

## EFFECTIVENESS OF MODERN METHODS OF TESTING BUILDING STRUCTURES

**Khamidov Adhamjon**

Professor of Namangan Engineering-Construction Institute

**Akhmedov Islombek**

Dosent of Namangan Engineering-Construction Institute

**Kholmirezayev Sattor**

Professor of Namangan Engineering-Construction Institute

**Jalalov Zayniddim**

Teacher of Namangan Engineering-Construction Institute

**Yusupov Shavkatjon**

Teacher of Namangan Engineering-Construction Institute

**Umarov Isroiljon**

Teacher of Namangan Engineering-Construction Institute

<https://doi.org/10.5281/zenodo.7447838>

**Abstract.** *The article substantiates the effectiveness of testing building materials and structures by non-destructive methods.*

**Keywords:** *construction, building materials, structures, testing, non-destructive methods, destructive methods, efficiency.*

## ЭФФЕКТИВНОСТЬ СОВРЕМЕННЫХ МЕТОДОВ ИСПЫТАНИЙ СТРОИТЕЛЬНЫХ КОНСТРУКЦИЙ

**Аннотация.** *В статье обоснованы эффективность испытания строительных материалов и конструкций неразрушающими методами.*

**Ключевые слова:** *строительство, строительные материалы, конструкции, испытания, неразрушающие методы, разрушающие методы, эффективность.*

### INTRODUCTION

The speed and size of modern construction is increasing, various new building materials, modern advanced technologies, and technical progress are connected. Therefore, reliable operational monitoring of the quality of building construction materials is required in factories and construction sites. Currently, the amount of data obtained by means of non-destructive testing mechanical and electronic means, the speed of static processing and the evaluation of the results do not meet the high requirements of verification. In controlling the quality of construction materials, the use of computer technologies, outdated measuring techniques and results processing methods are incompatible.

### RESEARCH MATERIALS AND METHODOLOGY

In the last decade, a new generation of non-destructive testing has been focused on increasing the volume of measurements, speed of processing results, and increasing the reliability of non-destructive testing.

In Uzbekistan, in the centers established under the State Standard, various small-sized microprocessor devices, defectoscopes, thickness measuring devices, reinforcement tension control devices, devices that determine the location of reinforcement in concrete and many other devices are being produced for measuring the strength, moisture, thermal conductivity of building materials. All of them are autonomously powered by battery elements, provide operational data as indications on a matrix display, are connected to a computer [1].

Destructive and non-destructive testing methods are used for testing construction structures[2,3].

By comparing these methods, it is possible to determine the effectiveness of the test methods.

## RESULTS OF THE STUDY

Disadvantages of hacking methods:

- tests are not performed at the facility and operating conditions are not taken into account;
- tests are performed only on samples of elements taken from one batch (one construction) and they may not be objective, because different elements of constructions have different properties;

- most of the time, it is not possible to perform the tests on one structure, in which samples cut from the structure or special samples representing the properties of the structure are tested;

- it is possible to determine the reliability of constructions in operational conditions by determining only one or several properties in a hacked and tested method (the information obtained is insufficient);

- tamper control method cannot be performed under operational conditions. During testing, work must be stopped and the element under test removed from the structure (which may weaken the structure);

- constructions are affected by various external and internal influences, so the samples are required to be taken at different times. Samples taken at one time may not represent the entire exploitation process.

- if the samples taken for testing are made of valuable materials, replacing the taken samples with other samples will increase the cost of testing;

- testing methods require the use of mechanical or other destructive testing methods and the use of large machines. As a result, the cost of testing is high and the number of samples available is limited. These methods are characterized by a relatively high labor demand, and qualified specialists are required to conduct testing;

- When using destructive testing methods, the duration of testing time is increased and it leads to high cost of testing methods.

Advantages of non-destructive testing methods:

testing methods are carried out in constructions that are in operation;

- It is possible to get full information about the structure by performing the sanding works in a short time;

- tests are performed in constructions operating in different real conditions, which increases the reliability of the obtained data;

- test works are conducted to test various constructions, and during this, general information about the constructions is obtained and full information about the building is obtained;

- test works can be performed in dangerous sections of constructions;

- different properties of structural elements can be determined using different non-destructive testing methods;

- testing can be done during the construction process, without stopping the work, and it will be possible to determine various properties related to the working conditions;

- it is possible to re-perform the tests at any time, and during operation, the defects found in the constructions are studied and their impact on the durability of the construction is determined;
- When valuable elements of structures are tested, they do not fail during testing. Testing can be repeated when it is economically and practically justified;
- it is possible to test the tested elements with little processing and without processing;
- testing equipment is portable, light, small in size and takes a short time for testing, testing can be fully automated using computer equipment;
- test results are stored in the memory of the equipment for a long time, can be viewed on a computer monitor, and the results can be processed automatically;
- non-destructive testing methods require less labor than destructive testing methods and the data obtained is reliable, cheap and accurate.

## CONCLUSION

In conclusion, it can be noted that comparing test cases, non-destructive testing methods are more effective than destructive testing methods.

## REFERENCES

1. Fathulloev A.M., Eshev S.S., Samiev L.N., Ahmedov I.G', Jumaboyev X., Arifjanov S. Boglanmagan gruntlardan tashkil topgan uzanlarda yuvilmaslik tezliklarini aniklash [To the determination of non-effective speed in the beds containing from unconnected soils] //Journal "Irrigatsiya va melioratsiya". Tashkent. – 2019. – C. 27-32.
2. Arifjanov A., Akmalov Sh., Akhmedov I., Atakulov D. Evaluation of deformation procedure in waterbed of rivers //IOP Conference Series: Earth and Environmental Science. – IOP Publishing, 2019. – T. 403. – №. 1. – C. 012155.
3. Arifjanov A., Samiyev L., Akhmedov I., Atakulov D. Innovative Technologies In The Assessment Of Accumulation And Erosion Processes In The Channels //Turkish Journal of Computer and Mathematics Education (TURCOMAT). – 2021. – T. 12. – №. 4. – Pp. 110-114.
4. Axmedov I.G', Muxitdinov M., Umarov I., Ibragimova Z. Assessment of the effect of sedibles from sokhsoy river to kokand hydroelectric power station //InterConf. – 2020.
5. Arifjanov A.M., Ibragimova Z.I., Axmedov I.G'. Analysis Of Natural Field Research In The Assessment Of Processes In The Foothills The American Journal of Applied sciences. – 2020. – T. 2. – №. 09. – Pp. 293-298.
6. Арифжанов А.М., Самиев, Л.Н., Абдураимова, Д.А., Ахмедов, И.Г. Ирригационное значение речных наносов [Irrigation value of river sediments] //Актуальные проблемы гуманитарных и естественных наук. – 2013. – №. 6.
7. Ахмедов И.Ф., Ортиқов И.А., Умаров И.И. Дарё ўзанидаги деформацион жараёнларни баҳолашда инновацион технологиялар [Innovative technologies in the assessment of deformation processes in the riverbed] // Фарғона политехника институти илмий-техника журнали. – Фарғона. – 2021. – Т.25, №.1. – С. 139-142.
8. Axmedov I.G', Ortiqov I.A., Umarov I.I. Effects of water flow on the erosion processes in the channel of GIS technology // <https://doi.org/10.5281/zenodo.5819579>
9. Tadjiboyev S., Qurbonov X., Akhmedov I., Voxidova U., Babajanov F., Tursunova E., Xodjakulova D. Selection of Electric Motors Power for Lifting a Flat Survey in Hydraulic

- Structures // AIP Conference Proceedings 2432, 030114 (2022); <https://doi.org/10.1063/5.0089643>
10. Abduraimova D., Rakhmonov R., Akhmedov I., Xoshimov S., Eshmatova B. Efficiency of use of resource-saving technology in reducing irrigation erosion // AIP Conference Proceedings 2432, 040001 (2022); <https://doi.org/10.1063/5.0089645>
  11. Холмирзаев С. А., Комилова Н. Х. Влияние сухого жаркого климата на ширину раскрытия трещин внецентренно-сжатых железобетонных элементов //Приволжский научный вестник. – 2015. – №. 4-1 (44).
  12. Холмирзаев С. А. Температурные изменения в керамзитобетонных колоннах в условиях сухого жаркого климата //Журнал «Бетон и железобетон. – 2001. – №. 2.
  13. СА Холмирзаев, АР Ахмедов. Базальт толасининг тўлдирувчи сифатида цемент тошининг мустаҳкамлик хоссаларига таъсирини ўрганиш Ijtimoiy fanlarda innovasiya onlayn ilmiy jurnali 2 (6), 49-55 2022
  14. Хамидов А. И. и др. Использование теплоизоляционного композиционного гипса в энергоэффективном строительстве. – 2021.
  15. Хамидов А. И., Нуманова С. Э., Жураев Д. П. У. Прочность бетона на основе безобжиговых щелочных вяжущих, твердеющего в условиях сухого и жаркого климата //Символ науки. – 2016. – №. 1-2. – С. 107-109.
  16. Нуманова С. Э. Хамидов Адхамжон Иномжонович //ISSN 2410-700X. – С. 107.
  17. Хамидов А. И., Ахмедов И., Кузибаев Ш. Теплоизоляционные материалы на основе гипса и отходов сельского хозяйства. – 2020.
  18. Хамидов А. И. Использование теплоизоляционных материалов для крыш в энергоэффективном строительстве //Научно–технический журнал ФерПИ. Спец. – №. 2018.
  19. Хамидов А. И., Мухитдинов М. Б., Юсупов Ш. Р. Физико-механические свойства бетона на основе безобжиговых щелочных вяжущих, твердеющих в условиях сухого и жаркого климата. – 2020.
  20. Нуриддинов А. О., Ахмедов И., Хамидов А. И. АВТОМОБИЛ ЙЎЛЛАРИНИ ҚУРИЛИШИДА ИННОВАЦИЯЛАР //Academic research in educational sciences. – 2022. – Т. 3. – №. TSTU Conference 1. – С. 73-77.
  21. Нуманова С. Э. Хамидов Адхамжон Иномжонович //ISSN 2410-700X. – С. 107.
  22. Ризаев Б. Ш. Прочность, деформативность и трещиностойкость внецентренно-сжатых железобетонных элементов в условиях сухого жаркого климата. – 1993.
  23. Абдуназаров, А., Хакимов, С., Умаров, И., Мухторалиева, М., Дедаханов, Ф., & Шаропов, Б. (2022). МЕРОПРИЯТИЯ ПО ПОВЫШЕНИЮ ЭНЕРГОЭФФЕКТИВНОСТИ СОВРЕМЕННЫХ И РЕКОНСТРУИРУЕМЫХ ЗДАНИЙ. Journal of new century innovations, 18(1), 130-134.
  24. Hakimov, S., Sharopov, B., Umarov, I., Muxtoraliyeva, M., Dadaxanov, F., & Abdunazarov, A. (2022). URILISH MATERIALLARI SANOATIDA INNOVATSION MATERIALLAR ISHLAB CHIQRISHNING ISTIQBOLLI TOMONLARI. Journal of new century innovations, 18(1), 149-156.
  25. Sharopov, B., Hakimov, S., Umarov, I., Muxtoraliyeva, M., Dadaxanov, F., & Abdunazarov, A. (2022). QUYOSH ENERGIYASIDAN FOYDALANIB TURAR JOY BINOLARI

- QURISHNING ISTIQBOLI TOMONLARI. *Journal of new century innovations*, 18(1), 135-141.
26. Sodiqjon, K., Begyor, S., Aleksandr, K., Farrukh, D., Mukhtasar, M., & Akbarjon, A. (2022). PROSPECTIVE ASPECTS OF USING SOLAR ENERGY. *Journal of new century innovations*, 18(1), 142-148.
27. Kazadayev, A., Sharopov, B., Hakimov, S., Umarov, I., Muxtoraliyeva, M., Dadaxanov, F., & Abdunazarov, A. (2022). MAMLAKATIMIZDA NEMIS TA'LIM TIZIMINI JORIY QILISHNING SAMARADORLIGI TAHLILI. *Journal of new century innovations*, 18(1), 124-129.
28. Mukhtasar, M., Begyor, S., Aleksandr, K., Farrukh, D., Isroil, U., Sodiqjon, K., & Akbarjon, A. (2022). ANALYSIS OF THE EFFECTIVENESS OF THE DEVELOPMENT OF THE GERMAN EDUCATION SYSTEM IN OUR COUNTRY. *Journal of new century innovations*, 18(1), 168-173.
29. Dadakhanov, F., Sharopov, B., Umarov, I., Mukhtoraliev, M., Hakimov, S., Abdunazarov, A., & Kazadayev, A. (2022). PROSPECTS OF INNOVATIVE MATERIALS PRODUCTION IN THE BUILDING MATERIALS INDUSTRY. *Journal of new century innovations*, 18(1), 162-167.
30. Begyor, S., Isroil, U., Aleksandr, K., Farrukh, D., Mukhtasar, M., Sodiqjon, K., & Akbarjon, A. (2022). MEASURES TO IMPROVE THE ENERGY EFFICIENCY OF MODERN AND RECONSTRUCTED BUILDINGS. *Journal of new century innovations*, 18(1), 157-161.
31. Кодирова Ф. М. Получение кондиционных углеводородов переработкой пироконденсата и подземной газификацией угля компаундированием // Вестник Науки и Творчества. – 2017. – №. 7 (19). – С. 15-18.
32. Yuvmitov A., Hakimov S. R. Influence of seismic isolation on the stress-strain state of buildings // *Acta of Turin Polytechnic University in Tashkent*. – 2021. – Т. 11. – №. 1. – С. 71-79.
33. ЮВМИТОВ А. С., Казадаев А. М. ИССЛЕДОВАНИЕ РАСПРОСТРАНЕННЫХ ОШИБОК, ДОПУСКАЕМЫХ В ПРОЦЕССЕ СТРОИТЕЛЬСТВА ЗДАНИЙ И СООРУЖЕНИЙ, МЕРЫ ПО ИХ НЕДОПУЩЕНИЮ И УЛУЧШЕНИЮ КАЧЕСТВА СТРОИТЕЛЬСТВА // *Central Asian Research Journal for Interdisciplinary Studies (CARJIS)*. – 2022. – №. Special issue. – С. 140-145.
34. Хакимов, С. (2022). АКТИВ ВА ПАССИВ СЕЙСМИК УСУЛЛАРИ ҲАМДА УЛАРНИНГ АСОСИЙ ВАЗИФАЛАРИ. *Journal of Integrated Education and Research*, 1(2), 30-36.
35. Умаров, Ш. А. (2021). Исследование Деформационного Состояния Композиционных Арматурных Балок. ТА'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI, 1(6), 60-64.
36. Davlyatov, S. M., & Kimsanov, B. I. U. (2021). Prospects For Application Of Non-Metal Composite Valves As Working Without Stress In Compressed Elements. *The American Journal of Interdisciplinary Innovations Research*, 3(09), 16-23.
37. Умаров, Ш. А., Мирзабабаева, С. М., & Абобакирова, З. А. (2021). Бетон Тўсинларда Шиша Толали Арматураларни Қўллаш Орқали Мустаҳкамлик Ва Бузилиш Ҳолатлари Аниқлаш. ТА'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI, 1(6), 56-59.

38. Yuldashev, S., & Hakimov, S. (2022). ТЕМИР ЙЎЛ ТРАНСПОРТИДАН КЕЛИБ ЧИҚАДИГАН ТЕБРАНИШЛАР ҲАҚИДА. *Science and innovation*, 1(A5), 376-379.
39. Шаропов, Б. Х., Хакимов, С. Р., & Рахимова, С. (2021). Оптимизация режимов гелиотеплохимической обработки золоцементных композиций. *Матрица научного познания*, (12-1), 115-123.
40. Хакимов, С., Шаропов, Б., & Абдуназаров, А. (2022). БИНО ВА ИНШОТЛАРНИНГ СЕЙСМИК МУСТАҲКАМЛИГИ БЎЙИЧА ХОРИЖИЙ ДАВЛАТЛАР (РОССИЯ, ЯПОНИЯ, ХИТОЙ, АҚШ) МЕЪЁРИЙ ХУЖЖАТЛАРИ ТАҲЛИЛИ. *BARQARORLIK VA YETAKCHI TADQIQOTLAR ONLAYN ILMIY JURNALI*, 806-809.