SIKA AT WORK

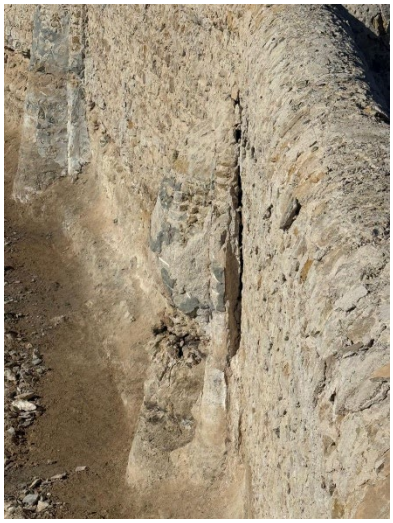
AGHLABID BASINS, KAIROUAN. TUNISIA

ENGINEERING REFURBISHMENT: SikaCarbodur® Grid/ SikaWrap® FX-50 C/ SikaEmaco® S 285 TIX
CONCRETE: SikaFiber®-200 Végétal

BUILDING TRUST

FRCM STRENGTHENING OF THE BUTTRESSES OF THE AGHLABID BASINS, KAIROUAN, TUNISIA

Removal of the original lime-based render.



Condition of butresses showing diagonal cracks.

THE AGHLABID BASINS, BUILT IN 9TH CENTURY TO SUPPLY WATER TO KAIROUAN, STAND AS A UNESCO-RECOGNIZED MASTERPIECE OF ISLAMIC HYDRAULIC ENGINEERING AND MEDIEVAL INGENUITY.

PROJET DESCRIPTION

The **Aghlabid Basins**, constructed between **860 and 862 AD** under the Aghlabid dynasty, represent one of the most remarkable hydraulic systems of Islamic heritage. As part of a network of approximately fifteen basins designed to supply water to the city of **Kairouan**, the historical capital of Arab empires in Tunisia, they are considered among the most significant hydraulic works in the history of the Islamic world.
Inscribed on the UNESCO World Heritage List as part of the property **"Kairouan" in 1988**, these exceptional structures, built in rubble masonry and covering an area of approximately **11,000 m²**, consist of a decantation basin and a large storage basin, with a total storage capacity of approximately **68,800 m³**.

The decantation basin has a regular polygonal shape with 17 sides and an internal diameter of 37.5 m. It is stabilized by 45 buttresses, including 28 external buttresses and 17 internal buttresses. The large storage basin has a 64-sided polygonal shape, an internal diameter of 129.67 m, and a depth of approximately 4.80 m. Its stability is ensured by 182 buttresses, including 118 external buttresses and 64 internal buttresses.

PROJECT REQUIREMENT

Within the framework of the restoration and conservation project of this historic monument, the client's requirements called for repair and strengthening solutions fully compatible with the original materials and compliant with UNESCO international heritage conservation principles.
Investigations revealed the presence of inclined cracks affecting several masonry buttresses in both basins, requiring a structural intervention that would respect the historic fabric of the monument.
In order to preserve the authenticity of the structure, the strengthening system had to be cement-free, compatible with traditional lime-based masonry, and designed to ensure the least intrusive intervention possible.

PROJECT PARTICIPANTS

Owner:	Ministry of Cultural Affairs / Saudi Fund for Development / National Heritage Institute
Architect:	T2a Architecture
Engineer:	BFM Engineering
Main Contractor :	Société Bouzguenda Fréres (SBF)
Sub-contractor:	STRAM
Sika organization:	Sika Tunisia SARL

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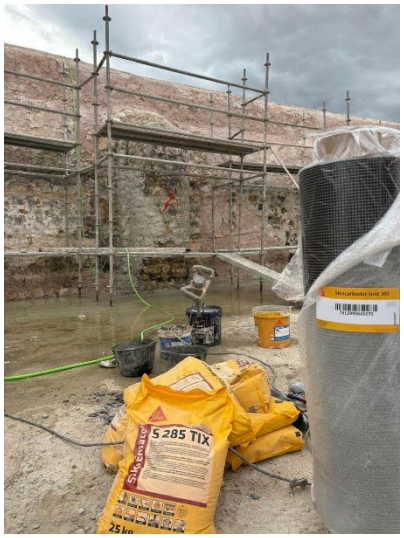
THE AGHLABID BASINS, KAIROUAN, TUNISIA

Application of the Sika Carbodur®Grid + SikaEmaco®S 285 TIX System.

PROJECT SOLUTIONS

The selected solution is based on the **SikaCarboDur® Grid** system embedded within the lime-based cement-free repair mortar **SikaEmaco® S 285 TIX**. This system is complemented by **SikaWrap® FX-50 C** carbon fiber strands, which provide anchorage of the grid and ensure optimal load transfer within the masonry.

In total, **20 internal buttresses** as well as **one vault** required the application of this strengthening system. On each buttress, the reinforcement was applied over the full width, approximately **4.50 m**, extending **50 cm beyond each side of the walls**, and over a height of approximately **2.50 m**, ensuring effective load redistribution and proper confinement of the cracked zones. One vault, with an area of approximately **12 m²**, was also strengthened using the same system. The total treated surface area is approximately **250 m²**.

In addition, the repair works of the structural elements incorporated the use of **SikaFiber®-200 Vegetal** as an additive in the lime-based concrete used for masonry restoration. This solution, both natural and sustainable, improves the mechanical performance of the mortar by reducing shrinkage cracking, while remaining fully compatible with heritage conservation requirements.


Légende: Completed strengthening system with SikaWrap® FX-50 C

The combination of a mineral-based composite strengthening system and lime-based repair materials enhanced with natural fibers represents an innovative approach that balances structural performance, durability, and respect for historical authenticity. This intervention successfully restored the load-bearing capacity of the damaged elements while meeting the conservation requirements of a UNESCO World Heritage site, ensuring the long-term preservation of one of the most prestigious hydraulic structures of the Islamic world.

The works were carried out during **April and May 2026**.

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