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THE USE OF MODERN GEODETIC TOOLS WHEN CREATING A GEODETIC BASE FOR SURVEYING LINEAR STRUCTURES

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Abstract
This article describes the necessary work on the preparation and updating of the topographic plan of the area where linear structures will be designed, as well as the method of tacheometric and leveling surveys. In order to conduct a large-scale survey in the fastest, most efficient and most promising way, it is necessary to evaluate the accuracy and performance of surveying instrumentation equipment.

Keywords: tacheometric survey, leveling, tracing, topographic survey, GPS system.

Introduction

Since the first years of independence, construction of new highways that meet modern requirements and reconstruction of existing ones are being carried out intensively in our Republic. The geodetic works performed on the basis of the project at the required level are of great importance.

In particular, this was caused by the rapid introduction of modern automated tools and technologies in the field of geodesy in the field of geodesy in the design, construction and restoration of highways, and the development of results on a computer with the help of special software, as well as ensuring that graphic materials can be completed in a short time with less effort. . It is known that a large amount of earthworks are performed during road construction, therefore, geodetic works are performed using a modern electronic tachyometer, and calculating the volume of earthworks on the basis of a computer program, in turn, increases the productivity of works, allows saving time, and also increases labor efficiency. .

As a proof of the above explanation, below we will consider the implementation of the basis of the survey in the process of design, construction and reconstruction of highways using traditional and modern tools and technologies.

First, we estimate the accuracy of the measurements in the process of establishing the geodetic base of the survey using traditional geodetic instruments - 2T30P optical theodolite, while measuring the distance using a steel tape using the following formula.

$$M^2 = nm_s^2 + \frac{m_\beta^2}{p^2} \cdot \sqrt{\frac{n+3}{12}} \cdot [S]^2 \quad (1)$$

.

where, M - the mean square error in determining the planned position of the end point of the theodolite road, m_s - the mean square error of the distance measurement, m_β - the mean square error of the angle measurement, n - the number of sides, $[S]$ -the perimeter of the theodolite road.

= 6см, = 30″, number of sides as 4, $[S]$ = 1000 m, we create the following according to formula (1)

$$M^2 = 4 \cdot 0{,}0036 + \frac{30^2}{206265^2} \cdot \sqrt{\frac{4+3}{12}} \cdot [1000]^2 = \sqrt{0.0145} = 0.12м$$

.

Then, measurements at the base points of the survey established using traditional geodetic instruments are carried out using a modern Leica TS06 electronic total station, and taking m_s =3мм m_β =5″, we find the root mean square error in determining the planned position of the end point of the theodolite path according to the formula (1)

$$M^2 = 4 \cdot 0{,}003 + \frac{5^2}{206265^2} \cdot \sqrt{\frac{4+3}{12}} \cdot [1000]^2 = \sqrt{0.000484} = 0.022м$$

(1) from the results calculated by the formula, it can be seen that the accuracy of measurements made by traditional instruments (0.12 m) is almost 6 times lower than the accuracy of measurements made by modern geodetic instruments.

It is well known that geodetic measurements performed with traditional geodetic instruments during the construction of highways require a lot of manual work and calculations. Measurements of the base of the gauge are automatically performed by means of a modern TS06 electronic tachyometer, and the results are processed by Credo_DAT software.

It is highly effective to create plan-elevation bases using GPS receivers as well as electronic tachymeter devices. When constructing geodetic networks using GPS receivers, visibility between points is not required, and through them, the plan position of points can be found with an accuracy of 5 mm and the height position with an accuracy of 10 mm, which is sufficient accuracy for the construction of highways.

The results of geodetic works in road construction are developed from the Credo complex and AutoCAD software, and a topographic plan of the site is created using it (Fig. 1) and the longitudinal and transverse profiles of the highway are drawn on it (Fig. 2). Using these longitudinal and transverse cuts, designers carry out design work.

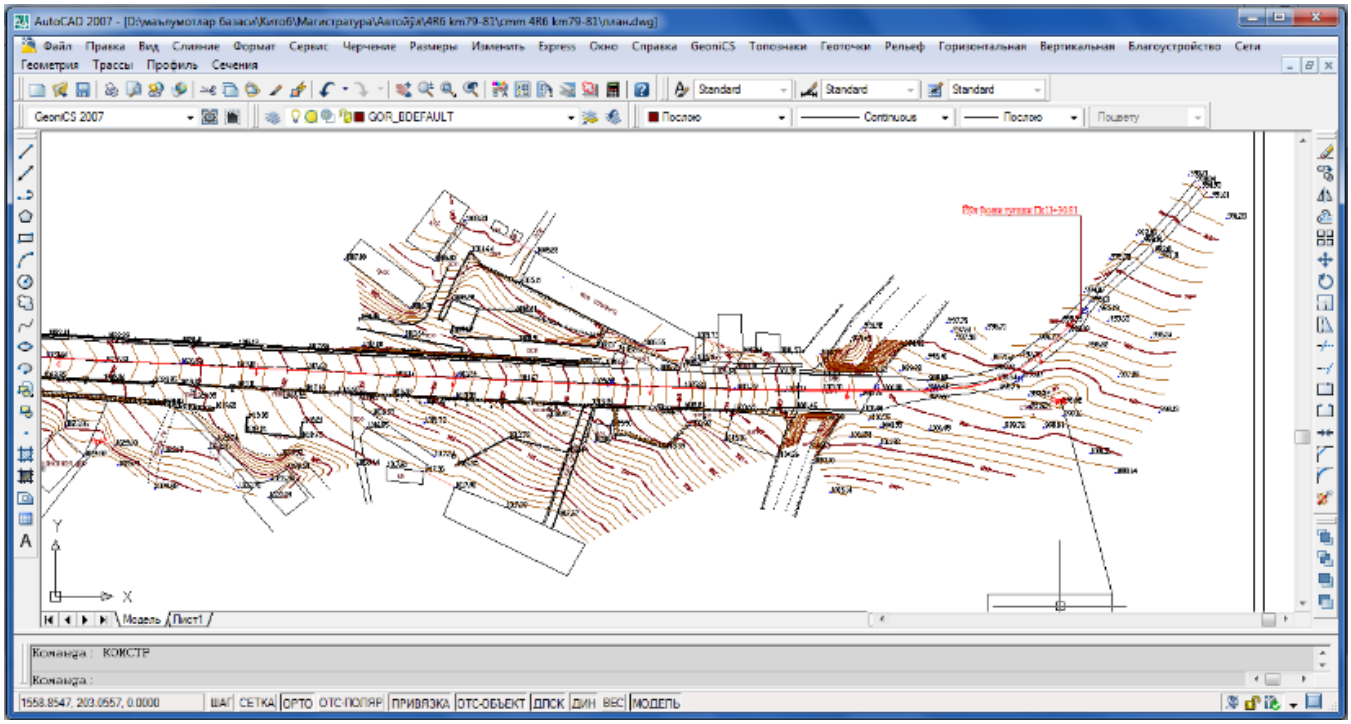

Figure 1. Topographical plan of the place

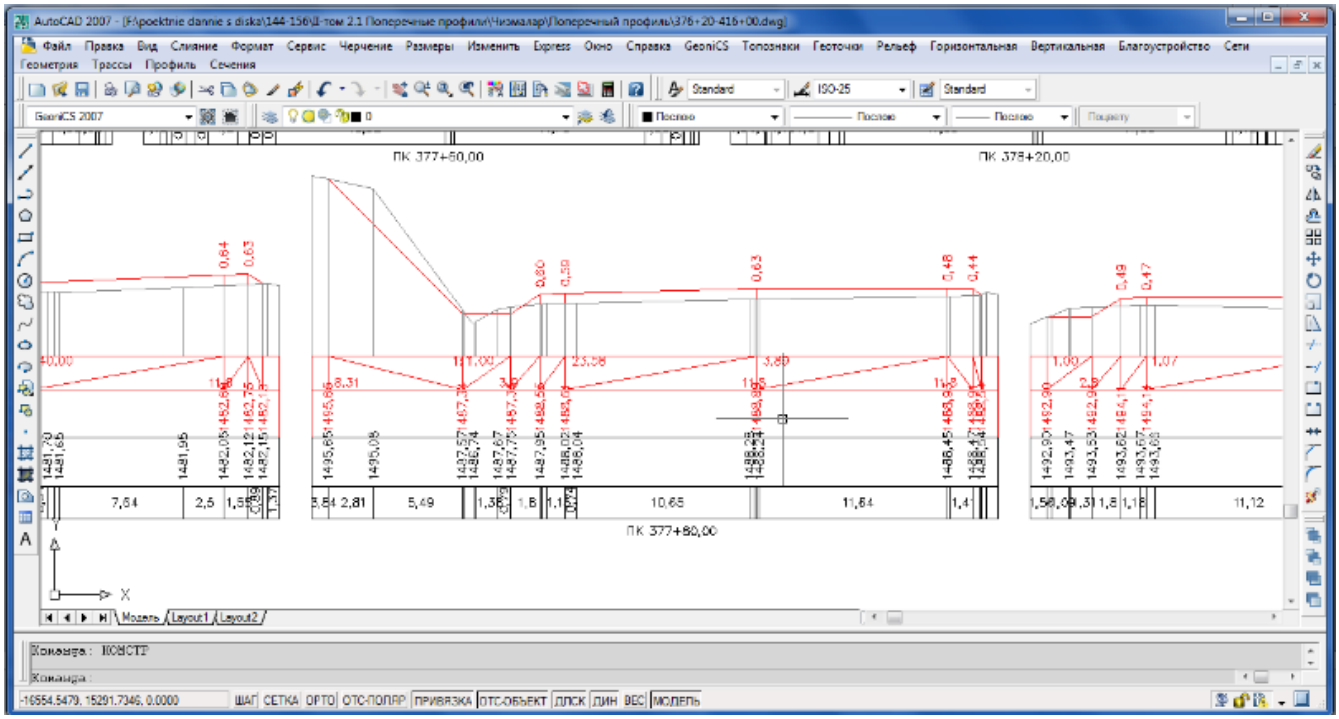

Figure 2. Transverse incision

In conclusion, it is worth noting that in the design, construction and reconstruction of highways, carrying out geodetic work with the help of modern geodetic instruments, the implementation of measurement results and graphic materials on the basis of computer technology allows to increase work efficiency and time saving by 40-50%.

References

1. Бойков, В. Н., Федотов, Г. А., & Пуркин, В. И. (2005). Автоматизированное проектирование автомобильных дорог.
https://elibrary.ru/item.asp?id=19637133
2. Федотов, Г. А. (2004). Инженерная геодезия: Учебник.–2-е изд. Москва: Высш. шк, 77-99.
https://scholar.google.com/scholar?cluster=10629830865459872280&hl=ru&as_sdt=2005&sciodt=0,5
3. Мубораков Ҳ., Саттиев Ю. Автомобиль йўлларини полотноси қуришда ер ишлар ҳажмини ҳисоблашни автоматлаштириш масаласи ҳақида//Замонавий география ва Ўзбекистон табиий – ресурс потенциалини баҳолаш. – Тошкент, 2015.
4. Sattiyev, Y. S., & Sirochov, A. M. O. G. L. (2022). YERLARNING MELIORATIV XOLATINI YAXSHILASHDA, GEODEZIK ISHLARNING AXAMIYATI. Academic research in educational sciences, 3(7), 91-95.
http://ares.uz/storage/app/uploads/public/62d/6cc/73c/62d6cc73cae48535434485.pdf
5. Yunusbek, S., & Rakhmatillo, S. (2022). THE ROLE OF GEODESY WORK IN THE DESIGN OF PUMP STATIONS. Universum: технические науки, (4-11 (97)), 48-50.
https://cyberleninka.ru/article/n/the-role-of-geodesy-work-in-the-design-of-pump-stations
6. Базаров, Д. Р., Муаллем, Н., Нишанбаев, Х. А., Улжаев, Ф., Норкулов, Б. М., Курбанова, У. У., & Эшонкулов, З. (2018). Влияние двойного регулирования стока на морфометрические и гидравлические параметры русла реки Амударья. Аграрная наука, (11-12), 70-77.

https://www.vetpress.ru/jour/article/view/409
7. Саттиев, Ю. Ш., & Абдумуталипова, Х. (2021). КОСМИК СУРАТЛАРДАН ФОЙДАЛАНИБ ТУПРОҚ ШЎРЛАНИШИНИ АНИҚЛАШ ВА МОНИТОРИНГ ҚИЛИШ УСУЛЛАРИ. DEVELOPMENT ISSUES OF INNOVATIVE ECONOMY IN THE AGRICULTURAL SECTOR, 239.
https://sbtsue.uz/frontend/web/sahifalar/Conference/To%27plam/SBTSUE_CONFERENCE_1_PART_compressed.pdf#page=255
8. Шерматов, Р. Ю., Ишанкулов, З. М., Саттиев, Ю. Ш., & Абдулхаков, Ф. Х. (2021). ОБЕСПЕЧЕНИЕ БЕЗОПАСНОСТИ УЧКУРГАНСКОГО ГИДРОУЗЛА НА РЕКЕ НАРЫН. Главный редактор: Ахметов Сайранбек Махсутович, д-р техн. наук; Заместитель главного редактора: Ахмеднабиев Расул Магомедович, канд. техн. наук; Члены редакционной коллегии, 25.
https://7universum.com/pdf/tech/11(92)/11(92_3).pdf#page=25
9. Uralov, B., Li, M., Qalqonov, E., Ishankulov, Z., Akhmadi, M., & Maksudova, L. (2021). Hydraulic resistances experimental and field studies of supply canals and pumping stations structures. In E3S Web of Conferences (Vol. 264, p. 03075). EDP Sciences.
https://www.e3s-conferences.org/articles/e3sconf/abs/2021/40/e3sconf_conmechydro2021_03075/e3sconf_conmechydro2021_03075.html
10. Саидходжаева, Д. А., Саттиев, Ю., & Ишонқулов, З. (2020). Application of modern innovative technologies in the regulation of water consumption and calculation of single-walled hydraulic structures. Актуальные научные исследования в современном мире, (2-2), 80-85.
https://elibrary.ru/item.asp?id=42781156