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VERIFICATION OF THE PERFORMANCE OF TEST METHODS IN LABORATORY CONDITIONS TO DETERMINE THE RELATIVE UNIFORM ELASTICITY OF METAL REINFORCEMENT BUILDING MATERIALS

Tugalov Babur Karshiboy ugli
large teacher , Tashkent University of Architecture and Civil Engineering.
Rajabov Sardor Jumaboy ugli
assistant professor, Tashkent University of Architecture and Civil Engineering.

Abstract : This work covers the issues of verification of the implementation of test methods for determining the value of the relative uniform elongation (relative deformation) of metal reinforcement construction materials in laboratory conditions. The main purpose of the study is to assess the mechanical properties of reinforcing steel, in particular, the accuracy and reliability of deformation indicators during elongation, and to verify the repeatability and reproducibility of current standard test methods.

In the work process, the stages of sample preparation, marking, dimensioning, and tensile testing are carried out in laboratory conditions in accordance with current regulatory documents, including the requirements of Uzbek DSt 1497 and GOST 12004. Tests are performed on universal testing machines, and load and relative elongation indicators are recorded using special measuring instruments. Obtained results statistic analysis average value, variance and deviation indicators is determined.

Keywords: metal reinforcement, construction material, relative elongation, deformation, elongation test, laboratory tests, mechanical properties, verification, universal testing machine, measurement accuracy, standardization, Uz DSt 1497, GOST 12004, quality control, statistical analysis.

Introduction and justification of the research According to clause 7.2.1.5 of the DSt ISO/IEC 17025:2019 standard, before using the methods in the work, the laboratory must confirm that the selected methods can be used correctly, providing the required indicators. Records of the confirmation must be maintained. If changes are made to the method by the development organization, the verification must be repeated as necessary.

Based on this, all methods used in the laboratory (quantitative, qualitative, etc.) should be verified.

When validating a method, the laboratory must evaluate, characterize, and verify that it meets the following requirements before evaluating its performance:

Environmental conditions;
The presence of a risk of environmental pollution; test conditions;
The time interval between tests (when tests are conducted sequentially or at multiple levels);
Equipment and documents;
Necessary aids;
References / references (if used);
Conditions of carriage;
Employee qualifications; Documents and records;
The cost of testing (if necessary) and other factors;
suggestions and conclusions.

It is required to provide objective evidence and evidence of the appropriateness of the chosen method before applying it. The following diagram check and / or the method check plan presented will:

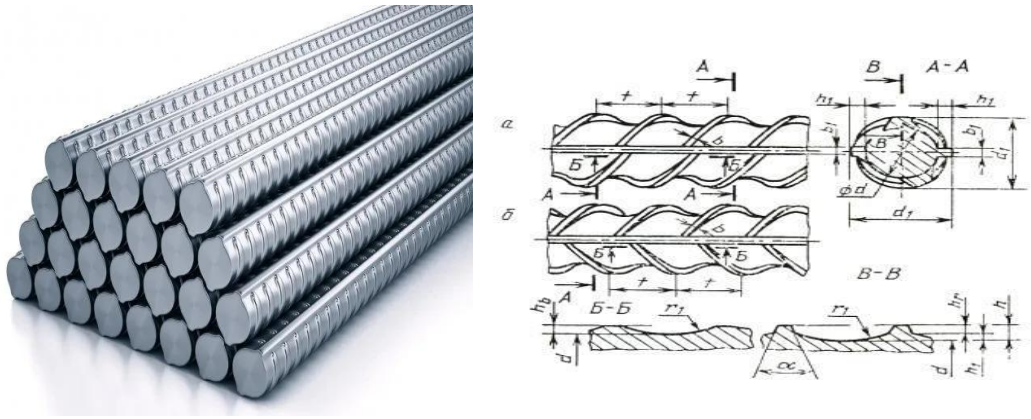
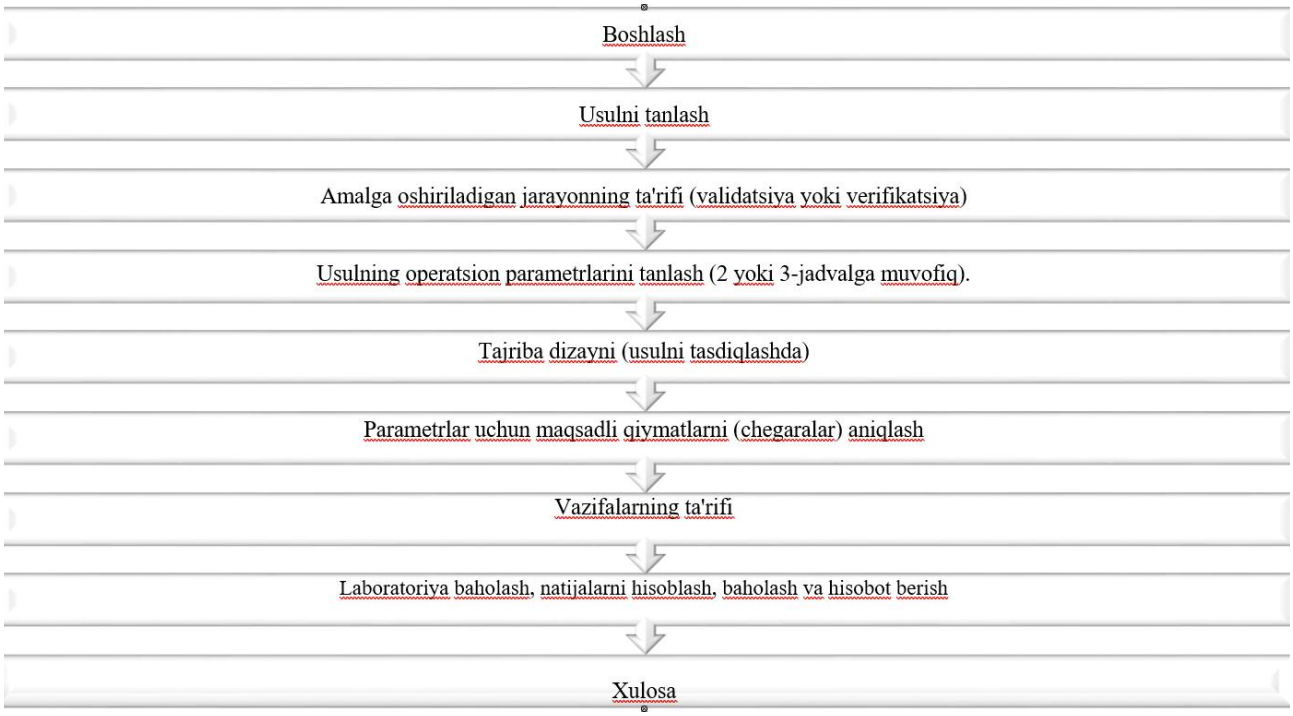


Figure 1 metal fittings



The following in cases verification will be held:

International, regional or national standard methods (e.g. ISO, IEC, OIML, EN, GOST, own Own DSt) or recognized technician organizations scientific published in magazines from methods or recognized working issuer by designated from methods if used and if this methods laboratory required by work settings

(confirm) results) own inside when receiving;

If the method known one matrix for intended if and laboratory required by work parameters about enough information there is if.

Own DSt ISO / IEC 17025:2019 state According to clause 7.2.2.3 of the standard, the method work indicators the following to be possible (but they with unlimited without):

– work range;
– accuracy;
– measurement of the results uncertainty;
– determination limit of error (LOD);
– quantity limit (LOQ);
- method selectivity;
- linearity;
- repeatability or reproducibility;

- external to the effects resistance or sample or test of the object matrices impact to do impact;
- offset (bias).

Given work parameters they determined to the place looking at difference to do possible.

Laboratory of the method work parameters determination possible proof for enough was actions plan (method) statistic assessment according to work size ( ) But every how under the circumstances this to the method included matrices (analytics) types , method measurement range) and test degrees into account to be taken need . Some in cases experience matrices every kind to types to be and every one the group representative samples choice through done increase In validation, if the method range wide if, every one the group representative one sample suitable accordingly is being checked and if otherwise not specified if, every one sector for at least 5 different groups is confirmed.

If the method limited in quantity groups own inside (for example, 1, 2, 10 and others), then relevant the group indicating sample using check possible. Confirm all of samples work to the method appropriate that it is working proof need. Method to the range according to, most difficult product to be checked possible (most difficult groups check research as a result taken the most big deviation and relative standard deviation with is determined). Experiments all applicable variables (staff, tools, gauges, test devices), their location, cost materials (time) and others) and their impact scale into account received without to be planned needed. Selected experience to the project appropriate work parameters (characteristics) are studied and their results record Research after completion after every one operational parameter assessment order relevant title under given. More details study and experience plan of the method operational parameters in the department discussion A series of in recommendations free reagents standards and matrices suitable coming from forms in use usable other experimental designs about information In this case, interlaboratory in comparison from samples use in mind Samples are kept. suitability deadline or use deadline during stability product opened since then starting confirmation need (work) issuer to the information according to or literature to the information is based on).

The method confirmation and of inspection borderline and targeted values law documents or consumer by the method relevant accordingly application based on into account is taken. Selected of the method work parameters one kind definition with and one kind for the purpose check and in inspection is applied. Performance both parameters and check for action does.

Performance parameters chosen experimental to design appropriate is being checked and results record Research after completion after every one parameter assessment order separately statement to be necessary.

Metal fittings construction material relative one kind stretching value determination for test methods laboratory under the circumstances fulfillment test method verification in doing following The results were obtained:

Conclusion and offers

Metal fittings relative one kind elongation (relative) stretching level, that is plastic deformation indicator) value determination construction of constructions strength and reliability in providing important importance has. Laboratory under the circumstances this indicator usually to stretch test machines using is determined.

Research this The test shows that of the results accuracy and reliability following to factors related:

- Test equipment technician status and calibrated
- Sample standard requirements based on preparedness
- Measurement accuracy and human factor
- Test in the process loading speed normative at the level to be

- Environment conditions (temperature, humidity)

Suggestions

1. **Test equipment regular calibration**

Stretching test machines and measurement tools designated in terms of time metrological from inspection transfer necessary.

2. **To standards strict compliance Do**

the test. in the process **ISO 6892-1** and national normative documents requirements complete action to do necessary.

3. **Sample preparation quality control Making**

Armature samples length, diameter and worker part to standards suitable accordingly preparation need.

4. **Laboratory employees qualification Increase**

Test process take going experts for regular qualification increase courses organization to grow recommendation is being done.

5. **Automated measurement from systems Use**

Digital deformation application of gauges (extensometers) human factor the impact reduces.

6. **Statistical analysis methods current** To be **received**

the results mathematical-statistical methods using again work of tests reliability level increases.

7. **Internal quality audit system on the road Put**

in the laboratory regular internal audit and verification processes organization to grow test of the results stability provides.

Used literature

1 “Materials Science and construction materials technology” – RX Saydahmedov, TO Almatayev, UA Ziyamukhamedova
2 “Construction materials technology” – VA Mirboboyev;
3 NS Bibutov, AX Hojiyev – “Materials resistance”
4 SR Majidov, AA Kholiyorov – Laboratory works according to manual