UDC 528(071)

TO THE 50 ANNIVERSARY OF THE GEODETIC POLYGON IN BEREZHANY CITY

Z.Tartachynska

Lviv Polytechnic National University

Keywords: educational geodetic polygon, geodetic practice, department of geodesy.

Educational practice is an integral part of the educational process and the main dominant in the process of preparing students-surveyors. Even in 1886/87 Mr. Professor D. Zbrzhek first introduced practical training in geodesy and introduced a 20-day training geodetic practice conducted in the summer in the cities of Galich, Zhovkva, Zolochiv, Kalush, Kolomyia, Rzeszow, Przemysl, Sanok, Tarnuv and Yaroslav. During their practice, students created topographical plans for these cities. In the 1950s, student geodesists were practicing in the cities of Galich and Terebovlya. And in 1960-1962 gg. under the direction of Associate Professor A.L. Ostrovsky in Sudov Vyshnya, Lviv oblast, created the first educational geodetic polygon (NGP), in which practice students of the I-III courses of the geodetic faculty of Lviv Polytechnic took place [2].

With the development of geodetic science, changes in curricula and the significant increase in the number of students of the geodesy faculty, the question arose about the expansion of the practice base. To ensure the organization and conduct of all types of training practices at the GF, it was necessary to choose a new place of practice base. It was necessary to find such a territory that would simultaneously satisfy the requirements for topographical, geodetic, engineering-geodesic, astronomical and geomorphological practices. After a long search, the choice was made in favor of the city of Berezhany.

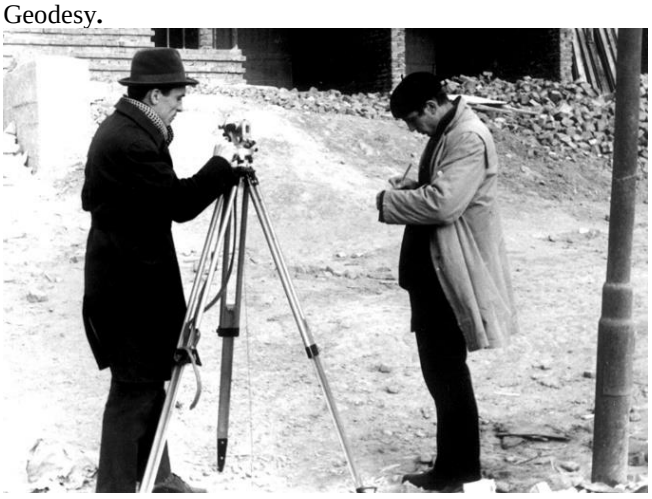
So in 1968 a transfer to the Lviv Polytechnic Institute of land about 4 hectares was commissioned legally for the construction of the basement base and a project documentation was prepared. That is why this year can be considered the beginning of the 50-year history of the Berezhansky educational geodetic polygon.

Already in the spring of the same year a small detachment of polytechnic, headed by the head of the NGB V.Vaschenko, was located on the shore of Lake Berezhansky in two tents, which also began construction of the base. In 1973, the construction of the main buildings completed. An autonomous town with a hostel for 240 people was created, a dining room with 144 beds, water and heat supply, cleaning and necessary economic facilities [1].

The main merit in designing and building a training ground in Berezhany is the dean of the faculty TN Chalyuk, assistant professors I.N. Kmetko and B.T.Tlusstiak and the first chief of the landfill V.I.Vaschenko. Significant contribution to the creation of NMPs was made by the heads of the department of geodesy D. I. Maslich, AL Ostrovsky, teachers R.S. Sidorik, MK Drok, P.I. Konyukhov, I.S. Trevoy, VO Sazhin, Z.F. Patova A.Yu. Fedorishchev and dean of the GF MI Kravtsov

Thanks to the efforts of the Head of the Department of Geodesy O. I. Moroz in 2008, the reconstruction of the NFP base, major repairs of the dormitories and dining rooms, the construction of a new modern boiler house, as well as landscaping of the territory began. Due to lack of funds, the reconstruction lasts for 10 years. But thanks to the effective organization of repair works on the territory of the base and, in particular, in the hostel from 2013, IGDG students will have the opportunity to take a summer training course on the basis of NNP in Berezhany city. A special merit in this director of the base of the educational and scientific training ground P.V.Mihaylevich.

During the last 5 years, the NNPP in Berezhany was led by the teachers of the Department of Geodesy, teaching topographical and geodetic practices in 13 groups of IGDG. In 2018, at the geodetic polygon, it is planned to practice in 4 groups of the 2nd course of the Institute of Geodesy.



Performing removal is carried out by the first head of the educational geodetic polygon V. I. Vashchenko. Berezhany, 1972

Construction of the main objects of the educational geodetic polygon base is completed in the city of Berezhany. 1973.

The study of the stability of the intervals of the phase region of the Berezhansky reference base is performed by Art. teacher I.Ya.Pokotilo and assistant V.L.Tarnavsky. 2013

Hostel at the educational-scientific geodesic landfill in Berezhany city. 2015

In addition to building the premises of the practice base, on an area of about 150 square meters. km, an educational geodetic polygon was created. The planned geodetic network of the landfill consists of points of the reference network, analytical points (APs) and points of polygonomy (4 classes and 1, 2 digits). The first 13 points of the reference planning network were laid in 1969-1970. The laying of the centers, the construction of external geodetic signs, the observation and processing of the measurement results was carried out by the Zhytomyr expedition of the AGP-13 geodetic enterprise. The coordinates of the points were determined by the method of triangulation with an attachment to the points of the DMM of grades 2-4 [3].

Every year, 2-3 groups of students of the 1st and 2nd courses of the GF took part in the practice and at the same time participated in the creation of a geodetic network and the construction of a practice base. Students, teachers and teaching auxiliaries of the department of geodesy carried out work on the uniform consolidation of the geodetic basis throughout the training ground for experimental research and educational geodetic practices. So in 1973 a scientific expedition of the department of geodesy was organized under the guidance of the assistant B.T.Tlusstiak. The expedition included teachers P.I.Konyukhov, R.S.Sydorik, I.S.Trevoi, Z.F.Patov, labors of the department of geodesy and students of the 2nd year of the GF. During the summer geodetic practice, five (by the number of units) polygonomic steps of 1 degree of increased accuracy with a total length of more than 20 km were laid [1]. In total 65 geodetic centers were laid; angular measurements in the course performed by theodolites of type T2; linear - pro-packaged measuring wires [3]. In order to congeal the triangulation network of the polygon for the direct binding of the polygonal passes, six metal tetrahedral pyramids of 5 meters high were constructed. The workers of the training ground base built a platform for astronomical observations.

The created geodetic network covered almost the whole territory of the landfill. Subsequently, it was complemented by points for replacing lost and new polygonal paths. Beginning with the end of the 70's, linear measurements were performed by light-diodes, and from 1999 - electronic tacheometers. Angular measurements were performed by theodolites T2, 2T2, Theo 010 and Theo 010B [3].

Already in 1974, more than 1200 students of 1-3 courses of geodesy, the first courses of building, heat engineering and architecture departments were trained in the Berezhany educational geodesic facility. The practice was led by lecturers of departments of geodesy, applied geodesy, higher geodesy and astronomy, as well as experienced engineer-surveyors of production.

During the time of the site there were dozens of scientific expeditions. In particular, the teachers of the department of geodesy carried out research on vertical refraction at large distances, above the water surface, on a vertical basis in order to improve the method of geometric leveling, and others like that. The created geodetic basis and to this day are used for topographic removal, as well as for solving various engineering-geodesic tasks. Points of the Berezhany landfill are used during scientific research on the issues of increasing the accuracy of geodetic measurements, the study of the influence of the external environment on the results of geodetic measurements, the creation of the latest methods of performing topographic and geodetic works. Total geodetic network of the landfill includes 160 points. Inspection and restoration of points of the polygon are constantly carried out [6,7].

For the first time the modernization of the testing ground was carried out in 1981-1984 under the direction of prof. AL Ostrovsky In 1981, the faculty members of the Department of Geodesy and the students of the 2-year course performed a reconnaissance of the network, identified the location of the laying of new items, and constructed more stable and higher external geodetic signs - three-dimensional tubular pyramids with a height of 6-7 m to replace the existing quadrangular. Observations were carried out during two field seasons during the educational practices of 1982-1983. Measurement of the original side of the triangulation network was performed by radio remote control RDHV, and the horizontal angles were measured with the theodolite T05. Angular measurements were performed by assistants of the Department of Geodesy V. I. Mukha, O.I.Drbal and VMKolugunov [3].

In 1993, the planned support network of the Berezhansky polygon was supplemented with 4 new triangulation points. The binding of these items to the triangulation network was carried out by the expedition of

the department of applied geodesy under the guidance of the assistant P. I. Kovaly [3].

With the advent of the latest technologies, the coordinates of the reference points of the Berezhansky polygon are determined using GNSS receivers. Since 1999, 11 GPS campaigns have been conducted. The coordinates of 23 points of the geodetic network [8] are determined. Absolute errors of definite straight angular coordinates within 1,2-1,6 mm. To orient the GPS network of the Berezhansky polygon, the results of the determination of the astronomical azimuth, performed in 1984 by the assistant of the department of geodesy VMKolugunov, and the determination of the astronomical coordinates, performed in different years by the assistant of the department of applied geodesy P.I.Koval, the engineer of the GNLD-18 I.S.Sidorov.

Since 2000 every year during educational geodetic practices students of the second year under the supervision of teachers of the department of geodesy carried out repeated measurements of polygonomic steps, starting points of which were the points of the reference network of the Berezhansky polygon, coordinates of which were obtained from GNNS observations.

In 2000, at the base of the NPS, the construction of the model geodetic basis of the 2nd level was completed, where experimental researches and direct reference of light-dip markers and electronic tachymeters are performed every year [5,7].

In 2013-2015 lecturers of the Department of Geodesy carried out reconnaissance, survey and laying of additional points for expanding the capabilities of the Berezhansky polygon. Work is underway to create a geoinformation system of the landfill. The schemes and catalogs of coordinates and heights of points of the geodetic network are made, which allow to control the results of geodetic measurements during the training practice. Today, the coordinates of 40 points of the landfill are known with a millimeter accuracy [4,6,7].

At present, 150 to 170 students and teachers can live in the base dormitory. The network of geodetic points allows conducting all types of geodetic practices for students of the Institute of Geodesy. The only problem is the incomplete reconstruction of the dining room on the territory of the base, due to the lack of funds.

Berezhany educational training ground is a unique educational object of its kind. With the efforts of enthusiasts, he succeeded in modernizing, updating, making modern and comfortable living conditions for students and teachers during practice, and the main thing - to preserve the traditions of Lviv geodetic school to teach students in conditions close to production.

References

1. Кафедра геодезії. 130 років: Історико-бібліографічний нарис / За редакцією О. І. Мороза. Львів. 2001. - 158 с.

2. Кафедра геодезії. 145 років: Історико-бібліографічний нарис / О. Мороз, З.Тартачинська, В. Тарнавський, О. Дрбал; За редакцією О. І. Мороза. – Львів: Видавництво Львівської політехніки, 2016. – 200 с.

3. Колгунов В.М., Літинський В.О. Модернізація планової мережі Бережанського геодезичного полігона // Геодезія, картографія і аерофотознімання. – 2001. – Вип.61. – С. 63-69.

4. Колгунов В.М., Літинський В.О. Дослідження точності нівелірної мережі Бережанського навчального геодезичного полігона // Сучасні досягнення геодезичної науки та виробництва: Зб.наук.праць. – Львів: Ліга-Прес, 2002. – С.159-160.

5. Колгунов В.М., Літинський В.О., Савчук С.Г. Застосування GPS-спостережень для вимірювання Бережанського базису // Сучасні досягнення геодезичної науки та виробництва: Зб.наук.праць. – Львів: Ліга-Прес, 2004. – С.83-85.

6. Про розширення можливостей Бережанського геодезичного полігона. / І.Покотило, З.Тартачинська, І.Гарасимчук, В.Тарнавський // Геоінформаційний моніторинг навколишнього середовища: GNSS і GIS-технології : зб. матеріалів XVIII Міжнар. наук.-техн. симп., 10-15 верес. 2013 р., Алушта (Крим) — Львів : Вид-во Львів. політехніки, 2013. — С. 168-169.

7. Про оновлення навчально-наукового Бережанського геодезичного полігону / С.С. Перій, І.С. Сідоров, І.Я. Покотило та ін. // Науковий вісник Ужгородського університету. Серія. Географія. Землеустрій. Природокористування. — Ужгород, 2014. — Вип. 3. — С. 72-75.

8. Савчук С.Г., Колгунов В.М. Бережанський геодезичний полігон: 10 років GSSN-визначень // Геодезія, картографія і аерофотознімання. – 2010. - Вип.73. – Львів: Вид-во Львівської політехніки, 2010.– С.35-38.

To the 50 anniversary of the geodetic polygon in Berezhany city

Z.Tartachynska

The main preconditions of the construction of educational-scientific geodetic polygon in Berezhany city, its structure, significance for students' studies, science and production are described in the article.