CONSULTING ENGINEERS

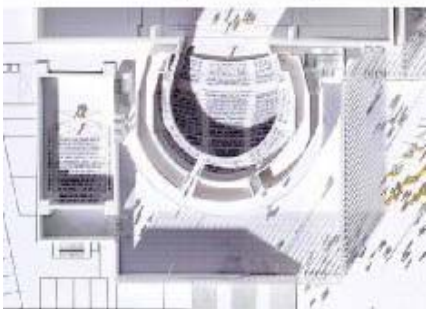
STAVROS NIARCHOS FOUNDATION CULTURAL CENTER

Employer : **STAVROS NIARCHOS FOUNDATION, EXPEDITION ENGINEERING**

Location : **ATHENS, GREECE**

Duration of the Design : **2009-2011**

Scope of the Design : **Stuctural- Antiseismic Design, Tender Documents, Construction Supervision**



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GENERAL DESCRIPTION:

The Cultural Center Stavros Niarchos (CCSN) is a mutli-functional and environmentally feasible center for education, art and recreation, which consists of the Stavros Niarchos Park, with a total area of 170,000 sqm, and the new, state of the art facilities for the Greek National Library (EBE) and the Greek National Opera (ΕΛΣ).

The construction of the CCSN commenced at the end of 2011 and will last approximately four years. The CCSN will be completed in 2015.
The CCSN will cover an area of 170,000 sqm, 85% of which will be covered by the Park, while the buildings of the National Library and the Opera House will account for 15% of the total acreage.

The overall cost of construction and equipment for the CCSN will amount to €566/$803 million.

The project includes many impressive designs which service the architectural vision of Renzo Pianno.

The main design works related to this project are:
1)The Greek National Opera
2) The Greek National Library
3)Parking Building
4) Creation of an atrificial hill for the park
5) Other works

The structural design was undertaken by the companies Expedition and OMETE.
Construction supervision was undertaken by OMETE.

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GREEK NATIONAL OPERA:

The Greek National Opera includes an auditorium of 1400 seats with a maximum height at the area of the stages of 45 meters. The building is borne on seismic isolators and has foundations of piles and diaphragms with dimensions of approximately 110X100 meters. This includes a small theatre location with 400 seats which is sound insulated from the rest of the building – box-in-box. In its roof there is a Lighthouse room which is organically a part of the adjacent library and with which it is connected via a steel bridge. On top of the building the Solar Collector is also founded, an innovative construction consisting of scaffolding with membranes of ferrocement and steel diagonal connectors with dimensions of 100X100 meters which is founded on steel piles via springs and isolators.

GREEK NATIONAL LIBRARY:

The Greek National Library is dimensioned at approximately 95X100 meters is also borne on seismic isolators and founded on piles. Both buildings have impressive lobby areas with glass panes reaching 20 meters in height. All the complex buildings have a visible concrete finish both externally but also internally with a grid of visible blinds which require extensive preparations in formwork and programming of concreting.

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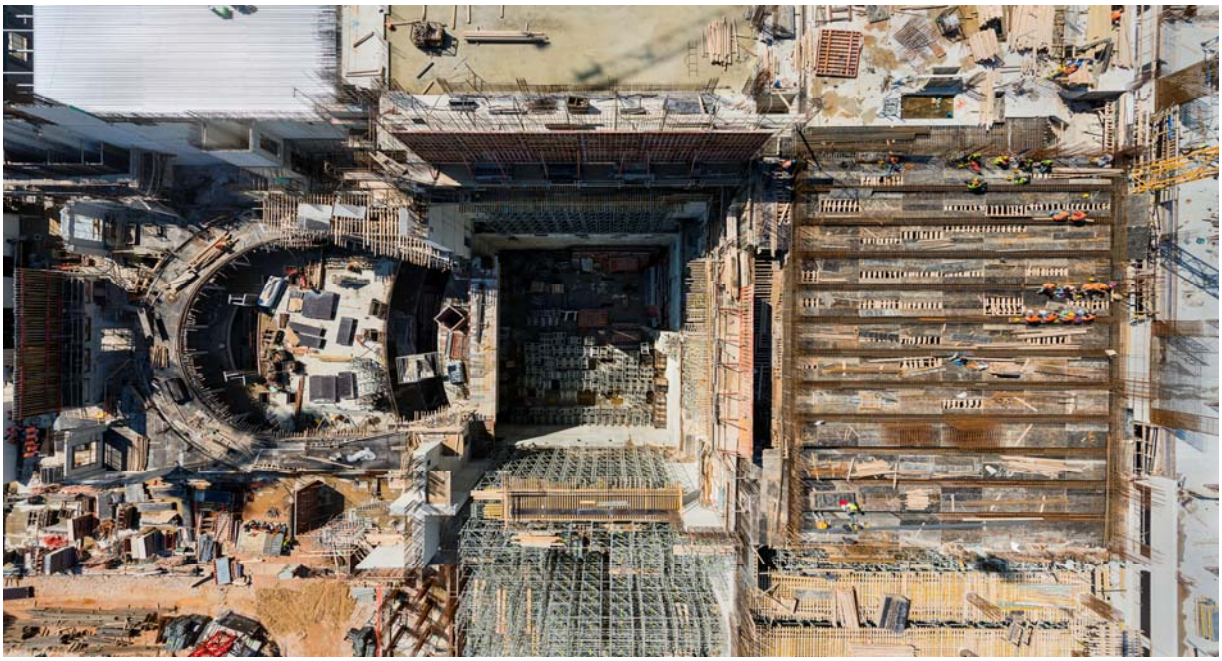

PARKING BUILDING:

The Parking Building is a four storey building with a slanted roof with dimensions of approximately 200X50 with a joint which separates the construction into two independent load bearing structures. All the buildings have green roofs and the parking building has been designed for planting trees on it. The roofs of the buildings are part of the extension of the artificial hill which the green park has. All the constructions were designed based on the Eurocodes, and a specialized micro-seismic study was performed with requirements greater than those outline in the Greek Anti-Seismic Code.

ARTIFICIAL HILL:

The park is created on an artificial hill with its lowest point in the north section of the plot of land and a continuous gradient leading up to the height of the roofs of the buildings. The backfills of the hill are supported along their perimeter via reinforced earth with a total volume of over 80,000 m3. As the height of the hill reaches 16.5 m in its tallest point, an extensive number of copperpiles was required (approximately 2900) for the support of the underground. The total volume of the hill exceeds 370,000 m3. All the hill is enclosed along its perimeter with visible concrete.

OTHER WORKS:

There are also smaller one storey constructions in the perimeter of the hill, an artificial channel with dimensions of 300X30 m, the configuration of the pre-existing Esplanade with support via two rows of piles, the buildings of the Park and the Channel with roofs of ferrocement – a guide for the construction of the Solar Collector, the Drops in front of the buildings in their facing to the sea, the vertical mezzanines with a height of up to 32 meters.

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