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Property Damage after an Emergency Calculating Average and Indicators of Variation

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Abstract:

The article shows the assessment of the damage of emergency situations and its importance, the application of special simple cases. It is based on the analysis as a result of eventological observation. Methods of analysis of statistical data on emergency situations are explained. Formulas for determining variance, mean square deviations in the study of emergency damages are given. Eventological analysis is the basis of the theory of probabilities, the parameters of emergency damage calculation are presented.

Keywords: damage, probability, risk, random variable, mean linear variance, variance, mean square deviation, average damage, mathematical expectation, average damage.

Problems arising from emergency situations are one of the urgent problems of our time. Disasters such as uncontrollable large fires and floods cause the greatest damage. Therefore, the assessment and calculation of emergency situations in general and extreme fires in particular remain important.

Although the average quantity indicates the generalizing feature of the studied collection, it does not fully represent its structure. It is important to know how much the loss average differs from the individual amounts, because the more realistic or reliable the calculated averages are, the safer it is to use them in practice. The less the individual quantities of the symbol differ from the average (within the variance), the more fully the average quantity reflects the characteristics of the set units. According to the purpose and task of statistical research, the difference between the quantities of the observed set of variables is analyzed by various indicators [1].

This article calculates the average amount of damage and variation indicators in emergency situations based on the amount of damage given as a result of an emergency situation.

The sums of damages awarded as a result of the emergency are distributed as follows.

Damage amount, million soums	up to 10	10-20	20-30	30-40	40-50	50 and above
Number of emergencies	12	17	23	13	6	4

We calculate the average amount of damage and variation indicators in emergency situations. First, an auxiliary table is created and filled in to simplify the calculation [2].

Damage amount (x_1)	Number of emergencies (f_1)	x_i	$x_i f_i$	$\lvert x_i - \bar{x} \rvert$	$\lvert x_i - \bar{x} \rvert \ f_i$	$(x_i - \bar{x})^2$ f_i
up to 10 10-20 20- 30 30-40 40—50 50 and above	12 17 23 13 64	5 15 25 35 45 55	60 255 575 455 270 220	19,5 9.5 0,5 10,5 20,5 30,5	234 167,5 11,5 136,5 123 122	4563 1534,25 5,75 1433,25 2521,5 3721
$\sum$	75	—	1835	—	788,5	13778,75

Average amount of damage,

$$\bar{x} = \frac{\sum x_i f_i}{\sum f_i} = \frac{1835}{75} \approx 24{,}5 \text{ million soums.}$$

Width of variation,

$$R = x'_{\max} - x'_{\min} = 55 - 5 = 50 \text{ million soums.}$$

Mean linear variance,

$$\bar{d} = \frac{\sum (x'_i - \bar{x}) f_i}{\sum f_i} = \frac{788{,}5}{75} = 10{,}5 \text{ million soums.}$$

Dispersion,

$$\sigma^2 = \frac{\sum (x'_i - \bar{x})^2 f_i}{\sum f_i} = \frac{13788{,}5}{75} = 183{,}7 \text{ million soums.}$$

Mean squared variance,

$$\sigma = \sqrt{\sigma^2} = \sqrt{183{,}7} = 13{,}55 \text{ million soums.}$$

Coefficient of variation,

$$v = \frac{\sigma}{\bar{x}} = \frac{13{,}55}{24{,}5} = 0{,}55 \text{ or } 55\%.$$

Using the important mathematical properties of dispersion, it can be calculated by the moment method as follows:

$$\sigma^2 = k^2 (m_2 - m_1{}^2),$$

in this: m_1, m_2 - first-order moment, respectively,

$$m_1 = \frac{\sum (\frac{x_i - A}{k}) f_i}{\sum f_i},$$

second order torque,

$$m_1 = \frac{\sum (\frac{x_i - A}{k})^2 f_i}{\sum f_i}.$$

In conclusion, a statistical analysis was carried out according to the indicated methods and distribution functions, parameters of distribution functions were obtained. Parametric models of distribution functions of extreme values of indicators are described, on top of which lies the mathematical theory of one-dimensional extreme quantities. According to Fisher's theorem, it defines the third type of marginal distribution of normal extrema of sequences of independent, equally distributed random variables.

Literature

1. Гумбель. Статистика экстремальных значений. М.: Мир, 1965.
2. Лидбеттер М. Линдгрен Г., Ротсен Х. Эктремумы случайный последовательностей и процессов. М: Мир, 1989. 392б.