RION ANTIRION BRIDGE

Rion Antirion Bridge: Consultancy services. Bridge, design, base isolation, seismic assessment

Location
Patras, Greece

Client
Vinci Construction Grands Projects (FR)

Project, work supervision
Studio Calvi Srl
Project manager:
Prof. Eng. Gian Michele Calvi

Start of planning 1998
End of planning 2004

Project description
Located in the western end of the Gulf of Corinth in Greece, an area characterized by high seismic activity, the Rion-Antirion Bridge links the Peloponnese (southern Greece) to the Greek mainland. The bridge was opened by the Olympic flame and is the longest cable-stayed bridge in the world with a suspended deck of 2252 m and has a reference span of 560 m.
The Rion-Antirion Bridge features four pylons made of reinforced concrete, piers range from 25m to 45m above sea level. The pylon heads reach a total of 160m above sea level. The structural configuration of the bridge foresees a pendulum behavior of the deck suspended by means of the cables anchored at the top of each pier.
In order to restrain the transverse displacements of the deck under wind loads and moderate seismic actions specific devices have been placed at each pier. These are 4 viscous dampers for energy dissipation and one fuse element. The latter is a device that provides restraint up to a limit transverse force and releases the deck once this force is achieved.
Because of the high seismic activity of the area, the Rion-Antirion Bridge required seabed reinforcement via 200 hollow steel piles (for each pier) driven into the seabed and topped with gravel. No connection between the pier and the foundation piles is created in order to reduce the base shear.
A 27.2m-wide deck contains two traffic lanes plus a safety lane and pedestrian walkway in both directions. The structure of the deck is composite with a steel frame of two longitudinal 2.2m- high plate girders with transverse plate girders.
For the design of the Rion-Antirion bridge Prof. Calvi is recipient of the fib award for Outstanding Concrete Structure “for the contribution to the design and construction of the Rion– Antirion Bridge” (2006).

Above. Full view of the bridge.

Opposite page. Pylon and deck phases of costruction and viscous dampers and fuse element