CE certificates as the main standards. Although fire safety services in the European Union countries are independent in each country, they exchange experiences with each other because the issue of fire safety is

considered a global threat. Sweden is one of the countries known for its effective systems and developed standards in the field of fire safety. In this country, the laws, technical standards, educational programs, and practices necessary for ensuring fire safety are very well-developed. Sweden has comprehensive legislation and standards for ensuring fire safety. For example, **Sweden's** Fire Safety Code is aimed at ensuring fire safety in buildings and structures in the country, and this code is a document that defines the main fire safety requirements in construction processes. Sweden adopts and implements European fire safety requirements and directives (EU Fire Safety Directive). This ensures that these states are in line with a common fire safety policy. The experience of developed countries shows that modern technologies, international standards, prevention, and education play an important role in ensuring fire safety.

Each country develops its own systems according to its national characteristics in terms of legislation and technical standards, but each country takes measures to minimize fire risk based on international experience.

In international practice, fire safety systems between countries are based on important general principles, but each country has its own unique mechanisms based on its national characteristics. The experience of each country in the field of fire safety may vary depending on its location, natural conditions, and economic capabilities. But the general goal is to protect human life and property.

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