The American Journal of Engineering and Technology
(ISSN – 2689-0984)
**Published:** September 30, 2021 | **Pages:** 12-17
**Doi:** https://doi.org/10.37547/tajet/Volume03Issue09-03

IMPACT FACTOR
2021: 5. 705
OCLC - 1121105677


**Journal Website:** https://theamericanjournals.com/index.php/tajet



# The Use Of Strength Sensors In Construction

**Uktam Sirojiddinov**
**Samarkand State Institute Of Architecture And Construction, Uzbekistan**

**Kamoliddin Shodiyev**
**Samarkand State Institute Of Architecture And Construction, Uzbekistan**

## ABSTRACT

This article discusses the use of strain gauges in determining the magnitude of stress arising in building structures, as well as their use in the processes of dosing and weighing the components of reinforced concrete products. The principles of operation and methods of operation of some types of strain gauges are given.

## KEYWORDS

Building structures, dosing and weighing, strain gauges, electronic dosing systems, strain gauges.

## INTRODUCTION

The automation of metering and metering systems plays an important role in the modernization of concrete mixing equipment or other facilities in the building materials industry. Modern electronic sensors, unlike old mechanical meters, allow automated metering and control systems to measure materials and enter flow rates with high accuracy. This will completely eliminate errors and shortcomings associated with the "human factor". In addition, electronic weighing systems used in various batching machines speed up the metering and dosing of mixtures and ensure full compliance with technical regulations. In particular, the role of electronic sensors in measuring and dosing the mass of cement, chemical additives and other similar substances is invaluable.

Electronic sensors are designed to perform a wide range of tasks. These include the determination of the mechanical characteristics of the forces acting on the objects under study, the measurement of the

The American Journal of Engineering and Technology
(ISSN – 2689-0984)
**Published:** September 30, 2021 | **Pages:** 12-17
**Doi:** https://doi.org/10.37547/tajet/Volume03Issue09-03

IMPACT FACTOR
2021: 5. 705
OCLC - 1121105677

quantities necessary to assess the state of the objects, continuous monitoring during the operation of the objects. Such problems are varied and arise in almost all areas of technology. In this article, we'll take a look at some of them [1-3].

Electronic dosing systems do not require constant monitoring and adjustment - all processes are automated, and operator intervention is rarely required. In addition, employees are prevented from distorting or stealing product loading standards during batching of materials, loading or unloading finished products. A report on all processes occurring at the facility is automatically generated and stored in the electronic memory of the device. They can be printed, sent by email or sms at any time. Compared to mechanical metering and metering methods, the electronic system allows data to be obtained in a relatively short time, with high reliability and accuracy. Currently, in the process of modernization and automation of the engineering complex, the replacement of obsolete mechanical measuring instruments in the fuel dispenser with electronic sensors has begun. This is due to the fact that the combined operation of mechanical and electronic sensors negatively affects the achievement of high productivity, measurement accuracy and dosing of materials [4-6].

A strain gauge system for determining the mass of a material is widely used at enterprises for the production of building materials and has a number of advantages not only over mechanical measuring systems, but also over systems based on piezoelectric or vibration-frequency sensors.

FLA / FLG load cells are adhesive mounts made of a copper-nickel foil mesh and a special plastic backing. The plastic base has high electrical insulating properties and can be made in different colors depending on the purpose of using the device.

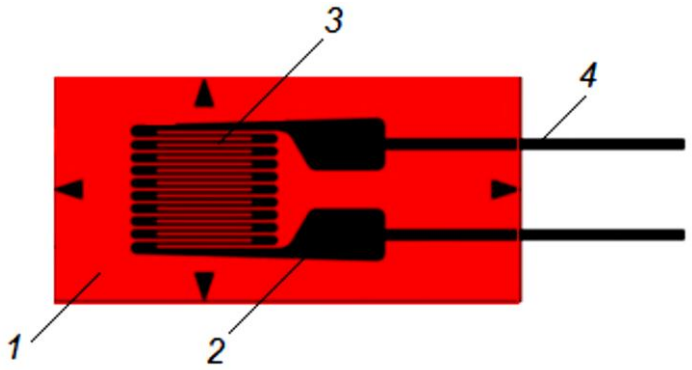


Figure 1. General view of the FLA / FLG load cell.
1-base; 2-strain gauge; 3-basement; 4- result.

Tensor-resistor sensors (strain gauges) used in weight measurement are characterized by high accuracy, small measurement errors, reliability, resistance to aggressive environmental influences and stability (Figure 2).

The American Journal of Engineering and Technology
(ISSN – 2689-0984)
**Published:** September 30, 2021 | **Pages:** 12-17
**Doi:** https://doi.org/10.37547/tajet/Volume03Issue09-03

IMPACT FACTOR
2021: 5. 705
OCLC - 1121105677

Figure 2. Weight load cells.

The principle of operation of strain gauges is based on a change in electrical resistance under the action of pulses of elongation or compression forces [7-11]. The simplicity and compactness of the sensor design allows accurate measurements even in the most difficult process conditions. Considering the variety and wide range of capabilities of load cells, they can be equipped not only with a hopper or silo, but also with any container in which the material to be measured or dosed is located. To ensure high dosing accuracy, it is desirable that the number of load cells installed in dispensers, especially in dispensers for spraying materials, should be at least 3, in some cases at least 6. This is due to the fact that when filling with crumbling materials, a shift in the center of gravity of the container is usually observed ... Due to the inability to predict the occurrence of the shear effect, it is not possible to make adjustments to the system during a process when only one sensor is used.

Today, traditional mechanical scales are becoming obsolete in today's rapidly evolving manufacturing environment [12-17]. They will be replaced by electronic scales with a compact digital display. When automating technological processes, it is difficult to imagine whether it will be scales or dosing units, or an integrated scale system without load cells.

In construction, strain gauges can be used to experimentally study the flexural strength and deformation properties of building materials and concrete (Fig. 3). For this, samples are taken for the bearing edges and stretched surfaces, to which the strain gauge is glued, and the power transmission and reference points are determined in accordance with the loading scheme in the experimental sample.

Figure 3. Interlink FSR 400 resistor.

The American Journal of Engineering and Technology
(ISSN – 2689-0984)
**Published:** September 30, 2021 | **Pages:** 12-17
**Doi:** https://doi.org/10.37547/tajet/Volume03Issue09-03

IMPACT FACTOR
2021: 5. 705
OCLC - 1121105677

Then tensor resistors are glued to the middle gap (middle of the span) to determine the distribution of deformation along the edge of the beam. In the same order, tensor resistors are glued to the lower elongated edges of the beam to determine the moment of crack formation and connected to the measuring circuit.

The approximate shear resistance is determined by testing one or two specimens without a tensor resistor. According to the tensor resistors obtained as a result of research, it is possible to express the distribution of deformation relative to the magnitude of the load along the height of the section.

In addition to the above, strain gauges are also widely used to continuously monitor and measure the deformation of prestressed concrete structures.

During operation, any building structure is subjected to various loads. These include, for example, the pressure exerted on the foundation of a building, both on the ground and on elements under the building itself (roof slabs, stairs) and other operational loads.

These loads need to be measured periodically during the operation of the buildings. Because this is the only way to find out the residual resource and the level of security of the building, to identify problem areas that require full or partial repairs, replacement of hazardous elements. But the most efficient way is to determine the loads during the construction phase and fix the problem. If the operation goes wrong, you can pause this site or fix it in the field to fix it [18-22]. In fact, strain gauges are dwarf weight (weight) sensors. But unlike conventional weights, they measure the force applied to a specific element, not weight. For example, there are strain gauges designed to determine changes in the parameters of a concrete mixture during the hardening period (Figure 4).


Figure 4. Shear strain gauge.

At the same time, they are placed directly inside the concrete structure and control the state of concrete, recording changes in the values of internal stresses (stresses) of the structure during the transition from a liquid state to a dark state. The same devices are used on the anchor tension rods. If reinforced concrete structures contain elements subject to high loads, then the reinforcement inside the structure is constantly monitored, since it is very important to control that any steel bar has its own tensile and flexural strength and that external loads do not exceed the specified limit. Displacement strain gauges allow you to control the relative amount of strain that occurs in concrete structures (tunnels, piles, bridges, foundations, dams) in surface cracks and joints, as well as when structural elements

move relative to each other. If it is necessary to control the movement in the horizontal and vertical directions simultaneously, a system of sensors installed on different surfaces is used. In this case, a dynamic change in the value is observed in a continuous automatic mode.

## REFERENCES

1. Yusufbekov N.R., Mukhamedov B., Gulamov Sh. (2012). The Control and Automation of Technological processes. Tashkent: Uqituvchi.
2. Jukov A.N., Fadina A.A. (2015). Sequence of strain tests of internal elements of reinforced concrete structures. M: Molodoy uchyoniy, № 7.
3. Josef Cukan, Kostikov K. (2011). Strain gauge power sensors. Components and technologies. № 1.
4. Shodiyev, K. (2021). Features of state regulation of development of tourism in uzbekistan. Oriental renaissance: Innovative, educational, natural and social sciences, 1(5), 492-497.
5. Sirojiddinov, U. S., & Shodiyev, K. (2021). Alkalineactivated oil-well cements and solutions on the bate of local active mineral substances and wastes of production. Oriental renaissance: Innovative, educational, natural and social sciences, 1(5), 486-491.
6. Sirojiddinov, U. S. (2021). Study of the composition of alkali cements and concretes based on vollastonite of koytosh deposit. Oriental renaissance: Innovative, educational, natural and social sciences, 1(5), 498-503.
7. Qizi, Y. Z. S. (2021). Determination of pressure in the plunger during the operation of oil wells by submersible pumps. Academicia: An International Multidisciplinary Research Journal, 11(3), 159-163.
8. Shodiev, K. (2021). The entrepreneurship development on the basis of government–private partnership and clustering in the touristic sphere. ResearchJet Journal of Analysis and Inventions, 2(04), 177-183.
9. Shodiyev, K. (2021). Optimization of production activity of the tourist enterprise. Academic Journal of Digital Economics and Stability, 6, 106-114.
10. Sirojiddinov, U. S., & Shodiyev, K. (2021). Investigation of Alkali Cements and Concrete Based on Local Raw Materials. International Engineering Journal For Research & Development, 6(3), 1-16.
11. Юлдашова, З. С. К. (2020). Определение давления на плунжер при эксплуатации нефтяных скважин. Science and Education, 1(6).
12. Shamsiddin o'g'li, K. S. (2020). The effect of stimulators on the location of the first pod of soybean varieties. International Scientific And Technical Journal "Innovation Technical And Technology", 1(2), 7-9.
13. Uktam Samaridinovich Sirojiddinov ,Kamoliddin Shodiyev. (2021). The effect of stimulators on the location of the first pod of soybean varieties. Academic Journal of Digital Economics and Stability. 9, 30-37.
14. Melikov Zarshed Jamshedovich 2021. Rules for inspection of the technical condition of the building during reconstruction. European Scholar Journal. 2, 5 (May 2021), 118-121. DOI: https://doi.org/10.17605/OSF.IO/J7WMV
15. Melikov Zarshed Jamshedovich. (2021). Rules for inspection of the technical condition of the building during reconstruction. Euro. Sch. J. 2, 118-121.
16. Melikov Zarshed Jamshedovich. (2021). Rules for inspection of the technical condition of the building during reconstruction. European Scholar Journal, 2(5), 118-121.

https://doi.org/10.17605/OSF.IO/J7WMV

**17.** Melikov Zarshed Jamshedovich, & Abdurakhmon Akhunjanov. (2021). Safety rules when checking the technical condition of a building during reconstruction. European Journal of Humanities and Educational Advancements, 2(6), 56-59. https://doi.org/10.17605/OSF.IO/7V35B

**18.** Melikov Zarshed Jamshedovich. Abdurakhmon Akhunjanov. (2021). Safety rules when checking the technical condition of a building during reconstruction. Euro. J. Hum. Edu. Adv. 2, 56-59

**19.** Salomovich, T. E., & Pulatovich, M. B. (2021). Thermal Insulation Of The Foundation Walls Of Buildings And Calculation Of Its Thickness. The American Journal of Engineering and Technology, 3(04), 70-78.

**20.** Goyibov Oybek Inatillayevich, Matyokubov Bobur Pulatovich. Analysis of Underground Projects of Energy Efficient Low-Rise Residential Buildings Built on Highly Flooded Soils. https://doi.org/10.31149/ijie.v4i9.2156

**21.** Shodiyev, K. (2021). Contribution of ict to the tourism sector development in Uzbekistan. Academicia: an international multidisciplinary research journal, 11(2), 457-461.

**22.** Shodiev, T., Turayey, B., & Shodiyev, K. (2021). ICT and Economic Growth Nexus: Case of Central Asian Countries. Procedia of Social Sciences and Humanities, 1.