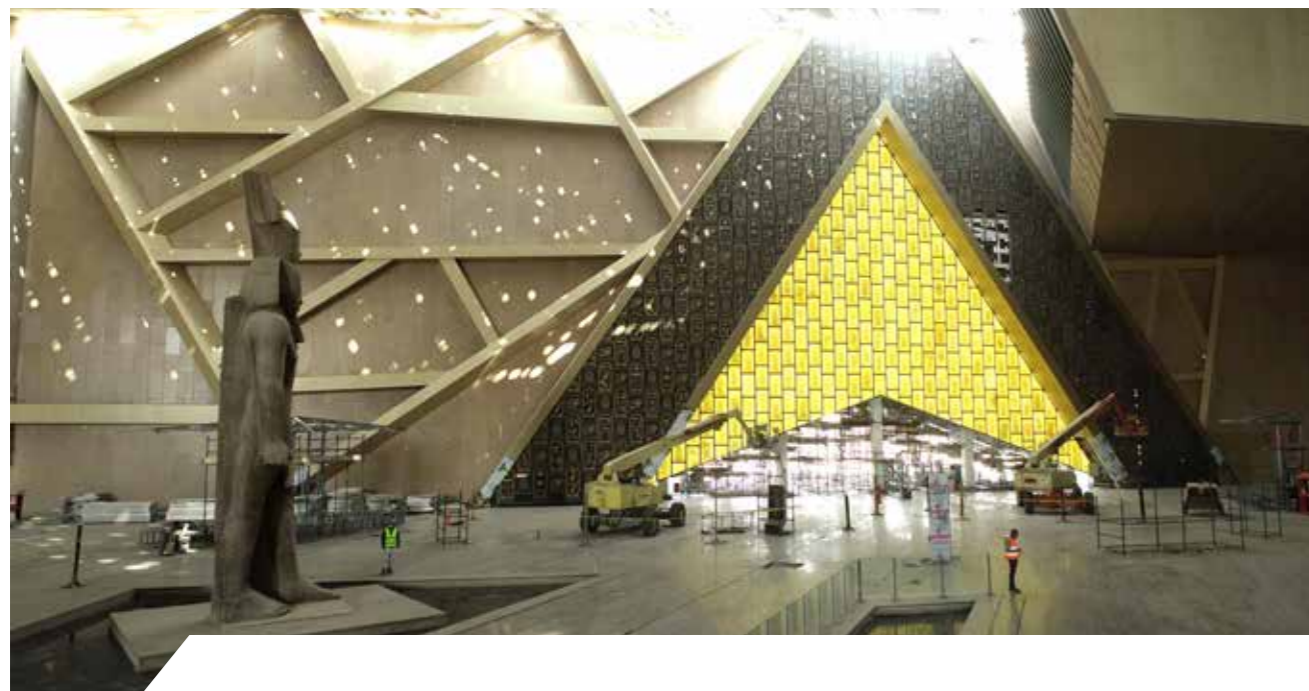




Buildings

THE GRAND EGYPTIAN MUSEUM, A CULTURAL JEWEL DEDICATED TO THE SPLENDOUR OF EGYPTIAN CIVILISATION



IT IS ONE OF THE LARGEST CONSTRUCTIONS IN EGYPT SINCE THE PYRAMIDS. THE GRAND EGYPTIAN MUSEUM IS IN FACT BUILT IN PERFECT ALIGNMENT WITH THE THREE PYRAMIDS OF GIZA, WITH WHICH IT WILL FORM AN EXCEPTIONAL TOURIST COMPLEX OF TRIANGULAR SHAPE, A STONE'S THROW FROM CAIRO. IT WILL ALSO BE THE WORLD'S LARGEST MUSEUM DEDICATED TO A SINGLE CIVILISATION.

THE ARCHITECTURE OF THE BUILDING IMPOSED UNPRECEDENTED CHALLENGES IN TERMS OF CONSTRUCTION, WHICH BESIX AND ORASCOM, IN COLLABORATION WITH THE ARAB REPUBLIC OF EGYPT, MET BRILLIANTLY. THIS INCLUDES THE HALL OF RAMESSES II, THE GRAND STAIRS AND THE FIRST EXHIBITION GALLERIES DEDICATED TO THE TREASURE OF TUTANKHAMUN, WHOSE 5,300 OBJECTS WILL BE ON DISPLAY IN THEIR ENTIRETY FOR THE FIRST TIME SINCE HOWARD CARTER DISCOVERED THE

TOMB IN 1922. IN ADDITION, BESIX AND ORASCOM ARE ALSO RESPONSIBLE FOR THE CONSTRUCTION OF ADDITIONAL EXHIBITION GALLERIES, A CONFERENCE CENTRE, ACADEMIC FACILITIES, A RARE BOOK LIBRARY, AND MANY ADDITIONAL FACILITIES THAT WILL ENCHANT FUTURE VISITORS ON THEIR JOURNEY THROUGH THE HISTORY OF ANCIENT EGYPT.

FOR THE BESIX 2020 ACTIVITY REPORT, MAJOR GENERAL ATEF MOFTAH, GENERAL DIRECTOR OF THE PROJECT FOR THE ARAB REPUBLIC OF EGYPT, DR. ELTAYED ABBAS, ASSISTANT MINISTER OF TOURISM AND ANTIQUITIES AND HEAD OF THE CONSERVATION CENTRE, AND THE BESIX EGYPT TEAM PRESENT THIS EXCEPTIONAL PROJECT: THE GLOBAL LANDMARK FOR EGYPTIAN CIVILISATION AND AN ESSENTIAL PART OF THE WORLD HERITAGE.

GRAND EGYPTIAN MUSEUM, CAIRO, EGYPT



490,000 m²
TOTAL SURFACE AREA

#1

THE WORLD'S LARGEST MUSEUM DEDICATED TO A SINGLE CIVILISATION

320,000 m³
OF CONCRETE

8,500 tonnes
OF STEEL

200,000 m²
OF STONES, INCLUDING MARBLE AND ONYX

95,000,000
WORKING HOURS

CONTRIBUTING TO THE WORLD HERITAGE

THE INCREDIBLE CONSTRUCTION OF THE GRAND EGYPTIAN MUSEUM

Installed in January 2018 in the main hall, the 11-metre-high, 3,200-year-old statue of Ramesses II has since majestically watched over the construction of the Grand Egyptian Museum. It was installed there before the completion of the structural work because its size would not have allowed it to enter the building afterwards. The Museum was therefore partly built around him. Since 2020, the Great Pharaoh has no longer been alone. Other exceptional statues of similar age have joined him. A few metres from Ramesses II, seventy-two of them now share the steps of the Grand Stairs. This majestic flight of stairs is an impressive place to stay for immortal pharaohs. It is also flanked by colossal columns in the shape of inverted pyramids, pointing to the ground, up to 30 metres high, covered with fine Egyptian marble and perfectly matching the triangular patterns of the white concrete ceilings. In Ancient Egypt, workers, craftsmen and artists were all designated by the same hieroglyph. The architecture in the Grand Egyptian Museum is both so demanding and beautiful that, here too, construction and art often become one. This only further augments the performance of BESIX and Orascom.

THE FINAL STRETCH

The year 2020 has had its fair share of challenges and remarkable progress. Works have now entered their final stretch.

Precautionary measures related to the Covid-19 pandemic have of course slowed down activities for several months, but this did not stop the project team from progressing on all fronts. "We have completed the preparation of the galleries dedicated to Tutankhamun, which allowed the Grand Egyptian Museum's Conservation Centre to start installing the 5,300 items of his Treasure", explains Christophe Ledur, Country Manager for BESIX Egypt. "The Tutankhamun Galleries constitute the first phase of the exhibitions, adding to the spaces dedicated to Ramesses II and other stone statues in the Grand Stairs", continues Christophe Ledur. This first phase will be completed and delivered to the client by 30 June 2021.

Meanwhile, the design of the second phase of the exhibitions has been completed. These are the twelve other exhibition galleries, an area of about 20,000 m² which will host 12,000 artefacts of various sizes presenting the history of Ancient Egypt. Their design enabled the joint venture to provide the necessary guidelines for the selection of subcontractors

which are involved in the placement of showcases, fit-out, lighting and audio-visual equipment, among other tasks.

THE VISIBLE AND THE INVISIBLE

Twice the size of the Louvre in Paris, built on a total surface area of around 490,000 m², the complex architecture of the Grand Egyptian Museum presented challenges, some unprecedented. Ceiling heights of up to 24 metres and huge single-piece ceilings made of white concrete. Cantilevers, including an entire floor cantilevered over a length of 20 metres. Pyramid-shaped structures integrated into the walls, combining high-quality materials, fine patterns and plays of light and transparency. The angles of the building are themselves perfectly aligned with the three pyramids of Giza, both in terms of the inclination of the roof and the direction followed by the side walls.

The amount of materials needed to build all this is obviously overwhelming. "We have used more than 8,500 tonnes of steel and 320,000 m³ of concrete. There are also more than 200,000 m² of stunning stones, including Egyptian marble and Iranian translucent onyx", says Pablo Lozano, BIM Coordination Manager for BESIX.



GRAND EGYPTIAN MUSEUM, CAIRO, EGYPT

The excellence of the building, however, does not stop at its visible structures. "In addition to the unique design features that architecture lovers will admire, the Museum is also equipped with considerable invisible infrastructure", explains Sergio Santos, Construction Manager for BESIX. This is the case for the IT and MEP systems, which are omnipresent throughout the building. These are no less complex than the visible architecture and concern, among other systems, public addressing, telecommunication and access control, electrical and back-up power, video surveillance, emergency, fire-fighting as well as ventilation and air-conditioning. "These systems will ensure a unique experience to visitors, as well as the necessary security and latest technologies that a modern museum requires to protect this unique collection of artefacts", adds Sergio Santos.

These visible and invisible parts of the building are themselves coordinated in a BIM model, a digital replica of the Museum. This allowed the design to be further refined, for example, to solve possible problems in advance, and to prepare and support the construction phases.

THE KHUFU SOLAR BOAT

In 2020, the Egyptian Ministry of State for Antiquities also awarded BESIX and Orascom an additional contract to construct a new building, next to the Grand Egyptian Museum. This will house the Khufu Solar Boat, the world's oldest full-scale ship. Presumably built for King Khufu, it was placed around 2500 BC in a pit at the foot of the Great Pyramid and was only discovered in 1954 by Egyptologist Kamal el-Mallakh. The construction of this additional building started in 2020.

WE HAD TO LIVE UP TO THE PURPOSE OF THIS MUSEUM, WHICH WILL BE AN INTEGRAL PART OF THE WORLD'S HERITAGE, AND OUR WORKERS AND TEAMS HAVE MADE THIS HAPPEN. //

**CHRISTOPHE LEDUR,
COUNTRY MANAGER
FOR BESIX EGYPT**



BESIX and Orascom will also assist the Supreme Council of Antiquities with the transportation of the ship from the archaeological site of the Giza pyramids to the Grand Egyptian Museum, an extremely delicate operation following a route of 8.5 kilometres. This will be carried out in the course of 2021.

AWAITING THE OPENING

Pharaohs are now getting ready. Soon, millions of visitors from all over the world will discover their history, their greatness and the beauty of their civilisation in a new light. Many artefacts will be displayed for the very first time, including three quarters of the fabulous Treasure of Tutankhamun which are still unknown to the general public. While waiting for their visitors, just like the statue of Ramesses II, the Pharaohs will continue to be accompanied daily by the active presence of BESIX and Orascom workers. At the end of 2020, these totalled more than 95 million working hours since the start of the project.

The few other visitors are senior officials. "We frequently receive officials such as the Egyptian Prime Minister, the Egyptian Minister of Tourism and Antiquities or foreign representatives such as the Secretary General of the World Tourism Organisation in August 2020", explains Christophe Ledur. "They were all extremely impressed by the excellence and the beauty of the work carried out, of which BESIX and Orascom can be extremely proud. We had to live up to the purpose of this Museum, which will be an integral part of the world's heritage, and our workers and teams have made this happen", concludes Christophe Ledur.

INTERVIEW OF MAJOR GENERAL ATEF MOFTAH, GENERAL DIRECTOR OF THE GRAND EGYPTIAN MUSEUM PROJECT AND SURROUNDING AREA

AS DIRECTOR OF THE ENGINEERING COMMITTEE OF THE ENGINEERING AUTHORITY OF ARMED FORCES, MAJOR GENERAL ATEF MOFTAH SERVES AS GENERAL DIRECTOR OF THE GRAND EGYPTIAN MUSEUM. IN THIS KEY ROLE, HE SUPERVISES THE EXECUTION OF THE PROJECT ON BEHALF OF THE ARAB REPUBLIC OF EGYPT, WORKING IN CLOSE COLLABORATION WITH BESIX AND ORASCOM CONSTRUCTION.



MAJOR GENERAL ATEF MOFTAH AND CHRISTOPHE LEDUR

What does the Grand Egyptian Museum represent for Egypt? How was its location chosen?

The Museum in Tahrir Square is 110 years old. It no longer offers enough space to exhibit Egyptian civilisation. Thanks to the Grand Egyptian Museum, we will now be able to present the greatness of our history and the genius of the pharaohs in a comprehensive manner. Egypt wants to both preserve our heritage and present it to the world. The location has been chosen by the State to create a golden cone. It will link the Grand Egyptian Museum and the Pyramids of Giza to form an immense open-air museum. The area will offer comfort and security to visitors and will also include hotels.



The Grand Egyptian Museum is a particularly complex building. What were its main technical challenges?

The architecture is unique and has imposed many challenges. The Museum has a unique cone shape due to its exact alignment in the extension of the Pyramids. No two angles are the same, no two stones are the same size and there are thousands of them. Added to this is the complexity of the relationship between the materials as well as ambitious cantilevers, including a 21-metre long and 16-metre wide storey. Creativity was often required. The Grand Stairs, which has 108 steps and rises 26 metres, accommodates 72 sculptures, each weighing several dozen tonnes. To install them, it was decided to use the method of the Ancient Egyptians with a ramp on which they were pulled to their places. In 2018, the statue of Ramesses II, 11 metres high and weighing 83 tonnes, had to be handled vertically and was therefore installed during the work. It is a sculpture more than 3,000 years old, which then observed the progress of the work. I was proud to contribute to the architectural design of the Pyramid wall, which is the main façade of the Museum, the Museum and the transport of the Khufu Solar Boat, the Tutankhamun language wall and the world's first hanging obelisk. Each of these designs requires exceptional technical requirements.

THE FIRST PHASE OF THE WORK WILL BE FULLY COMPLETED BY 30 JUNE 2021. THIS INCLUDES THE CONSTRUCTION, THE EXHIBITION SPACES DEDICATED TO TUTANKHAMUN, THE OBELISK, THE GRAND STAIRS AND THE GREAT HALL OF RAMESSES II. //



MAJOR GENERAL ATEF MOFTAH, GENERAL DIRECTOR OF THE GRAND EGYPTIAN MUSEUM

The year 2020 was also marked by important milestones. Which ones do you remember?

The installation of the Obelisk from Tanis is a milestone. We noticed, when the Obelisk was relocated, that the cartouche of Ramesses II was engraved under its base. We decided that the public should see this. We have therefore placed the obelisk on a raised transparent support, under which visitors can pass. On another note, we have obtained three ISO certifications in 2020. These cover the areas of health and safety, respect for the environment and monument conservation.

What are the next phases of construction?

The first phase of the work will be fully completed by June 30, 2021. This includes the construction, the exhibition spaces dedicated to Tutankhamun, the Obelisk, the Grand Stairs and the great hall of Ramesses II. The second phase will then have to be completed. This includes the installation of the other twelve exhibition galleries, which present the history of the Egyptian civilisation through the ages. These cover around 20,000 m² and will contain 12,000 items. Moving these pieces and putting them in their places requires time. We are working on this in close cooperation with the Conservation Centre.

You accompanied the construction of the Museum. How will you feel on the day of its opening?

My feeling will be indescribable. I will be immensely happy to have been able to help my country to achieve this pharaonic project. My task was entrusted to me by President Abdel Fattah el-Sisi and I am proud of what we have achieved. On a personal level, I will be happy as a citizen of Egypt and the world. I am proud to see this civilisation preserved and proud that Egypt is giving it this special attention.



MAJOR GENERAL ATEF MOFTAH AND ZURAB POLOLIKASHVILI, SECRETARY-GENERAL OF THE UN WORLD TOURISM ORGANIZATION

INTERVIEW OF DR. ELTAYEB ABBAS, ASSISTANT MINISTER OF TOURISM AND ANTIQUITIES FOR ARCHAEOLOGICAL AFFAIRS

DR. ELTAYEB ABBAS IS ASSISTANT MINISTER OF TOURISM AND ANTIQUITIES FOR ARCHAEOLOGICAL AFFAIRS. AS PART OF HIS DUTIES, HE IS AT THE HEAD OF THE CONSERVATION CENTRE, LOCATED NEXT TO THE GRAND EGYPTIAN MUSEUM. IT IS AT THE HEART OF THE CENTRE THAT THE ARTEFACTS ARE RESTORED AND PREPARED.

Can you give us an idea of the work carried out by the Conservation Centre?

The Conservation Centre was inaugurated in 2010. We restore artefacts made of a wide variety of materials, including wood, stone, metal and textiles. More than 150 people work in our laboratories. They include restoration experts, archaeologists and administrative departments. The artefacts to be displayed in the exhibition galleries pass through the Centre and they come from all corners of Egypt.

ON THE RIGHT, DR. ELTAYEB ABBAS



ONE OF THE GREAT CHALLENGES WAS THE OUTER COFFIN AND SHIELD OF TUTANKHAMUN. THE SKIN COVERING THE SHIELD WAS IN AN EXTREMELY COMPLEX CONDITION. //

**DR. ELTAYEB ABBAS,
HEAD OF THE CONSERVATION CENTRE**

How would you describe the challenges of the restoration work?

Restoration consists of preserving a piece by trying to intervene as little as possible. In some cases it is preventive restoration so that the artefact does not deteriorate over time. Some artefacts require more in-depth restoration when objects are in a poor state of conservation. This is the case of Tutankhamun's coffin, which arrived in 2019 and whose condition required rapid intervention. We restored the fallen gold leaf and fixed the pieces that had fallen off. To do this, we use products that do not cause long-term damage.

What are the restoration stages followed from the arrival of the pieces?

The phases differ from one object to another, particularly depending on the materials of the piece. They are first studied on site, before being protected and moved to the Centre. Organic materials, in particular, are immediately isolated and treated against insects and bacteria in order to avoid contagion to other objects. The restoration team will then determine the work that needs to be done. Once restored, they are kept in a suitable environment in terms of temperature, lighting and humidity. We accompany them on their installation in the Museum and analyse all aspects that guarantee their perfect conservation.

Could you give us an example of an object restored in 2020 that you are particularly proud of?

One of the greatest challenges was the outer coffin and shield of Tutankhamun. The skin covering the shield was in an extremely complex condition. Tutankhamun's fabrics and clothing were also in a poor state of preservation. Unfolding them was an extremely delicate operation. Fortunately, Howard Carter's teams, with the resources of their time, did what they had to do to avoid damaging the pieces. This allows us to carry out our restoration work, which helps us to discover and rewrite the history of Tutankhamun.



An exhibition about Tutankhamun has enjoyed great success throughout the world in recent years. What will be the difference between this exhibition and the part of the Museum dedicated to this Pharaoh?

Tutankhamun's collection of 5,300 pieces will be exhibited in its entirety, for the first time since its discovery in 1922. While the centrepiece of Tutankhamun's treasure is his mask, all the artefacts are exceptional. The Grand Egyptian Museum will devote six times more space than the Tahrir Square Museum. Many previously unseen objects required titanic restoration work, including jewellery and necklaces.

For you and your teams, the restoration work carried out must have been exceptional, also on a personal and human level...

It is an unforgettable experience to have the opportunity to see the artefacts in front of me, without separation. It is also extremely rewarding to see them before and after restoration, which is always a team success. These are priceless objects that are entrusted to us and their restoration is always a challenge. Our team will certainly be the proudest people on the planet when this work is displayed to the public.