SOME ASPECTS WITH REGARD TO THE DESIGN OF TRANSPORT INSTALATIONS IN FORESTRY FUND USING MODERN TECHNOLOGIES

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The development of all activities concerning forestry implies the existence of an adequate infrastructure.

The network of roads serving the forestry sector, regardless to their specificity, must be designed with conformity to current technical normative, taking into account the characteristics and orography of the terrain.

The study of the transport installation routes was performed using appropriate cartographical materials and observations on site, specialized software with the goal of reliable technical designs.

Using specialized software adapted to terrestrial measurements and mathematical modeling software for the interpretation of the results, a series of solutions for the design of transport installations are proposed. These solutions take into account best alternatives of the transportation installations routes and the volume of route infrastructure.

The present case study is about the characteristics of the design of a forestry transportation road in the forest patch Plopiş from the production Unit I Sâniob, Forestry District Săcuieni, Forestry Direction Oradea, using some modern logistics.

***Key words**: technical design, transportation installations, forestry sector, modern logistics, specialized software*

Although the forestry fund occupies a considerable surface (26,7% from the surface of the national land fund) the degree of accessibility is relatively slow (approximately 6,5 l meters of road/hectare) a fact which situates us way below under the European average (17 l meters of road/hectare).

The inventory of the transport installations adherent to the forestry sector is to be found in the patrimony of the forestry wards and this raises a lot of problems regarding the maintenance and conservation of the already existing means of transport and also regarding the future designing of other means of transport necessary to current and future activities within the forestry sector.

The design of the transport installations adherent to the forestry sector is an extremely complex process having in view the extremely varied conditions specific to the forestry fund.

The non identical distribution of the national forestry fund, in geographical areas (58,5% in the mountain area , 32,7 in hills and hillocks and only 8% in fields and meadows) (from I, I Florescu, V,N Nicolescu, 1996, after The development

strategy of the silviculture) gives the technical activities for studying and designing the transport installations a series of obvious particularities which have to be taken into consideration when administrating and house holding the national forestry resources.

MATHERIAL AND METHOD

The study case has been done on the forest body Plopis, UP I Sâniob, O.S. Săcuieni, D.S. Oradea.

For the study and for the realization of the technical execution projects of the transport installations analyzed in the current study a series of cartographic materials have been used, as follows: the map with the level curves (scale 1:25000) for the work area - figure 1, the fit out map of the U.P I Sâniob, O.S. Săcuieni, D.S. Oradea.

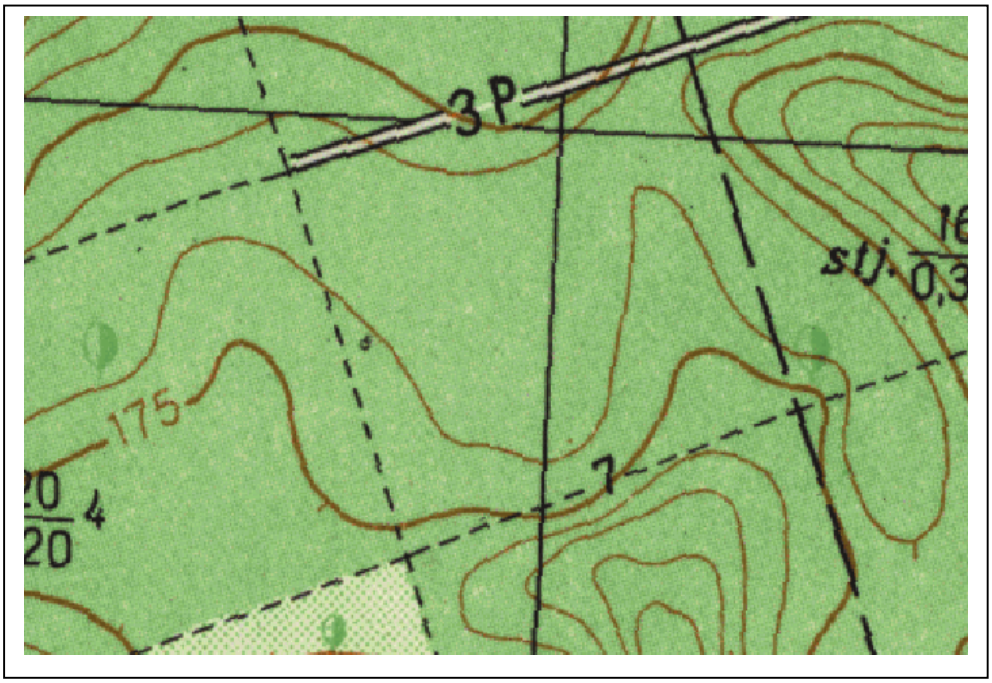

Figure 1 **The map with the level curves (scale 1:25000)**

Used instruments (apparatuses):

-4 GPS receivers model Trimble R3 with L1 frequency, with adherent accessories;

-A total Trimble station with its adherent accessories;

The soft used for recording, transferring and operating the data and for obtaining the final product in a digital system as well as in an analogical system are: Data Transfer, Topo Sys 5.0, Mapsys 7.0, Trimble Total Control, Tera Model 9.0, Surfer 8.

As research methods the following have been used: the observation, the experiment, the comparative analysis and the mathematical modeling.

RESULTS AND DISCUSSIONS

After picking and operating the field data we have analyzed the possibility to design a transport installation in lot 46 where, with the help of the total station we have raised in plane and in altitude the details using supporting points determined with the GNSS technology - *figure 2.*

Figure 2 **Points determined with the GNSS technology**

Thus the (2D+1D) space coordinates of the characteristic points in the national reference system - *table 1,* have been obtained being used later on for the realization of the leveled curve plan - *figure 3* and for the digital model of the field (DTM) - *figure 4.*

Table 1

Coordinates of the characteristic points in the national reference system

Pct.	X (m)	Y(m)	Z(m)	Pct.	X (m)	Y(m)	Z(m)
21	645307.169	279472.267	207	149	645022.186	279636.453	207
22	645307.169	279472.267	207	181	647065.199	280564.819	206
23	645332.003	279450.014	206	246	645261.498	279072.182	213
24	645333.433	279452.435	206	248	645016.138	279638.327	207
40	645237.023	279416.327	205	314	645373.646	279499.239	207
41	645239.915	279418.076	205	315	645373.643	279499.23	207
42	645224.903	279453.806	205	345	645014.774	279633.717	207
43	645227.178	279455.454	205	346	645395.522	279492.988	210
50	645061.916	279617.809	204	446	645017.129	279627.68	207
51	645062.763	279620.141	204	803	645018.132	279635.227	203
52	645161.231	279582.624	207	5000	645306.441	279401.956	208
53	645160.206	279580.128	207	5001	645398.164	279433.383	207
54	645221.971	279556.204	206	5003	645314.34	279524.18	207
55	645222.794	279558.484	206	5004	645278.067	279476.796	207
56	645265.927	279541.95	206	5005	645255.897	279420.5	207
57	645265.182	279539.888	206	5006	645264.646	279395.313	207
58	645360.071	279505.955	205	5007	645296.619	279415.76	207
59	645359.345	279503.627	205	5008	645277.496	279454.909	207
60	645378.117	279499.668	207	5013	645083.218	279587.151	207
61	645376.105	279495.017	207	5111	645075.769	279608.117	207
62	645369.52	279497.816	206	50081	645277.376	279439.927	207
63	645371.013	279502.639	206	50131	645083.226	279587.143	207
125	645281.192	279475.738	208	127	645297.919	279404.185	209
126	645221.973	279460.899	209	800	645205.744	279561.725	210
128	645206.13	279509.537	207	146	644871.113	279203.788	204

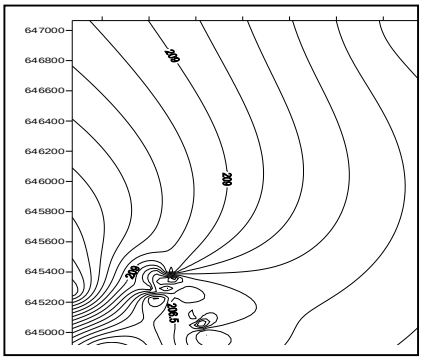

Figure 3 **The leveled curve plan after processing data field**

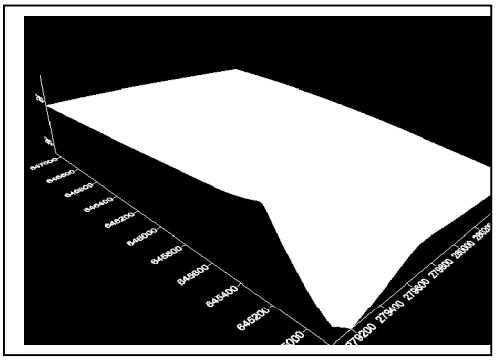

Figure 4 **The digital model of the field (DTM) after processing data field**

From the analysis of the cartographic materials studied after the vectoring the level curves from the raster - figure 5, obtained through scanning the space coordinates of the characteristic points in the national reference system - table 2, leveled curve plan- figure 6 and the digital model of the field - *figure 7*, adherent to this have been obtained.

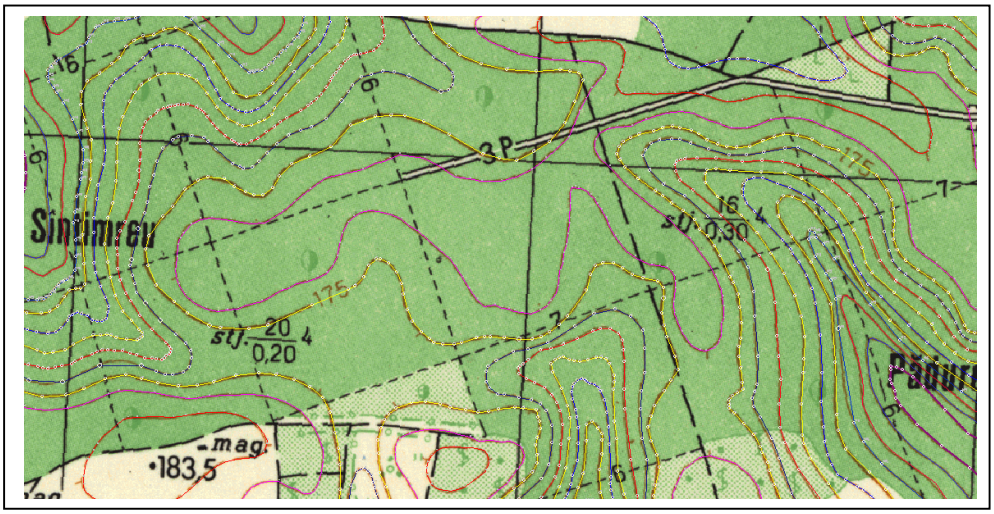

Figure 5 **Vectoring the level curves from the raster**

Table 2

Coordinates of the characteristic points in the national reference system, after the vectoring the level curves from the raster

Pct.	X (m)	Y(m)	Z(m)	Pct.	X (m)	Y(m)	Z(m)
895	644.902.842	279.179.916	175.000	5122	644.970.248	279.347.393	180.000
896	644.906.599	279.196.590	175.000	5123	644.976.763	279.366.940	180.000
897	644.917.043	279.229.469	175.000	5124	644.987.933	279.384.625	180.000
898	644.919.626	279.246.613	175.000	5125	644.996.875	279.390.557	180.000
899	644.920.331	279.259.060	175.000	5126	645.015.175	279.403.710	180.000
900	644.918.217	279.289.590	175.000	5127	645.029.853	279.407.713	180.000
901	644.914.694	279.323.643	175.000	5128	645.045.866	279.409.238	180.000
909	644.914.970	279.351.435	175.000	5129	645.063.976	279.412.098	180.000
910	644.919.961	279.371.397	175.000	5130	645.082.848	279.417.817	180.000
911	644.929.942	279.389.892	175.000	5131	645.103.436	279.419.723	180.000
912	644.946.675	279.410.735	175.000	5132	645.121.165	279.425.632	180.000
913	644.965.463	279.429.229	175.000	5133	645.144.993	279.429.636	180.000
914	645.023.044	279.471.602	175.000	5134	645.167.869	279.432.495	180.000
915	645.057.170	279.480.408	175.000	5135	645.180.450	279.434.020	180.000
916	645.076.619	279.491.417	175.000	5136	645.212.095	279.434.592	180.000
917	645.082.490	279.507.930	175.000	5137	645.236.114	279.434.592	180.000
918	645.082.490	279.529.947	175.000	5138	645.248.124	279.438.595	180.000

Table 2.a

Coordinates of the characteristic points in the national reference system, after the vectoring the level curves from the raster

Pct.	X (m)	Y(m)	Z(m)	Pct.	X (m)	Y(m)	Z(m)
919	645.071.114	279.551.230	175.000	5139	645.249.458	279.445.267	180.000
920	645.056.436	279.572.513	175.000	5140	645.246.408	279.452.130	180.000
921	645.049.464	279.596.732	175.000	5141	645.246.980	279.458.802	180.000
4504	645.322.320	279.243.926	175.000	5142	645.243.549	279.466.046	180.000
4505	645.312.896	279.279.266	175.000	5143	645.238.974	279.473.290	180.000
4506	645.308.773	279.318.139	175.000	5144	645.231.730	279.479.199	180.000
4507	645.328.799	279.354.656	175.000	5145	645.223.723	279.489.303	180.000
4508	645.350.003	279.389.407	175.000	5146	645.211.714	279.494.259	180.000
5108	645.152.220	279.100.729	180.000	5147	645.199.513	279.502.837	180.000
5109	645.135.000	279.120.741	180.000	5148	645.181.404	279.514.275	180.000
5110	645.112.661	279.146.339	180.000	5149	645.166.344	279.520.185	180.000
5111	645.091.252	279.170.539	180.000	5150	645.140.990	279.534.291	180.000
5112	645.074.032	279.184.036	180.000	5151	645.125.359	279.545.538	180.000
5113	645.050.297	279.198.464	180.000	5152	645.107.630	279.560.026	180.000
5114	645.025.631	279.211.960	180.000	5153	645.095.811	279.577.755	180.000
5115	645.001.895	279.229.646	180.000	5154	645.087.614	279.590.527	180.000
5116	644.986.537	279.245.935	180.000	5187	645.294.413	279.521.008	180.000
5117	644.989.329	279.268.740	180.000	5188	645.313.774	279.500.158	180.000
5118	644.982.813	279.285.029	180.000	5189	645.333.507	279.489.733	180.000
5119	644.980.486	279.298.525	180.000	5190	645.352.496	279.490.105	180.000
5120	644.976.298	279.311.091	180.000	5191	645.369.995	279.499.413	180.000
5121	644.973.505	279.327.846	180.000	5450	645.358.542	279.430.671	180.000
5451	645.335.272	279.406.238	180.000	5456	645.262.553	279.238.692	180.000
5452	645.312.584	279.380.059	180.000	5457	645.267.789	279.213.095	180.000
5453	645.288.150	279.349.226	180.000	5458	645.273.024	279.182.262	180.000
5454	645.272.443	279.316.066	180.000	5459	645.295.131	279.147.357	180.000
5455	645.263.134	279.282.324	180.000	5460	645.298.237	288.272.357	180.000

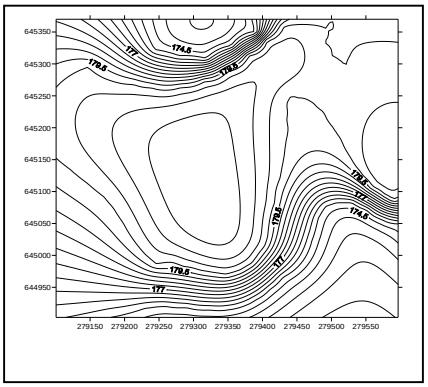

Figure 6 **The leveled curve plan after the vectoring raster**

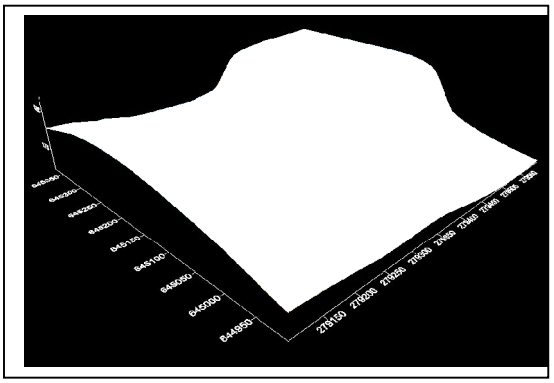

Figure 7 **The digital model of the field (DTM) after the vectoring raster**

Analyzing the products obtained for the study and for the design of a transport installation adherent to the lot number 46 it can be observed that the leveled curve plan and the digital model of the field show more accurately the objective reality from the field in comparison with the used cartographic products.

As a consequence, in order to realize the basic polygon of the transport installation with all the characteristic elements, the following have been used: the plan with the level curves and the digital model obtained after the field data have been processed - *figure 3* and *figure 4*.

CONCLUSIONS

It is recommended that, for the realization of the studies and for the technical designs necessary for the transport installations to have conventional earthly, as well as GNSS measurements in order to obtain results that show the objective reality existent on the field.

The analogical cartographic materials existent and realized with a classical technology and those materials that have a relatively low precision must be used only temporarily just to get a general image of the whole situation.

The modern technologies regarding the picking and the processing of the data, beside the fact that they allow the purchase of some complex final products, they also allow a continuous re - actualization and archiving by realizing a base with the adherent data.

Also, the soft used, being characterized by a great number of freedom degrees allows the realization of some complex types of case studies in different formats, plausible all over the world and characterizes itself through a high degree of interactivity.

It is recommended to use the soft and the suggested models differently according to the physical geographical particularities of the objective realities and according to the objectives suggested by the forestry house hold.

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