DOCUMENTATION ON THE FIRST REGISTRATION OF THE CFR LINE SECTION SLOBOZIA SUD – SLOBOZIA VECHE KM 12+814-16+258

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Abstract. *The purpose of this thesis is measuring and registering (in the Land Register) the CFR line section Slobozia SUD –Slobozia Veche KM 12+814-16+258. This is situated in Ialomita Country, inside the Slobozia municipality and has a distance of3.444 KM. In order for the measurements to begin, the following conditions have to be met: the determination of limits according to territorial plans issued by the CFR territorial department, which were drafted in 1994-1999, the procurement of real estate data registered in the database of the Land Register and Real Estate Publicity Ialomita (OCPI Ialomita) up to this date, situated in the neighbouring are of the real-estate properties that are to be registered, the procurement of the territorial plans with the scale of 1:5000 or 1 :10000 , the procurement of the rompos data with the purpose of adjusting/correcting the static measurements. In order for the measurements to be executed, the placement of 4 which are determined via static GPS, from which type RTK GPS cinematic measurements are executed. The equipment used is the GPS SOUTH S82V and an amplifying wireless waves modem. The data conditioning is done via the program Leica Geo Office Combined. The purpose of the registering is the registration of all real estate into the land register, regardless of the owner, according to the Act Nr. 7/1996 of cadastre and real estate publicity, along with the subsequent modifications and additions. These are required for the correct management of all public assets of the state, leased to CNFC, CFR, the assurance of opposability towards third parties regarding their limits and expansion, as well as the procurement of the urban planning certificate, building/demolishing license for the developments pertained to the public rail facilities (related to maintenance or investments). The documents required required for registering the real estate properties are procured from Regionala CFR Constanta.*

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

INTRODUCTION

The Railway Cadastre is a subsystem of registering and systematic track-keeping of all railway properties, from the technical, economical and juristic point of view, correlated with all the necessary additions regarding the registering of technological documents of the general cadastre and the real estate publicity documents. The licensed state public domain CN CF CFR SA is defined via the License contract no. MM/224/2002, finished between the Ministry of Transport as an administrator and CNCF, CFR SA as licensee. For each station and inter-station there is a coordination plan in the system, CFR being the part which possesses the cadastre service of each region. The topographic documentation for the registration of the railway infrastructure, is made up of three distinct parts:

1.1 The technical part:

The technical part (the acknowledgement of the plot of land, topographic development/measurements of the land which belongs to the railway infrastructure; the definement of the triangulation points; the definement of each coordinate point measured or calculated; drafting the documents and the location and delimitation plan)

The technical documentation will be drafted according to the following norms:

* Law nr. 7/1996 regarding cadastre and real estate publicity, along with the subsequent additions and modifications;

* Order ANCPI nr 534/2001 – Technical norms for the introduction of general cadastre

* Order ANCPI nr 700/2014 – Regulations regarding the content and drafting methods of the documents

* The mutual order MLPTL (MT) and MAP (MAI) nr 788/205/2002 – methodological norms of the railway cadastre work execution

1.2 The juristic part, which contains:

* The act through which the property right of the State has bed defined (the expropriation decree, land transfers, court orders depending on the case)

* The act through which the administration right for the MT has been defined (copy from HG nr 21/2015 regarding the MT organization and operation)

* The act through which the licensing right for the CNCF,CFR SA has been defined (the concession right nr MM/224 I 2002, as well as the Additional Act)

Fig. 1 GPS South S82V

1.3 The Paper edit:

- The writing and the content of the papers necessary for the registration of the property rights over real estate into the Land Registry, are according to the Order ANCPI nr 700/2014 regarding the approval of the notification, reception and registration rules in the cadastre registry and land registry, along with the subsequent additions and completions;

GPS SOUTH S82V (Fig.1) The necessary tabulation papers are:

- The registration certificate at the Railway National Company CFR SA Trade Register office
- Proof of registration
- Additional act nr. OIS/32274/23.07.2012 in the concession contract
- The first annex in the concession contract (Annex 16 at HG 1705/2006 for the
- The second annex in the concession contract (delivery and receiving of the goods belonging to the public domain of the state)
- HG nr. 1705/2006 for the centralized inventory approval of the goods belonging to the state public domain

MATERIAL AND METHODS

For the measurement execution the SOUTH GPS series S82V has been used, which is a device that contains numerous applications.

GPS S82V series may be used as a reference station, as a rover for static measurements as well as cinematic measurements. We have used two South S82-V GNSS which are equipped with double frequency, 220 independent channels, Orizontal RTK precision +/-1 cm + 1 ppm, Vertical RTK : +/- 2 cm + 1 ppm, RTK.- cinematic mode.

The points of interest determination has been done using RTK-cinematic in real time. Old and new geodetical points used: Not used. The data provided by the National System ROMPOS has been used, via the virtual station RO_VRS_3.2_GG.

The topographic point determination has been done via RTK – Cinematic in real time, by utilizing in real time the differential corrections issued from the specialized service ROMPOS. Where the GSM signal was not enough to measure via ROMPOS system, a base has been defined, and the measurements have been done with the second receptor in Radio system. In the GPS field book, there's data regarding: number of the stenographic coordination point 1970 (X, Y, Z) cartesian geocentric coordination (X, Y, Z), ellipsoidal coordination: latitude (b), longitude (L) the point code, horizontal determination precision (CEP), solution type (FIXED), number of visible satellites (SATS), the point engagement precision (PDOP, HDOP, VDOP), the measurement date and hour.

All GPS determined points have a fixed solution (FIXED), the average number of used satellites being 10. Via the field software SurvCE, measurements have been done directly into the national protection system STEREO 1970 and the reference system MareaNeagra 1975, SurvCE contains the best program implementation, offering the user identical results in real time. This program runs on the GPS field book South S82V (figure 1).

The GPS (type Carlson Mini (GEOS) controller, 520 MHz PXA270 controller and the operating system Windows Mobile 5.0), providing all the date related to the measurements highlighted above. From the GPS field book receptor, the data is transferred to AutoCad via the type lisp TopoLT 10.0 application, used to draft the lay-out plan.

The surface calculus has been done analytically. The results obtain are saved in digital format (files such as *.csv, *.txt, *.xyz, *.doc, *.rw5, *.asc, *.mdt, *.dwg, *.dxf) which can be accessed later in listed in analogical format. The paper has been done according to "The regulation regarding the statement, management, control and the reception of the geodesy, topography, photogrammetry, remote sensing studies and it meets the asserted requirements.

The structures belonging to CFR have been measured via the total station LEICA TCR 1205+, having an angle measurement precision of 5cc and 1mm+1,5pmm in terms of distance measurement. The data editing has been brought into effect via the CALTOP software, the calculate points have been subsequently inserted in AutoCad – used to draft the lay-out plan. The station points determination has been done via GPS South S82-V GNSS in RTK mode (real time) using the corrections transmitted by the permanent station COST (ROMPOS).

RESULTS AND DISCUSSIONS

The SloboziaSud – SloboziaVeche section has a length of 3.444 km and is situated in the south-eastern part of Romania, on the territory of Slobozia, Ialomita country (figure 2).

Initially, the field reconnaissance has been done in order to locate the best placement for the terminals. The terminals are typefeno. On it, the measurements were static, the time being calculated 1min/km as against the permanent stations Bucharest, Calarasi, Constanta, the farthest one being 150 km away plus 15 minutes of control.

The terminal coordinates are listed in the figure below (Fig. 3, 4, 5):

The old plans obtained from the CFR Regional helped us delimitate easier the land in CFR's possession, the safety limit which is 100 meters away from the road axis and the protection limit which is 50 meters away from the axis (Fig. 6, 7).

Fig.2 SloboziaSud-SloboziaVecheKM 12+814-16+258 section map

Table 1

Teminal coordinates forCFR SloboziaVeche-SloboziaNoua (stereographic 1970)

Borne	X (m)	Y(m)	Z(m)
B12	342534.759	686902.553	22.131
B13	341482.972	687597.071	23.732
B14	340620.482	687957.973	22.568
B15	340335.639	688537.336	21.632

In the field, the main railway elements have been emphasized:

- the safety zone limits of the railway infrastructure – the protection zone limits of the railway infrastructure

-the parcels pertaining to railway unit

-the railway axis and its geometric characteristics both horizontally and vertically

-kilometer and hectometer terminals

On the railway section, the rails have been measured every 20 meters if the section was straight and in case of curves the measurement has been made every 5 meters via GPS, the used codes being from Leica. Also, the batters, channels and roads situated in the safety zone

of the section have been measured. For the land situated in the CFR safety zone three types of documents are drafted:

-The first document involves the dismantling of the real estate if it's situated in the safety zone and outside it, it's separated in two parts

- for the first lot, a first registry documentation is drafted
- for the second lot, a data update document is drafted

Fig.3 Terminal netwok

Fig.4 Old plans overlapped on ortofotoplan

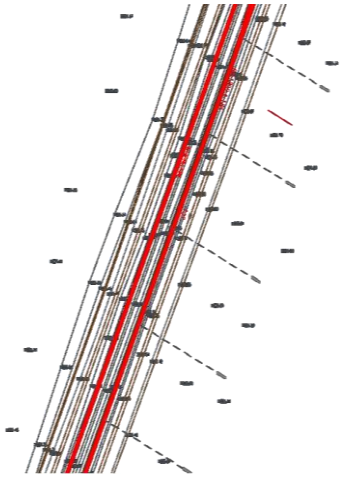

Fig. 5 Measurement plan

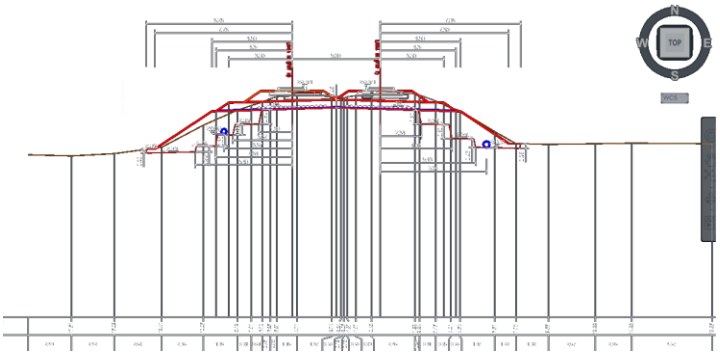

Fig 6 Transverse profiles

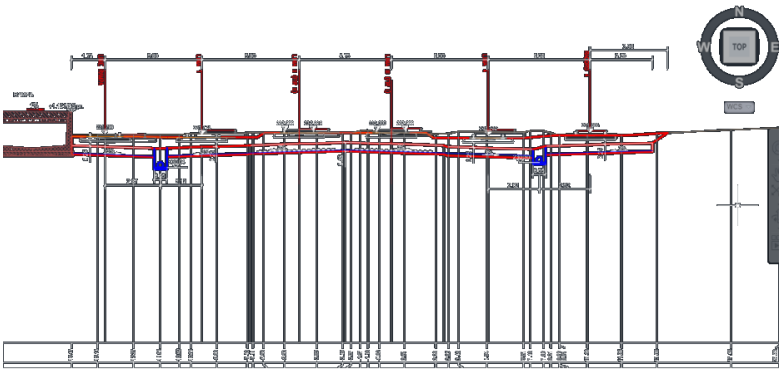

Fig 7 Transverse profiles

CONCLUSIONS

Following the measurements, all territories have been registered in the Land Registry, their purpose being the correct administration of the state public domain goods, leased by CNCF, CFR and the the opposability toward third parties insurance regarding their limits and expansion, as well as the procurement of urban planning certificates, the construction/demolition permits for developments pertained to public railway infrastructure (maintenance, investment, etc).

The railway rehabilitation can be done easier by knowing precisely what's inside the section in question, and the exact development cost as well as the execution plan can be calculated.

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