

Summary of Results

Introduction

Kremenets is one of the ancient towns of Ukraine. The first written mention about Kremenets is connected with the battle of Prince of Volhynia Danylo Romanovych and King of Hungary, dating back to 1227. In the winter of 1240-1241 Kremenets was the first European town to have withstood the Batu Khan hordes.

After the downfall of Galician-Volhynian principality Kremenets for a long time was under the rule of Lithuanian, Polish and Hungarian Kings, having witnessed the period of rise and stagnation.

In the 30-ieth of 16 century under the rule of Bona Sphera d-Argona – the wife of the Polish king and Great Prince of Lithuania Sigizmund I this ancient town became one of the leading centers of economy of Volhynia, having used the advantage of European money. It is at that time, we presume, that the Jewish cemetery was founded on the Southern stope of Kremenets mountains.

Nowadays the old gravestones prevail there, but one can also spot the burials dating back to WW II and the postwar period.

The German troops occupied Kremenets on the 3rd of July, 1941, having consequently turned the central part of the town into the concentration camp for Jewish people, who were shot on the night of September, 3, 1942, and the ghetto was burnt.

Due to the ancient fence, the cemetery preserved its boundaries, 8517 graves with gravestones have been recovered, a considerable part of them (1649) in satisfactory condition.

The expedition research carried out in the autumn of 2006 (supervised by the member of IFLA, Head of the Chair of Landscape Architecture, garden and urban ecology, PhD, Doctor of Sciences, Volodymyr Kucheriavyi Of National Forestry University of Ukraine) provided the material for Technical task, which is going to be the basic of “The project of restoration of the ancient Jewish cemetery” (the first half of the 16th century) in the town of Kremenets, Ternopil region, Ukraine.

The first stage of expedition works was an investigation of condition of burial places.

Main requirements made by customer had been completely implemented:

- for stock-taking of tombstones the territory of the cemetery was prepared by cleaning out vegetation;
- contacts with tombstones were minimized;
- no tombstone and grave have been damaged;
- clear identification of each tombstone has been provided;
- tombstones have been numbered.

Using results of implemented investigations the conditions of tombstones and cemetery fence were determined, soil conditions and erosion processes having taken place on the slopes of the cemetery were studied, conditions of vegetation covering were described, transit spontaneous and pedestrian paths were determined.

The results of investigation are presented in six following sections:

Section 1. General description of landscape parcel.

Section 2. Evaluation of condition of burial places.

Section 3. Condition of the cemetery fence.

Section 4. Soils and erosion processes on the slopes of the cemetery.

Section 5. Vegetation covering of the cemetery.

Section 6. Road-path network.

Section 1. General description of landscape parcel.

The cemetery is situated on the south slope of the hill included into Gologoro-Kremenetskyi mountain-ridge and is located not far from the highest point in this region - mountain Kremenetska (408m).

So the landscape parcel and its environment panorama is very picturesque.

Kremenetski mountains consist of hilly formations with typical grey forest soils. On the territory of the cemetery they are mixed with bedrock and are slightly expressed. Existent structure of topsoil is unstable and easily influenced by erosion processes.

The first and the second entrances to the cemetery are in a deep valley of gully which encircles its territory from the south. Along the valley of gully the street Dzherelna lies. It connects the cemetery with the central historical part of the town. There is a path leading from the first entrance to the north boundary with several observation points from which it is opened up the panorama of the town lying in the valley and mountain Zamkova dominating in the east is opened. This scenery is especially effectively grasped from the place of the northern fence where several observation sites were spontaneously formed. In perspective this adjacent zone of upland could be included into the landscape-memorial complex of the cemetery.

From the upper observation points it is nice to overview the territory of the cemetery where besides places with tombstones darken during the time there are some free standing oaks and patterns of tree-bush thickets. Some green fragments, considering their picturesqueness and modern landscaping, could be left after reconstruction of vegetation covering.

In summer-autumn period owing to long time of desolation the slope looks like a continental meadow with rich flowering motley grass, which partially could be left in the places where tombstones are fully covered by the ground.

The western and the eastern parts of the cemetery are edged by ravines covered with tree-bush vegetation. This vegetation on the one hand is a peculiar protective buffer zone and on the other hand is a joining element with neighboring landscapes.

Section 2. Evaluation of condition of burial places.

Cemetery contains 8517 graves discovered during the process of research works. Examination of graves was difficult because of their bad condition caused by long term influence of natural processes (rains, wind erosion, soil slides, overgrowing etc.) and also thoughtless human activity.

Results of graves examination are the following (fig. 1).

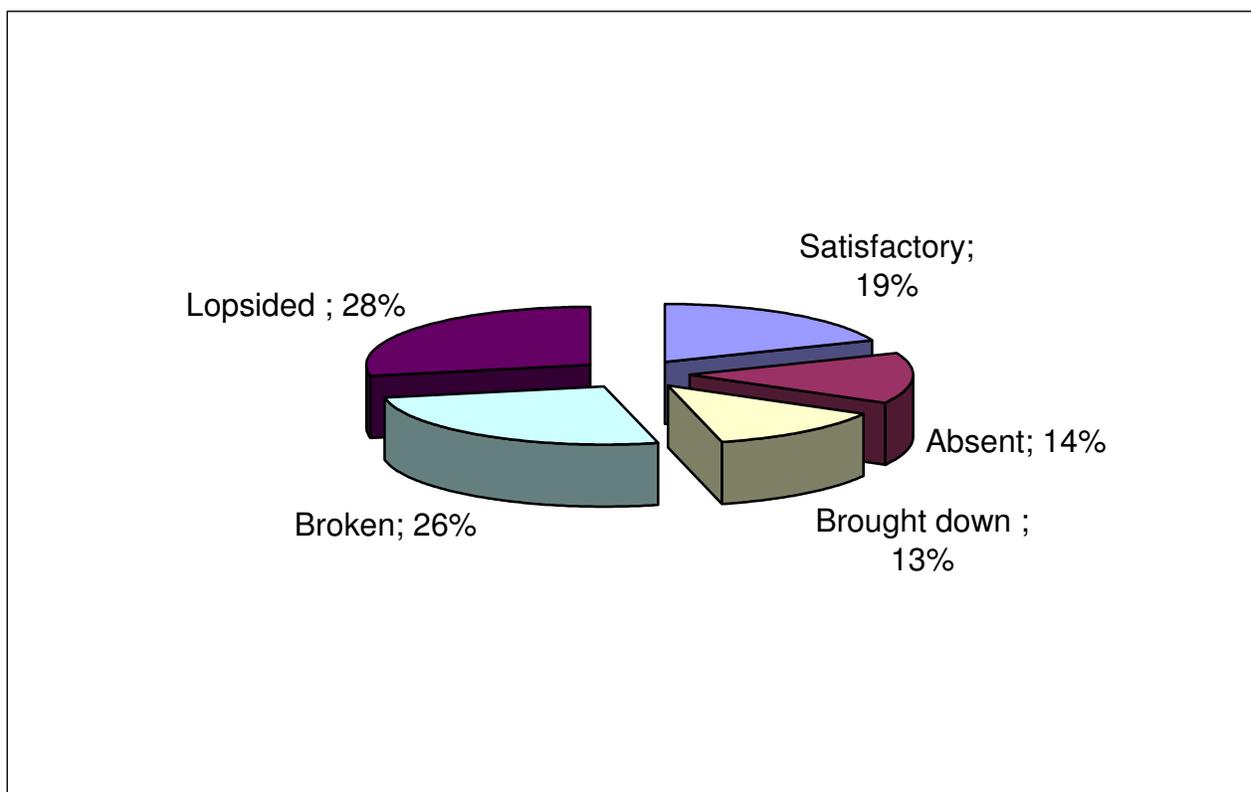


Fig.1. Condition of the tombstones of Jewish cemetery of town Kremenets.

- 1649 graves are in satisfactory condition and have comparatively presentable appearance. Other places of burial have the following defects:

- 2483 tombstones are lopsided; bigger part of them could be improved and transferred to the tombstones of previous category. We can also include to this category the tombstones, on which the epitaphs did not remain, so they have to be replaced;

- 2283 tombstones have disrupted integrity. Some part of them could be reconstructed by assembling separate wreckage, but some tombstones are so broken that they can not be restored. Among general number of accounted tombstones there are tombstones destroyed partially, i.e. only insignificant part of the tombstone is broken off. Such tombstones can be reconstructed using modern technologies;

- 1166 tombstones are fully brought down and lie in horizontal position; considerable part of them is covered with soil in consequences of action of erosion processes. We think that majority of them is acceptable for restoration and reversion to the previous condition.

- In the places of 1216 graves the tombstones are totally absent, so for reconstruction of these parcels it is necessary to produce new tombstones made of the same materials.

Usually complex of tombstone consists of vertical and horizontal stones. As in the cemetery 3969 horizontal tombstones are absent then it would be expedient to renew this element of burial as well. Maybe part of the horizontal tombstones is deep under the ground but for recognition of this it is necessary to implement additional investigations.

In general it can be defined that majority of the graves in the cemetery require clearing from soil drifts created in consequences of water and wind erosion and gravitational processes (subsidence caused by influence of their own weight).

Section 3. Condition of the cemetery fence.

The territory of the cemetery is encircled by the fence almost along all perimeter. The fence is a wall (width 0.8m) reveted of ashlar (sandstone), with the total length 624.54m. In some places the fence, despite the main function as a restriction of

spontaneous movements of visitors, has also a function of relieving wall protecting soil from a slide.

According to the degree of preservation the cemetery fence can be conventionally divided into three parts: totally destroyed, partially destroyed and with signs of destruction.

The totally destroyed fence has the length of 169.75m, only its basement is left. For its renovation it is necessary to restore the wall totally. For this purpose it is required to revet 175.54m³ of stone (if height of the fence is 1.2 m).

The partially destroyed fence is a wall with some gaps of different size where the stonewall is absent. The general length of this fence is 243.27m. To renovate this part of the fence it is necessary to add approximately 48.6 m³ of stone to the existent wall.

On those parts of the fence that were determined as in satisfactory condition it is necessary to implement slight reparation. It consists of supplementing absent stone. Such works have to be implemented on the plot of land 211.52 m long.

In some areas of the cemetery adjacent to the fence it is necessary to implement clearing of the wall from soil accumulated during longterm period and also from garbage brought by the inhabitants to one of the sites.

Indispensable condition for fence restoration is its renovation to the original form. For this purpose it is necessary to use original local stone and building mortar used when the primary fence was established.

The condition of the fence is shown on the scheme __, attached, in the appendix.

Section 4. Erosion processes on the slopes of the cemetery.

The main tasks of implementation of the soil investigation in the cemetery were:

- laying and description of soil profiles;
- soil sampling;

- determination of physical-mechanical and chemical properties of soils;
- determination of influence of edaphic factor and vegetation cover of the park;
- determination of the degree of soil impairment and directions of soil erosion.

Thickness of bedding ranges from 1 till 5 cm, which corresponds to 2-5-year quantity of litter according to the weight.

Research of topsoil in this territory was implemented on four transects: north, east, south and west.

The scheme of location of soil trenches on the cemetery territory relatively to corners of the earth is shown on the scheme of soil sampling. In general 10 soil trenches were created, namely 3 soil profiles on the slope of the northern side, 1 on the slope of the eastern side, 3 on the slope of the south side and 3 soil profiles on the slope of the western side.

Physical-mechanical properties of topsoil of the cemetery territory are shown in the table 1.

Density of top layer of soil ranges within the bounds of 0,98 – 1,32 g/cm³. Type of soil according to density is normal, compacted and strongly compacted. Density of solid phase of soil is from 2,35 till 2,49 g/cm³.

Field moisture of soil ranges within the bounds of 16,01 – 24,12 % and depends on slope exposition and altitude of sampling. Thus, the upper part of slopes is characterized by less field moisture than the bottom. In this way the obtained results show that samples №5 – 16,01%, №7 – 14,71%, №8 – 16,01% have less porosity in contrast to the west slope (sample №10 – 22,32%), and to the north slope (sample №9 is 22,32%).

General porosity of soil is changing from 43,8% till 59,55%. The least porosity has been fixed in the bottom part of the slope near the cemetery entrance, not far from the path. Aeration degree ranges within the bounds of 40,41 – 73,50 %.

Chemical properties of topsoil of the cemetery territory are presented in table 2.

Analysis of results has shown that pH of water extract of all the samples taken exceeding 7 units and ranges within the bounds 6,75-7,7 units. Soils are alkaline and alkalescent.

Percentage content of humus in topsoil of the park does not exceed 3,52% and is decreasing down along the profile and in the places where erosion processes are observed. Maximum values of percentage content of humus are fixed in upper strata of soil profile of southern part of the cemetery (sample №4 – He – 3,53 % of humus; №4 – He – 3,49 % of humus). In these places there is grass covering with the highest density.

On some slopes the thickness of strata is changing and extraction of parent material on the surface is observed in consequence of erosion processes.

Impaired and filled-up soils of the cemetery are influenced by linear and area erosion. The process shows gullied linear character of flow off and decreasing of humus in the upper part of the slope and its accumulation in the bottom zone (scheme of soil sampling, table 1).

Physical-mechanical properties of topsoil of territory of Jewish cemetery

Table 1

No	d1, soil density, g/cm³	Soil type according to density	d2, g/cm³	Field moisture, W, %	Hygroscopic water, Wh	Soil porosity, V %	Soil aeration, Vaer.	Aeration degree, %
1	1,32	strongly compacted	2,35	18,22	0,125	43,80	19,76	45,11
2	1,24	compacted	2,39	16,69	0,227	48,20	27,51	57,08
3	1,29	strongly compacted	2,48	17,42	0,189	48,05	25,58	53,23
4	1,18	compacted	2,47	24,12	0,272	52,23	23,76	45,50
5	1,14	normal	2,42	16,01	0,233	52,83	34,58	65,46
6	1,2	compacted	2,47	23,76	0,164	51,37	22,86	44,50
7	1,12	normal	2,41	14,71	0,216	53,56	37,08	69,23
8	0,98	normal	2,42	16,10	0,319	59,55	43,77	73,50
9	1,24	compacted	2,49	22,41	0,208	50,20	22,41	44,64
10	1,28	strongly compacted	2,46	22,32	0,166	47,94	19,37	40,41

Table 2

Chemical properties of topsoil of territory of Jewish cemetery

Northern direction

No	Stratum index	Stratum, thickness	pH (H ₂ O)	Humus, %
1	He	2-17	7,35	2,53
2	He	2-20	7,69	3,16
3	He	2-19	6,82	2,98
4	He	2-20	6,75	3,52
5	He	2-20	7,3	2,90
6	He	2-20	7,35	1,99
7	He	3-16	7,5	2,16
8	He	2-20	7,62	3,49
9	He	2-19	7,7	2,86
10	He	2-20	7,67	1,95

Section 5. Vegetation covering of the cemetery.

The territory of the cemetery is covered with bushy grass covering and parcels of tree-bush thickets.

In the grass phytocenosis the *Filipendula vulgaris* dominates, its height achieves 1 m. *Stenactis annua*, *Carax nana*, *Lonaria vulgaris*, *Hipericum perforatum*, *Potentilla repens*, *Enigeronica Canadensis*, *Tilipendula vulgaris* Moendi are widely represented. Herbage is so dense and high that in some places it hides tombstones.

Tree-bush phytocenosis is represented by the following groups:

1. parcel №1 4Haz. 2Pl. 1P. 1G.r. 1N.m. 1Wic. + O + H
2. parcel №2 3W. 2Ez. 1W.n. 1P. 1Bl. 1Pl. 1G.r. + N.m. + Wic. + H.
3. parcel №3 6N.m. 3W. 1Wic. + H. + As.
4. parcel №4 3W.n. 3P. 2Pl. 2Ap. + N.m. + As.
5. parcel №5 6G.r. 2H. 1Pl. 1Wic. + N.m. + H.
6. parcel №6 10 As. + H.
7. parcel №7 4H. 4El. 2N.m. + H.
8. parcel №8 5Haz. 5P. + H.

Haz. – Hazel

N.m. - Norway maple

Wic. - Wicken (*Crataegus monogyna*)

Pl. – Plum-tree

P. – Pear-tree

G.r. - Guelder-rose(*Viburnum opulus*)

W. – Willow

El. – Elder

W.n. – Walnut (*Juglans regia*)

Bl. - Blackberry (*Rubus*)

As. - Ash-tree

O. – Oak

Ap. – Apple tree

H. – Hornbeam

Section 6. Path-road network.

Path-road network of the cemetery has a transit character, as it is used for pedestrian traffic across all territory of the cemetery.

The main pedestrian road starts near the street Dzherelna. Probably in the past here there was the main entrance gate which is totally destroyed at the current moment. The road looks like a spontaneous path trodden out through grass vegetation and lies among graves. The emergence of such a route was caused, in our opinion, by the location of residential houses in the upper part of the slope. For inhabitants it is more convenient to get to this place across the territory of the cemetery. This path is also used by tourists. The path crosses the middle of the cemetery and divides it into two asymmetric parts. The end of the path is a spontaneous exit to the street Sychivka.

To the east from the first entrance on the same street Dzherelna there starts another entrance road used in the past for delivery of dead bodies directly to the graves. It is considered that first there was a gate on this road too. Currently is destroyed. The left side of the road is limited by relieving wall. Its height is gradually decreasing from 2.6m. till 0.5m. A sufficiently steep slope strengthened by tree-bush planting is on the right side of the road.

During the process of research works no other routes appropriated for movement besides above mentioned were found.