# Report of conservation and restoration process with the matzevah with a symbol for the Great Synagogue from Jewish Cemetery in Białystok, Poland

#### 1. Information about the project

The work was conducted by Bartosz Markowski, a specialist in conservation and restoration of stone sculpture and architectural detail on behalf of Bialystok Cemetery Fund. The microchemical analysis were made by Sylwia Svorová Pawełkowicz. The work process took place since November 2024 till May 2025.

#### 2. Description of the object and damage assessment

The work was conducted by Bartosz Markowski, a specialist in conservation and restoration of stone.

The matzevah was made in one piece of sandstone. The front surface was smooth grinded and then the letters and relief were carved. Some parts of the front surface were painted in black, green and orange colours. The backside of the matzevah was originally left ungrinded, just with chisel marks. Dimensions: width 50 cm, height 103 cm, thickness 10 cm.

The matzevah was found already taken out from original place. The slab was broken into 7 fragments and the bottom down part is missing. As the fragments have been staying covered with soil for a long time, the stone was penetrated with humidity and overgrown with moss. The three colours paint, with the black colour dominating, have flaked out in about 70%. There are also many small mechanical damages, like broken edges, scratches, etc.

#### 3. Project assumptions and restoration framework

The main task of this conservation and restoration process is, on the one hand to restore the matzevah and achieve aesthetically satisfying result, on the other to keep and preserve all historical data and original layers. Each method will be firstly tested to be sure it doesn't damage the stone or the original paint in yellow and black colour. The following

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framework is not definitive and could be slightly modified according to result during the work progress.

- 1. Dismantling and transportation of the matzevah to the studio
- 2. Taking documentary photographs before starting conservation works
- 3. Examination of the pigments in yellow, black and orange colours
- 4. Preliminary cleaning of the matzevah from soil and moss
- 5. Disinfection of the stone (e.g. Preventol Ri80)
- Cleaning of the stone with water-steamer and soft brushes without removing the yellow, black and orange paint remaining
- 7. If necessary, continuing of cleaning process using selected chemicals, depending on the needs, always after performing tests
- 8. Desalting of all the stone fragments with cellucotton (lignin) and distilled water compress
- 9. Enforcing of the sandstone structure with organosilicon (e.g. Remmers KSE 300)
- 10. Gluing of the fragments of the matzevah with epoxy resin (e.g. Akemi Akepox 5010) with enforcement of stainless-steel rods installed inside
- 11. If necessary, injection of cracks in the stone with liquid epoxy resin (e.g. Akemi Akepox 5000)
- 12. Filling of the cracks and bigger losses with mineral mortar (e.g. Remmers Restauriermortar).
- 13. Partial reconstruction of the missing colour in yellow, black and orange. The range of reconstruction will be limited, just to make the final result aesthetically balanced. The new paint will be chosen by colour (e.g. Keim Restauro Lasur)
- 14. Hydrofobic impregnation (e.g. Remmers Funcosil SL, Funcosil WS)
- 15. Installation of the matzevah back in the cemetery
- 16. Final report with photos and description of the process.

#### 4. Process of conservation and restoration

The fragments of the matzevah were collected and protected during the volunteer campaign of The US Bialystok Cemetery Fund in Summer 2024. In November 2024, after taking photos *in situ*, the fragments of the matzevah were pulled up and transported to the studio. The exact place of the matzevah was documented and fixed.

Once transported to the studio, the matzeva's fragments were photographed again and samples of orange, black, white and green pigments were taken and sent to analysis. The result of laboratory test (in attachment) were the following: orange – lead red, black – iron black pigment, green – lead white and chrome or emerald green pigment. The white was in fact just some random remnant of mortar, based on zink white and some oil and used only in one place, probably to cover a small hole. It may be sensitive to hot water, so this area was avoided when using a steamer. Cleaning was conducted in several stages: removing of soil and moss with soft brush, using cold water and then water-steamer. During the cleaning process, the stone surface was disinfected with Preventol Ri80 for several times. Then the stone was desalted by putting each fragment into a compress with cellucotton (lignin) and distilled water. After dried up, the fragments were glued with epoxy resin Akepox 5010 by Akemi and connections were enforced with stainless-steel rods ø 8-12 millimetres. Then the sandstone structure was enforced with organosilicon Remmers KSE 300 - the matzevah was submerged in the plastic pool fulfilled with KSE 300 to absorb it as much as possible. Then the stone was covered with plastic and seasoned for three weeks to harden the organosilicon. In the next stage the cracks and bigger losses were filled with mineral mortar Restauriermörtal, by Remmers, Germany. Hydrofobic impregnation was made with Funcosil SL by Remmers. Partial reconstruction of missing colour layer were made with silicate paint Restauro Lasur by KEIM. The new colour was put only on the fragments with detectable residues of original paint, otherwise the fragments were left unpainted. Missing and identified parts of the text were reconstructed just by painting, without carving the letters – the text is readable but also it's clear that some parts are reconstructed.

As the bottom half-part of the matzevah was missing, there was a problem how to put it back in vertical position. The solution was to install the matzevah on a small platform (a granite file) which will be hidden slightly below the ground level. The platform itself will be invisible (once moss will overgrow it) and no deep digging was needed, just around 10 centimetres. The connection between the matzevah and the platform is made with two stainless-steel rods ø 16 mm inserting tightly 10 centimetres long tubes installed into the stone. The matzevah stone doesn't touch the ground, so absorption of humidity will be reduced. It can be also easily detached from the platform, if necessary.

#### 5. Recommendations

It's highly recommended to limit any interventions on the object just to occasional removing of old leaves around and taking care that ground level at the matzevah will not raise. The granite platform should be always covered with some soil and overgrown with some moss or any other local plants. Some moss and dirt from the trees and atmosphere may appear also on the stone surface of the matzevah, with time, and it is natural process. Any advanced treatment, like e.g. cleaning or disinfection should be carried out by a professional restorer.

#### 6. Photographs

This report contains 60 photographs documenting all the stages of conservation and restoration process.



Matzevah at the cemetery, after protecting by US Bialystok Cemetery Fund staff



Matzevah at the cemetery, after protecting by US Bialystok Cemetery Fund staff



Matzevah uncovered at the cemetery



Fragments of the matzevah after transportation to the studio



All the fragments of the matzevah distributed on the platform



Matzevah in the studio, front view details



Matzevah in the studio, front view details





### Taking samples of green and black colours





Taking samples of white and orange colours





Dry cleaning of the stone with soft brushes



<image>

Cleaning of the stone with water-steamer





Desalting of the stone with cellucotton (lignin) and distilled water compress





Desalting of the stone with cellucotton (lignin) and distilled water compress



#### Installation of stainless-steel rods inside the sandstone



Installation of stainless-steel rods inside the sandstone



Gluing fragments of the matzevah



Stabilizing the matzevah after the gluing



Enforcing of the sandstone structure with organosilicon KSE 300 by Remmers



Enforcing of the sandstone structure with organosilicon KSE 300 by Remmers





![](_page_24_Picture_0.jpeg)

![](_page_25_Picture_0.jpeg)

![](_page_26_Picture_0.jpeg)

![](_page_27_Picture_0.jpeg)

![](_page_27_Picture_1.jpeg)

![](_page_27_Picture_2.jpeg)

### Installation of the matzevah on the platform, in the studio

![](_page_28_Picture_0.jpeg)

Installation of the matzevah on the platform, in the studio

![](_page_29_Picture_0.jpeg)

Partial reconstruction of missing colour layer with paint Restauro Lasur by KEIM

![](_page_30_Picture_0.jpeg)

Partial reconstruction of missing colour layer with paint Restauro Lasur by KEIM

![](_page_31_Picture_0.jpeg)

The matzevah after conservation, in the studio

![](_page_32_Picture_0.jpeg)

### The matzevah after conservation, in the studio

![](_page_33_Picture_0.jpeg)

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The matzevah after conservation, in the studio

![](_page_34_Picture_0.jpeg)

### The matzevah after conservation, in the studio

![](_page_35_Picture_0.jpeg)

Details of the matzevah after conservation, in the studio

בי הבירה תכלי ד 16 12 M בהמהה מלכה ב 52. 53.

Details of the matzevah after conservation, in the studio

![](_page_37_Picture_0.jpeg)

![](_page_37_Picture_1.jpeg)

![](_page_37_Picture_2.jpeg)

### Installation of the matzevah at the cemetery in Białystok

![](_page_38_Picture_0.jpeg)

Installation of the matzevah at the cemetery in Białystok

![](_page_39_Picture_0.jpeg)

Installation of the matzevah at the cemetery in Białystok

![](_page_40_Picture_0.jpeg)

### Installation of the matzevah at the cemetery in Białystok

![](_page_41_Picture_0.jpeg)

Installation of the matzevah at the cemetery in Białystok

![](_page_42_Picture_0.jpeg)

### Installation of the matzevah at the cemetery in Białystok

![](_page_43_Picture_1.jpeg)

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## Sprawozdanie z badań laboratoryjnych próbek pobranych z macewy

grudzień 2024

#### Spis Treści

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#### Metodyka badań

Obserwacje mikroskopowe prowadzono pod:

- mikroskopem stereoskopowym Olympus SZ61;

mikroskopem biologicznym do światła przechodzącego, światła spolaryzowanego i ciemnego pola:
Olympus CX41.

Zdjęcia wykonano kamerą mikroskopową Olympus UC30.

<u>Skład pierwiastkowy</u> próbki ustalono na podstawie spektrometrii fluorescencji rentgenowskiej (XRF) wykonywanej za pomocą spektrometru EDAX Eagle µProbe. Analizy XRF określające skład pierwiastkowy przedstawiono wymieniając wykryte pierwiastki zgodnie z intensywnością pików w porządku malejącym.

Autorzy badań:

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### Próbka nr 1. pomarańczowy

![](_page_45_Picture_1.jpeg)

Fotografia próbki, powiększenie x40.

![](_page_45_Figure_3.jpeg)

Skład pierwiastkowy: Pb. Interpretacja: minia.

### Próbka nr 2. czarny

![](_page_46_Picture_1.jpeg)

Fotografia próbki, powiększenie x100.

![](_page_46_Figure_3.jpeg)

Skład pierwiastkowy: Ca, Pb, S, Fe, Si. Interpretacja: węglan wapnia, pigment ołowiowy, śladowa ilość związków żelaza.

### Próbka nr 3. biały

![](_page_47_Picture_1.jpeg)

Fotografia próbki, powiększenie x40.

![](_page_47_Figure_3.jpeg)

Skład pierwiastkowy: Zn, S. Interpretacja: biel cynkowa.

#### Analiza mikrochemiczna spoiwa

+ H <sub>2</sub> 0	+ H <sub>2</sub> 0	+ NaOH	+ CuSO <sub>4</sub> / NaOH
(temp. pok.)	(po ogrzaniu)	(reakcja zmydlania)	(reakcja biuretowa)
delikatnie mięknie	mięknie bardziej	wynik pozytywny	wynik pozytywny

<u>Wniosek:</u> W badanej warstwie wykryto olej, żywicę lub wosk oraz spoiwo białkowe, co może wskazywać na zastosowanie techniki emulsyjnej.

### Próbka nr 4. zielony

![](_page_48_Picture_1.jpeg)

Fotografia próbki, powiększenie x40.

![](_page_48_Figure_3.jpeg)

Widmo XRF zarejestrowane dla spodniej warstwy próbki.

Skład pierwiastkowy: Pb, Cr, Fe.

Interpretacja: biel ołowiowa, zielony pigment chromowy (zieleń chromowa lub szmaragdowa).