

Improving the Assessment of the Quality of Products of Reinforced Concrete Products

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Abstract— The paper considers the methodology of quantitative assessment of the quality of factory products. It is planned to control the technological processes for the manufacture of prefabricated reinforced concrete structures.

Index Terms— Technological processes, concrete structures, construction products, technical conditions, norms, quality index.

1 INTRODUCTION

The paper considers the methodology of quantitative assessment of the quality of factory products. It is planned to control the technological processes for the manufacture of prefabricated reinforced concrete structures.

A methodology for quantitative assessment of quality at all stages of the formation of construction products is developed.

The relevance of this development lies in the fact that the numbers of enterprises in the construction industry from defective and defective products averages 1.5-3% of the estimated value of construction projects.

2 PROCEDURE FOR PAPER SUBMISSION

2.1 Review Stage

The method is based on the assumption that I use technical conditions, norms and GOSTs, it is possible to establish the composition of individual quality indicators that determine its use value. For each individual quality index there is a unit of measurement quantitatively characterizing it

1; 2; 3; 4; ... i ... m

The value of single indicators meeting the requirements we express through

$\Phi_1, \Phi_2, \Phi_3 \dots \Phi_i \dots \Phi_m$

The normative value of the quality index can be given by one number, for example frost resistance, bulk density, strength, etc. or with a certain range of permissible deviations ± 5 mm in length, ± 5 mm in height, etc.

In the second case, we denote these admissible deviations by

$\pm \Delta\Phi_1, \pm \Delta\Phi_2 \dots \pm \Delta\Phi_i \dots \pm \Delta\Phi_m$

2.2 Final Stage

Examining a certain batch of exterior wall panels in order to establish the actual quality level.

Sufficient number of observations "P" is determined depending on the general population of "N", i.e. from the number of products produced in a certain period and is determined by the formula:

$$n = N / 1 - E^2 N;$$

Where:

n is the number of samples

ϵ^2 -accepted limit error

N - The volume of production for the adoption of the reporting period.

The number of detected defects for each unit index allows us to calculate the relative frequency value of the occurrence of defects.

$$X^2 = t / n$$

where: t is the number of deviations of a single quality score from the normative value

n - Number of samples

After determining the distribution of X_i and determining the parameters of the distribution curve, it is possible to calculate the theoretical frequencies of these values

m

$$\Sigma = F(X_i) N$$

i = 1

In the volume of products studied, comparing the normative (L_i) and actual (F_i) values of individual quality indicators, three groups of products are identified, for which

$$1. L_i \pm \Delta L_i > \Phi_i$$

$$2. L_i - \Delta L_i \leq \Phi_i \leq L_i + \Delta L_i$$

$$3. L_i \pm \Delta L_i < \Phi_i$$

In order to analyze the histoty deviations from the regulatory requirements and establish the nature of the defects, the data obtained is presented in the form of an ordered variation series. The empirical form of these deviations in the form of a histogram is shown in Fig.

2.3 Figures

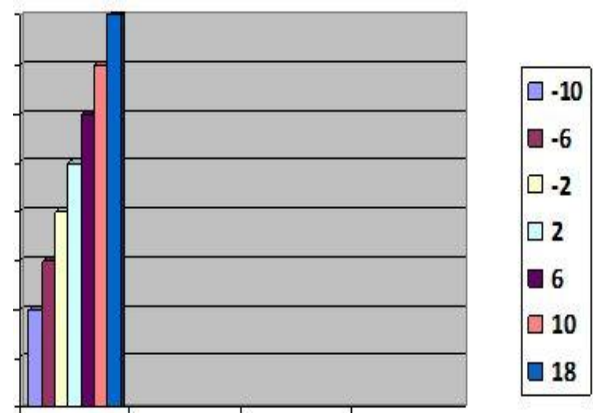
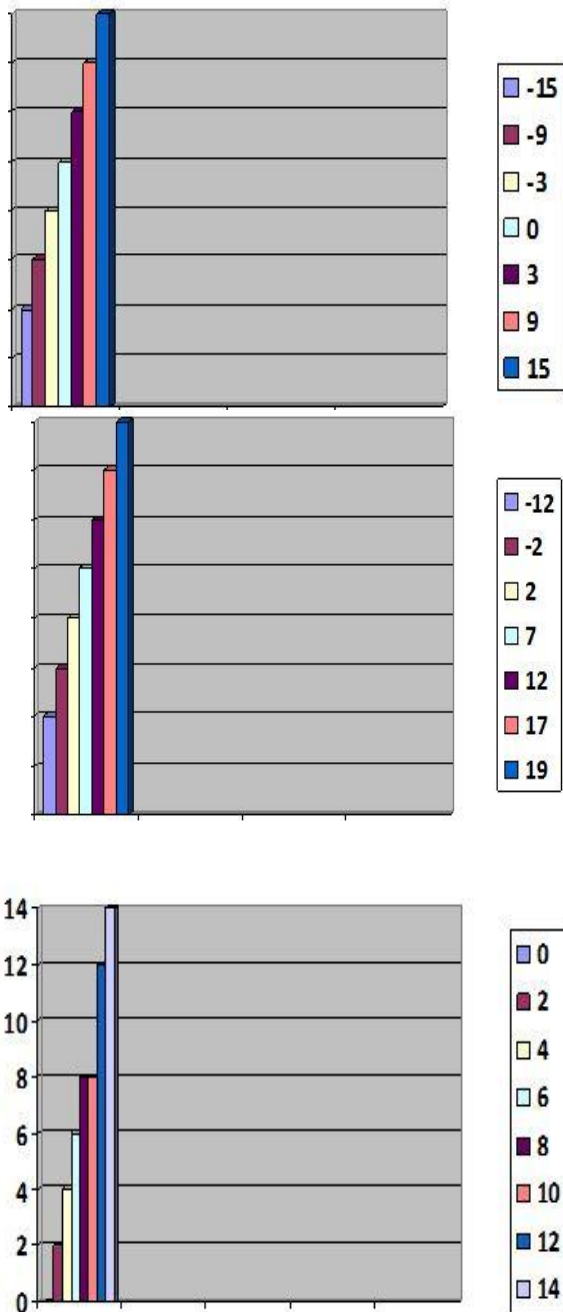


Figure 1. Histogram distribution

3 EQUATIONS

- The carried out researches on revealing of regularities of deviations of geometrical sizes of designs from standard sizes. The data obtained during the survey made it possible to put forward a hypothesis about the normal law of distribution of deviations.

To obtain confirmation of this hypothesis, the mean deviations from the requirements

$$S_m = d \sqrt{2S_2 - S_1 + S_2 - 1/12}$$

where: d is the interval step

S_1 is the deviation value

S_2 - cumulative number of deviations

With a confidence interval of 90%, the adjustable coefficient assumes values

$$m = \pm 1.645.$$

4 CONCLUSION

Thus, the normative value of quality indicators is set for this period, taking into account the level of quality of the final product.

This technique allows:

Identify deviations from the normative level of quality established by the relevant legislative standards;

To establish the specific weights of each deviation in the total aggregate aggregate;

Identify the bottlenecks shaping the quality of products in the technological process;

Economic evaluation revealed deviations;

Quantify the quality of products.

This technique can be used:

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- In the process of designing
- At the factory production stage
- At the stage of construction installation works.
- During the operation of buildings and structures.

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