

## RESTORATION OF A NATIONAL MONUMENT BUILDING ON MARGARET-ISLAND

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*Summary: The paper shows the general characteristics of restoration of national monument building Palatinus Bath. The Open-Air Bath, located on the Margit island, in a nature conservation area, was opened as a beach on the bank of the Danube in 1919. With the construction of the large pool it was transformed in 1921 into an open-air bath. Based on its high popularity demand it had to be expanded The t architectural project tender was launched in 1937, and the design project of István Janáky was accepted. The current installation Has been completed on the basis of these plans. The water to the pools are supplied from the thermal springs of the Margit Island.*

*In the 2016 started reconstruction work will ad a new wellness sectors to the complex.*

*The paper describes the "Major-method" because the collapsed structure elements it couldn't be used formwork system to stabilise the construction.*

*Keywords: Major-method, Margit island, national monument restoration.*

### 1. INTRODUCTION

The Open-Air Bath and swimming pool, located on the Margit island, in a nature conservation area, was opened as a beach on the bank of the Danube in 1919. With the construction of the large pool it was transformed in 1921 into an open-air bath.

### 2. RESULTS OF CONSTRUCTION AND RESTORER INVESTIGATION

The investigation of the building structure and building materials was finished in 2013. The most important question was the stability of construction [1] [2]. During the same time the restorer exploration was completed [1]. The findings were very nice because on brick wall there is a rest of „secco“ (Figure 1.,Figure 3. and Figure 4.) but other wall-paintings have to be reconstructed. It was discovered that the building materials and the building structures, including the columns, walls and the ceilings were made from aluminate cement concrete (Figure 2. and Figure 5.).

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The expert opinion was that this structure elements must be demolished and rebuilt.



21. Főépület. Középső épületszárny. Előcsarnok a pénztártól északra.  
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*Figure 1. The main entrance in 1937*



*Figure 2. The main entrance in 2016*



22. Főépület. Középső épületszárny. Előcsarnok a pénztártól északra. Pólya Iván hímesköve. 1943. Archiv felvétel.

*Figure 3. The sunbather lady (secco)*



*Figure 4. Restorer trove in brick wall*

The building of Palatinus Bath could be divided into three wings: south-wing demolished and constructed again, north-wing partly demolished and reconstructed, central-wing with main entrance could be reconstructed (Figure 2.) and the 18 columns will remain without intervention. The monitoring (supervision) is made by Monumental Protection Agency.

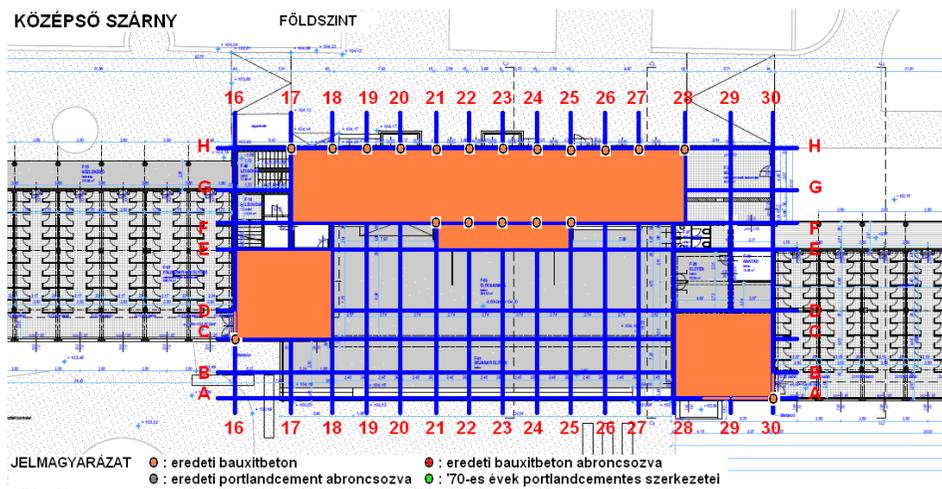


Figure 5. The state on the beginning of reconstruction

### 3. THE RENOVATION WORKS

The renovation started in 2016 because concerns of the stability of the building. On Margaret-island is the ground water level (GWL) very high (maximum level of GWL is on the surface). In case of flood the water level in Danube-river is above the ground. The acting water pressure (up-lift) is high too and it was taken into consideration in the design process. During the construction the basement wall crashed down on length of 21 meters (Figure 6.). It was caused by the high groundwater level. Additionally, the soil behind the basement wall had the uniformity coefficient smaller than 3-5. The building has had a large deformation but didn't crash down. With 100 tons weight was loaded the parapet concrete wall [3] (Figure 7.). The supporting systems Doka and Peri could not be used because the big amount of debris. It must be used rapid supporting system. The situation was life threatening.



Figure 6. Basement brick wall is collapsed



Figure 7. The collapsed basement wall caused new strength figure [3]

#### 4. MAJOR-METHOD OF SUPPORTING SYSTEM

The new supporting system is developed, the time factor was the most important one. In case of flood the sand-bag method is used to build and strengthen the dikes. These bags were filled with fresh concrete and used for supporting of damaged construction element. The Major-method is independent from basement conditions and from carrying capacity of soil (Figure 8. and Figure 9.).



Figure 8. First concrete bag column

How to build the concrete bag supporting element (Major-method):

2. the bags was filled up with fresh concrete,
3. concrete quality must be C16 or higher and with very low fluidity,
4. with using of concrete bags is built a column in form of cone, empty in the middle,
5. the bags were sprayed with water to accelerate the hardening of concrete,
6. on the end the hole in column will be filled with concrete,
7. a supporting column is ready.

The concrete column has distributed the 500 kN force on the ground soil (4 m<sup>2</sup>) and the acting pressure was very low. The stability of building was preserved with no risk.



Figure 9. Second column is made with concrete bags

### 5. WATERPROOFING

Waterproofing of basement is made with Sika System because the high level of groundwater level and flood risk on Danube-river.

Sika membrane system is used, which could be characterised as highly flexible membrane system, which protects the concrete structure up to the highest requirements – designed for long-term durability (Figure 10.):

8. first layer was Sikaplan W Felt 500
9. second layer was Sikaplan WP 1100-20 HL,
10. 1,0 mm protecting layer Sikaplan WP Floor Sheet-12H
11. 50 mm thermo-insulation Bauder PIR FA TE
12. 40 mm concrete.

On top of concrete layer has finished the reinforced concrete structure.

### 6. CONCLUSION

The restoration of national monument Palatinus Bath, started as an ordinary reconstruction. On the end it is turned into high-toned engineering performance. Sometimes the situation was close to catastrophic like when the basement wall crashed. This situation led to the new invention of the supporting Major-method.

The concrete bags could also be used for hydraulic engineering challenges. The other usage possibilities are going to control in WSG Ltd. (Orosháza, Hungary).

In case of flood we are using sand bags for flood-protection, may be the efficient of concrete bags will be higher. The terrain monitoring will confirmed the competence of concrete bags.



Figure 10. Hydro-isolation work of north-wing

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## RENOVIRANJE ISTORIJSKOG OBJEKTA NA MARGIT-OSTRVU

*Rezime:* U radu će biti prikazan jedan od projekata koji obuhvata renoviranje i modernizaciju Budimpeštanskih monumentalnih kupatila.

*Palatinus Strand je lociran na sredini Margit-ostrva, visoke podzemne vode i boksita betonske konstrukcije otežavali su dinamiku izgradnje objekta. Objekat je imao suteran koji*

*je planiran da će biti pregradjen i tu će biti izgradjeni termalni bazeni. U toku rušenja starih zidova srušio se deo glavnog zida i situacija je postala kritična, ceo objekat je bio u opasnosti. Primenjena je specijalna Major-metoda za sigurnosno podupiranje srušenog zida. Metoda će biti detaljno opisana u radu i diskutovana sa strane nosivosti prirodnog tla. U radu će se opisati moderni materijali i rešenja koje su garancija za stabilnost i vodonepropusnost konstrukcija među ekstremnim okolnostima.*

**Кljučне речи:** *Major-metoda podupiranja, monumentalne renovacije, stabilnost konstrukcija.*