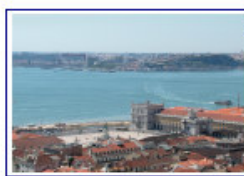

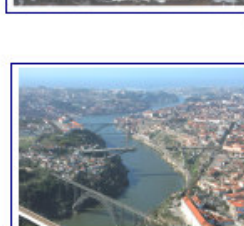




## ECCE Working Group : 250 years of Civil Engineering Heritage in Europe

### OE (Portugal) Proposals (1/4)


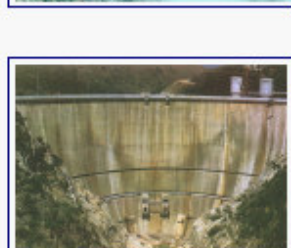
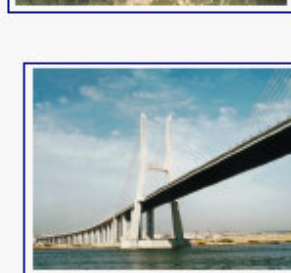
	<p><b>Lisboa Depois do Sismo de 1755. Lisbon After 1755 Earthquake. Lisbon, Portugal (1755)</b></p> <p>On November 1, 1755, a large earthquake struck Lisbon, was reduced to rubble by the two major shocks of this great earthquake and the waves of the subsequent catastrophic tsunami. A huge fire completed the destruction of the city. Six major plans were drawn for the reconstruction of downtown Lisbon. The chosen plan was from Eugénio dos Santos and represented the most rational and innovative one with a rectangular arrangement of longitudinal and traverse streets. The buildings were drawn by Casa do Risco das Obras Públicas with a uniform composition and height.</p> <p><i>Engineer: Eugénio dos Santos</i> <i>Contractors: Several</i></p>
	<p><b>Os Caminhos de Ferro Portugueses. The Portuguese Railway system. Portugal (1856-1900)</b></p> <p>The first railroad was opened to the public in 1856. The mentor of the project was Fontes Pereira de Melo and by the turn of the century, 44 years after, the length of the rail way had reached 2380km. The transportation policy had its objective in connecting the main economic places by way of train, the most effective and economical way of travel at the time. Many bridges and some tunnels were built along the way, being Gustavo Eiffel's Maria Pia Bridge over rio Douro, between Porto and Vila Nova de Gaia one of the most emblematic.</p> <p><i>Engineer: Portuguese Railways</i> <i>Contractors: Several</i></p>
	<p><b>As Pontes do Porto. Porto Bridges. Porto, Portugal (1877-2002)</b></p> <p>Several bridges cross the Douro river in the proximity of the cities of Porto and Gaia. Some examples of bridges that are still standing are the Dona Maria Pia Bridge, a engineering project by Gustavo Eiffel, 1877, D. Luís Bridge, by Teófilo Seyrig, 1886, Arrábida Bridge, by Edgar Cardoso, 1963, S. João Bridge, by Edgar Cardoso, 1991, Freixo Bridge, by António Reis, 1995 and Infante D. Henrique Bridge, by Adão da Fonseca, 2002. All these bridges make this part of Douro river a special place and the two cities on both margins unique.</p> <p><i>Engineering: Several</i> <i>Contractors: Several</i></p>

(OE Portugal). April 2005

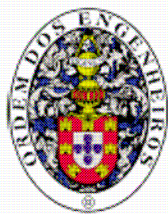


## ECCE Working Group : 250 years of Civil Engineering Heritage in Europe

### OE (Portugal) Proposals (2/4)

	<p><b>Barragem de Cahora Bassa. Cahora Bassa Dam. Tete, Mozambique. Portugal (1974)</b></p> <p>The Cahora Bassa lake is southern Africa's second-largest artificial lake, situated in the Tete Province in Mozambique. The Cahora Bassa dam is one of three major dams on the Zambezi river system. The dam begun to fill in December 1974 and has a maximum length and width of approximately 250 km and 38 km respectively, flooding an area of 2,700 km<sup>2</sup> with an average depth of 26 m. The dam is 164 m high and 303m long.</p> <p><i>Engineering: Hidrotécnica Portuguesa</i> <i>Contractor: ZAMCO</i></p>
	<p><b>Barragem do Alto Lindoso. Alto Lindoso Dam. Viana do Castelo, Portugal (1993)</b></p> <p>This dam is built on Lima River, in the north of the country, very near the Spanish border, and is the most powerful hydroelectric producing plant in Portugal with 970 GWh in a year of average rainfall. It is a concrete double arch dam, 110m high and 298 m long. The dam complex includes two flood outlets made through two spillways, located on the right bank, with a capacity of 2800m<sup>3</sup>/s and a subsoil power plant 21m x 42m x 9m, at a depth of 340m. This makes this one of the largest subsoil power plants in Europe. This project received the IV International Award "Puente de Alcántara".</p> <p><i>Engineering: EDP - Electricidade de Portugal</i> <i>Contractors: Engil</i></p>
	<p><b>Ponte Vasco da Gama. Vasco da Gama Bridge. Lisboa, Portugal (1998)</b></p> <p>The Vasco da Gama Bridge Project consists of a 12km crossing of the Tagus River in Lisbon, being one of the longest bridges in the world. The crossing is composed of North Viaduct, Expo Viaduct, Main Bridge, Central Viaduct and South Viaduct. The Main bridge presents a cable stayed solution with 420m central span and three lateral spans on each side with 62 + 70.6 + 72m. Innovative elasto-plastic dampers were placed between the deck and the towers to reduce the horizontal movements.</p> <p>The bridge was designed in terms of actions and durability for a service life of 120 years.</p> <p><i>Engineering: Tejo Projecto</i> <i>Contractor: Lusoponte</i></p>





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### OE (Portugal) Proposals (3/4)



#### Extensão Aeroporto da Madeira, Madeira Airport Extension, Funchal, Madeira Island, Portugal

The Funchal Airport Extension, Madeira Island, Portugal, received the Outstanding Structure Award for being 'a unique runway expansion project of supported concrete over sea reclaimed land, sensitive to environmental and aesthetic considerations'. The final runway extends 2800m and is 57m above sea level, having a bridge of 1020m long and 180m wide and was designed to carry the loads of the landing impact of a Boeing 747.

Engineering by : STA

Contractor : NOVAPISTA ACE



#### Docas da Margueira e da Mitrena, Margueira and Mitrena Docks, Setúbal and Cacilhas, Portugal (2000)

Mitrena is artificial island situated 12 km from Setúbal, on Sado river, and Margeira on the Tejo river in Cacilhas Almada. These docks can repair boats of 700000 and 1000000 tons respectively. Since these are boat repair docks the filling spilling times are very short and is processed by a butterfly valve installed on the doors. Particular attention is given to conservation as the construction is build on the sea.

Engineering by: Profrabril; Proman

Contractors: Somague S.A.; Sofamil



#### Barragem do Alqueva, Alqueva Dam, Alqueva, Portugal (2002)

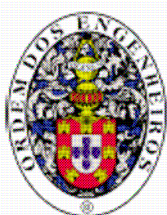
This dam is built on Guadiana River, in the Alentejo region. The dam is used for water storage and for electricity production. The reservoir will hold 4150 million cubic meters of water and will back up as far as 50 km further to the North-East, into Spain, and with a surface area of 250 km<sup>2</sup> making it the largest artificial lake in Europe. It is a concrete double arch dam, 96m high and 458m long.

Engineering:

Contractors: Somague

General references: [www.engenharia.com.pt](http://www.engenharia.com.pt); [www.ordemengenheiros.pt](http://www.ordemengenheiros.pt); [www.lnec.pt](http://www.lnec.pt)

(OE Portugal), April 2001



## ECCE Working Group : 250 years of Civil Engineering Heritage in Europe

### OE (Portugal) Proposals (4/4)



#### Euro Estádios, Euro Stadiums, Portugal (2004)

The public company Portugal 2004, S.A was responsible for supervising and monitoring the construction/remodelling work on the 10 Stadiums which staged the Final Round of the 2004 European Football Championships. The cities that hosted the Championship were Aveiro, Braga, Coimbra, Faro, Guimarães, Leiria, Lisboa and Porto.

Engineering: Several

Contractor: Several

General references: [www.engenharia.com.pt](http://www.engenharia.com.pt); [www.ordemengenheiros.pt](http://www.ordemengenheiros.pt); [www.lnec.pt](http://www.lnec.pt)

(OE Portugal), April 2005