MARKING THE OBJECTIVE - MĂNĂȘTIUR BAKERY TIMIȘ COUNTY

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Abstract. *The following operations were performed in order to mark the objective: first a polygonal traverse was made, beginning from S1 and S5 points provided by the designer, out of which 5 terminals-needed to mark the investment- resulted. Second, the insulated foundation pits for the factory shed and the administrative building were marked by RTK-cinematic method. No absolute accuracy was required for digging. Next, the levelling concrete was poured in the insulated foundations according to grade elevations using level Leica NA 728. Being a concrete pillars structure and having foundations based on barings with anchor bolts, when positioning the horizontal framing, the longitudinal and transversal axes of the objective on wooden pickets with nails were materialized in the field. 2, 3 frame centering in the foundations were made by using reference line programmer out of the total station menu for transversal axis and the extremities of longitudinal axis. The intermediary pickets on the longitudinal axes were marked as alignment points. Vertically, they were graded using the level. The axes were materialized on frames with anchor bolts beforehand, using a metal ruler and a scriber. Their centering was made by keeping the tolerance of +/-7,5 mm/frame. The following items were used for this work: 2 GPS, plus rover base, pacific crest external modem, Leica TCR 407 station, Leica builder 509 station, Trimble POS 180 station, Leica NA 728 level, metal ruler, scriber, tape line. The operations were made by complying with STAS 9824/0-74(Land measurement, land marking of the buildings/facilities, general perceptions), STAS9824/1-87(Land measurement, land marking of civil/industrial/agricultural and zoo technical facilities), guide C83-75(guide for detailed marking in constructions).*

Key words: *GPS, RTK, SOUTH S82V, PACIFIC CREST, Leica Geo Office Combined, CNCF, CFR*

INTRODUCTION

The objective was marked during April and July 2016 and it was built first .The next hall will be built in 2017.Marking a hall is part of engineering topography.

Engineering topography includes measurements made for designing, execution and exploitation of the buildings.The contents and importance of topographic and geodetic worksin studying, designing and execution, are influenced by many factors such as:the lenght and roughness of the land meant tobe built on, the measurements of the construction's elements, the precision of topographical works in order to design and build, the nature and volume of the groundwork, the materials used, execution methods, the deadlines, etc. The geodetician follows the building from the beginning (that is beginning with the technical and economic studies in order to substantiate the design themes while elaborating the project) to its exploitation. According to Law 50/1991 regarding building permit, building is only allowed based on a building permit or a demolition permit. A building or demolition permit is released at the request of the owner of the title of ownership of a building-land and/or building, or of another document which allows building or demolition, according to the law mentioned above.

MATERIAL AND METHODS

GNSS (Global Navigation Satellite System) uses the technique of positioning static or moving objects at any time, wherever they are on Earth's surface, in the water or in the air. It provides users with real-time current information, as precise solutions for safe navigation.

South S82V GPS model can be used as a reference station, as either rover or base.

Two South S82-V GNSS receivers with dual frequency and 220 independent channels (Horizontal RTK accuracy: +/- 1 cm + 1 ppm RTK Vertical: +/- 2 cm + 1 ppm RTK and total station Leica TCR 407) were used in order to accomplish work. POIs determinations were made in RTK mode - Cinematic Real time. Old and new geodetic support points used: none. Data used from the ROMPOS National System through RO_VRS_3.2_GG virtual station. The topographic point survey was performed as RTK - Real Time Kinematic, using the real-time differential corrections from ROMPOS specialized service.

The GPS field book mentions several data on: point number, 1970 stereographic coordinates (X, Y, Z), geocentric Cartesian coordinates (X, Y, Z), ellipsoidal coordinates: latitude (B), longitude (L), point code, the accuracy of horizontal fixing (CEP), the type of solution (FIXED), number of visible satellites (SATS), point occupancy accuracy (PDOP, HDOP, VDOP), date and time of the measurements.

All GPS fixed points have a fixed solution (FIXED); the average number of used satellites is 10. Through SurvCE field software, measurements were performed directly into the STEREO 1970 national projection system. Having Black Sea 1975 as a national reference system, SurvCE contains the latest implementation of the program, providing the user with identical results in real time. This program runs on the electronic field book of GPS (Carlson Mini (Geos) controller with 520 MHz PXA270 processor and Operating System: Windows Mobile 5.0), providing all the measurement data mentioned before. From the Leica station TCR 1205+`s field book, data is transferred to the computer where the location plan is executed. Data processing was performed with TopoSys software 5.0; later on, points resulting from subsequent processing by methods shown above were reported in AutoCAD using lisp application TopoLT 10.0 and Topograph 5.1.

The second phase consists of pouring levelling concrete to insulated foundations and mat, applied on field using a Leica NA 728 level (Fig.1).

Figure 1 .Leica NA 728 Level

Figure 2. Leica TCR 407

Figure 3. Gps South S82-V

RESULTS AND DISCUSSIONS

In order to mark the objective, a ranked plan was made first on a field of 125701 squqre feet with the cadastral number 40129. The bakery hall would be built on it afterwards. The ranked plan was made using 3 GPS devices, South S82V model (Fig.3). The method used to make the ranked plan was RTK with reference. After processing the data, the ranked plan was turned in to the designer in order to design the hall (Fig.4).

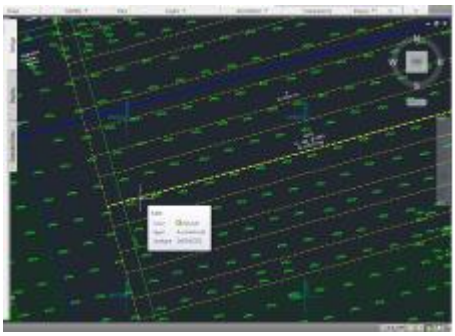

Figure 4. The ranked plan in autocad

After taking the project from the designer we went to the field to check S1 and S5 points out of which 5 terminals-needed to mark the investment- resulted(Fig. 5).

In order to mark the objective, we made a polygonal traverse beginning from point S1and S5. First, 40 insulated foundation pits were marked for the production hall and the big pit for the factory shed and the administrative building by RTK - cinemaric method(Fig.6). These foundations were marked using the GPS. No absolute accuracy was required. The levelling concrete was poured in the insulated foundations and the mat according to grade elevations using level Leica NA 728. Elevation grade 0 was given by the designer and marked by us in several places in order not to lose it and to be handy.

	Statia	Pct vizat	d 0	inapoi	inainte	Orientare I	Orientare II	x I	y I	x II	y II	X	Y	Pct vizat
		S1				156.2235						485064.013	272474.681	S5
1	S5	W1	96.518	156.2235	205.7619	205.7620	205.76144	-96.123	-8.723	-96.121	-8.723	484967.892	272465.958	W1
2	W1	W2	121.694	5.761942	282.4624	282.4624	282.46136	-33.104	-117.105	-33.103	-117.106	484934.789	272348.852	W2
3	W2	W3	108.998	82.46238	282.8828	282.8828	282.88123	-28.958	-105.081	-28.957	-105.082	484905.832	272243.770	W3
4	W3	W5	284.053	82.88277	155.4058	155.4058	155.40374	-217.161	183.104	-217.157	183.103	484688.675	272426.873	W5
5	W5	W6	116.952	355.4058	70.90797	70.9080	70.905382	51.608	104.950	51.609	104.949	484740.284	272531.822	W6
6	W6	S5	328.727	270.908	388.8807	388.8807	388.87754	323.722	-57.140	323.729	-57.141	485064.013	272474.681	S5
7	S5	S1		188.877	156.2235	156.2272	156.2235					485064.013	272474.681	S5
			1056.942			156.2235								
						-0.0005								
							delta +	375.330	288.054	375.338	288.052			
							delta -	-375.346	-288.050	-375.338	-288.052			
							DELTA	-0.015	0.004	0.000	0.000	0.000	0.000	
								375.338	288.052					
								-375.338	-288.052					
							Verificare	750.676	576.104					
							eroare	-0.015	-0.004					
								750.676	576.104					
							corectie +	-0.008	-0.002					
							corectie -	0.008	0.002					
							corectie	1.00002	0.999993					
							corectie	0.99998	1.000007					

Figure 5 The compensation table

Being a concrete pillars structure and having foundations based on barings with anchor bolts, when positioning the horizontal framing, the longitudinal and transversal axes of the objective on wooden pickets with nails were materialized in the field. 2, 3 frame centerings in the foundations were made by using reference line programmer out of the total station menu for transversal axis and the extremities of longitudinal axis (Fig.6). The intermediary pickets on the longitudinal axes were marked as alignment points (Fig.7). The axes were materialized on frames with anchor bolts beforehand, using a metal ruler and a scriber. Their centering was made by keeping the tolerance of +/- 7,5 mm/frame.

Figure 6 Example of landmark

Figure 7 Wooden pickets with nails and the enclosures

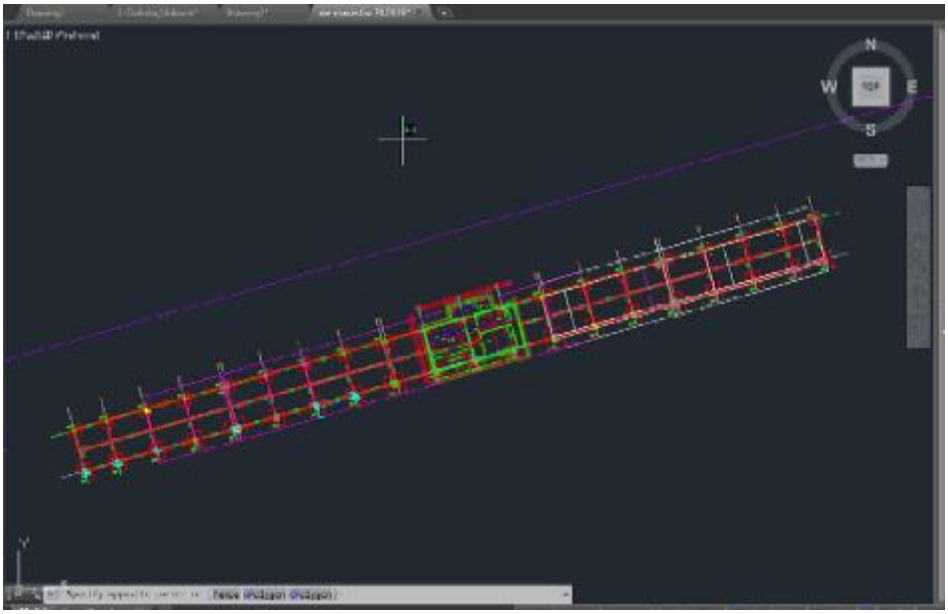

Figure 8 Investment plan

CONCLUSIONS

Attention is very important in engineering topography. A slight lack of attention may lead to big precision errors. The devices we use must be frequently checked in order not to be moved or offset or torn, all these leading to errors on field. The greatest accuracy is required when marking the enclosures because the pillars will be fixed on them. The precision can not be as big when digging because the bucket lacks precision. After marking each enclosure, we need a tape line to check. 2 people are required to do the checking: one to use the station and one to use the angle. Only one person is needed when using the GPS.

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