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## ЗНАЧИМОСТЬ ТАХЕОМЕТРИЧЕСКИХ РАБОТ ПРИ СТРОИТЕЛЬСТВЕ В ШАНХАЕ

### THE ROLE OF TACHEOMETRIC WORKS DURING CONSTRUCTION IN SHANGHAI

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**Аннотация.** Тахеометрическая съемка-это быстрый метод, который предназначен для измерения расстояний по горизонтали и вертикали, определения превышений, без использования ленты или других обособленных приспособлений уровня, с использованием прибора- тахеометра.

Это не самый точный метод определения горизонтальных расстояний, но он наиболее часто применяемый для проведения работ в горной местности, где трудно использовать другие методы, однако этот метод не точный.

Метод тахеометрической съемки широко используется во всем мире в строительстве при проведении обследования. Он используется в различных странах, таких как: США, Канада, Россия, Европа, Руанда, а также в Китае. К примеру, в западных странах тахеометрия неотъемлемая часть в геодезии, так в последнее время первоначальные измерения всегда проводятся с использованием тахеометров и записываются в журналы данных. Позиции расположения также определяются с использованием системы ГНСС (глобальная навигационная спутниковая система).

**Ключевые слова:** методы тахеометрической съемки, места использования тахеометров.

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**Annotation.** Tacheometry is the rapid method that is assigned for measuring the horizontal distance and vertical altitude with the angular from the surface of the earth point to another point without using chain, tape or other separated level instrument and the measurement is done by applying tacheometer instrument.

It is not so accurate method of finding the horizontal distances as the Chaining is, but it is most applicable for carrying out the surveys to find the distances in the mountainous area where it is hard to use other methods however it is not accurate.

The tacheometry method is commonly used over the world in construction during survey.it has been used in different countries like USA, Canada, Russia, Europe, RWANDA and also China. For instance, in western countries, tacheometry is fundamentally in surveying, as professional measurement recently is always carried out applying total stations and recorded using data collectors. Location positions are also determined using GNSS(global navigation satellite system).

**Keywords:** Tacheometric method ,the place where it's used.

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It has a wide number of uses:

- Check the more accurate taped distances to uncover error or mistakes.
- Determine differences of elevation between points.
- Carry lines of levels where Low order accuracy is required.
- Measure the length of traverse lines.
- Compile plan metric and topographic maps.
- Locate details for hydrographic (John mofire may 2013 tacheometry).

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In this paper, the study of Advantages of using tacheometry during survey comparing to other methods in Shanghai is presented.

### **Literature review**

Talking about of rapid method of measuring setup for the big number of controlled orientation points on great height and others types of constructions. This opinion is involved of taking measurements in one position of the telescope.

The most profitable would be, if the possible deviations from planar could be discovered right after casting of a concrete floor

and before installation of finishing material. This way, wasting of expensive finishing material like parquet, could be avoided.

Simultaneously it is assumed that every check point will be measured from a minimum of two different tachymeter stations. It is also assumed that the observation will survey the difference in elevation between the horizon of the instrument and the aiming mark representing a given controlled point.

The calculations take into consideration the following factors: residual index error of the vertical circle, influence of the Earth's curvature, and atmospheric refraction. Furthermore, it is proposed that direct levelling needs to be executed on each level of the construction.

The chain, tape and leveling instrument were ordinary methods of surveying failed satisfactory on the ground when related with clear of obstruction and bad precipitous.

### **Principles of Tacheometry:**

#### ***The advantages of tacheometry***

There are many advantages of doing survey by Tacheometry which is as follow:

- It is not necessary to do chain operation that is required in other method of surveying.
- We can do survey in area like Hill and mountain where it is very difficult to do survey by other methods.
- If we not need very high standards and accuracy, then this is right method.
- It requires low amount of time compare to other ways of surveying.
- Because Tacheometry is indirect method that we do not require some instrument that is necessary in plan table surveying or in theodolite surveying.

#### **Disadvantages of tacheometry:**

- Marking of the points is lost during time, maintenance is expensive.
- For the prescript comparison of the measurements with the initial measurement marking of the points is necessary at building completion.

#### **The tools of tacheometry:**

The instruments required for carrying out the Tacheometric survey are:

- A Tacheometer.
  - A Stadia Rod.
- **Tacheometer:** Tacheometer is more or less a Theodolite installed with a stadia diaphragm
  - **Stadia diaphragm** is equipped with three horizontal hairs and one vertical hair. So we can take three vertical staff reading at the same instruments setting, lower most hair reading, central hair reading and the top hair reading. The difference between the lower hair reading and the upper hair reading gives the staff intercept.

**Stadia rod** used in the determination of distance by observing the intercept on the rod subtending a small known angle at the point of observation; the angle usually is defined by two fixed lines in the reticle of a telescope (transit or telescopic alidade).

### **Литература: / Reference:**

1. URL : <https://en.wikipedia.org/wiki/Tacheometry>.
2. John Mofire may 2013 tacheometry.
3. Peng M.X., Liu J.J., and Wang C.K. Deformation monitoring technique for ccTV main tower during construction Building Science. – 2009. – 25 (11), P. 92–94.

4. Brownjohn J.M.W. «Structural health monitoring of civil infrastructure», Philosophical Transactions of The Royal Society A. –2007. – 365 (1851), P. 589–622.
5. Gura D.A., Shevchenko G.G., Gura A.Y. Development research methodology elastic deformation total station // Journal of Engineering and Applied Sciences. – 2016, Vol. 11, Issue 13. – P. 2885–2888.
6. Gura T.A., Tatiana M.A. On the necessity of permanent monitoring of deformations of unique objects of capital construction : In the book: INTERNATIONAL INNOVATION RESEARCH collection of articles of the winners of the V International scientific-practical conference. – Penza, 2016. P. 191–195.
7. Gribkov A.L., Skripkin A.I., Shabanova I.G., Lychagin D.V., Gorbenko V.V., Salnikov Y.O. Geodetic deformation monitoring of technical condition of unique buildings and structures // Science. Engineering. Technology (polytechnical bulletin). – 2016. – No. 2. – P. 104–108.
8. Kupriyanov A.A., Maksimova M.V. Monitoring of the technical condition of high-rise buildings with application of modern approaches // Slavic forum. – 2015. – No. 2 (8). – P. 153–167.
9. Liashenko P.A., Denisenko V.V. Calculation of microstructure characteristics of soil in the experiment with compression compression of the sample // Polythematic network electronic scientific journal of the Kuban state agrarian University. – 2009. – № 45 (01). – P. 66–82. – URL : <http://ej.kubagro. EN/2009/01/pdf/03.pdf>
10. Lyashenko P.A., Denisenko V.V. contact interaction of elements of the microstructure of clay soil // Polythematic network electronic scientific journal of the Kuban state agrarian University. – 2012. – № 78 (04). – P. 291–318. – URL : <http://ej.kubagro.ru/2012/04/pdf/25.pdf>
11. Denisenko V.V., Lyashenko P.A. Analysis of methods of compression testing of soils // proceedings of Kuban state technological University. – 2015. – № 2. – P. 104–125. – URL : <http://ntk.kubstu.ru/file/337>
12. Gura D.A., Shevchenko G.G., Kirilchik L.F., Petrenkov D.V., Gura T.A. Application of inertial measuring unit in air navigation for als and dap // Journal of Fundamental and Applied Sciences. – 2017. – Vol. 9. – No 1S. – P. 732–741. – URL : <http://dx.doi.org/10.4314/jfas.v9i1s.727>
13. Zheltko Ch.N., Gura D.A., Shevchenko G.G., Berdzenishvili G.S. Experimental investigations of the errors of measurements of horizontal angles by means of electronic tacheometers // Measurement Techniques. – 2014. – T. 57. – No. 3. – P. 277–279.
14. Autumn E.D., Khakhuk A.B., Gura D.A. Accounting and technical inventory of Capital construction projects // Analysis of the current system of technical registration and inventory of capital construction objects. – Krasnodar : Kuban state technological University, 2012. – T. 1.
15. Gura D.A., E.A. Verezubova MOBILE - a MOBILE SCANNING SYSTEM : In the book: earth Science at the present stage of the VIII international scientific-practical conference. – 2013. – P. 56–58.