LISBON BEFORE AND AFTER THE 1755 EARTHQUAKE

TECHNICAL VISITS TO LISBON'S HISTORICAL CENTRE

It is well known that several strong earthquakes have affected Lisbon in the past. Some of them caused severe damage and were responsible for important changes in Lisbon's urban structure and evolution. In fact, the need to respond to destruction led to the development of new ways of planning and conceiving the city, in order to provide it with new architectural, technical, social and economic structures, able to survive similar seismic situations in the future.

This was clearly the case of the 1755 Earthquake, a 8.5-8.75 magnitude event that completely destroyed Lisbon Downtown area, as well as a large number of areas in the Algarve, Alentejo, the south of Spain and northern Marrocco. Generated in the Atlantic Ocean, southwest from Portugal, this earthquake was followed by a huge 5-6 days fire and a 15 m high tsunami that burned and washed away what had been left by the quake.

Due to the unusual amount of energy released the 1755 earthquake was felt all over the European countries up to Finland and the tsunami wave reached the coast of Brazil and even the Caribbean coast.

This earthquake remains, even today, an historical reference, either from a technical and cultural point of view (it played a key role in stimulating the seismological thinking originating what can be called "the modern seismology"), or concerning the symbolical and cultural representations that are associated to it. This is well illustrated on the documents, descriptions, prints and drawings published in several foreign countries about the earthquake, as well as in the scientific, philosophical and religious discussions held all over the world of that time.

The city about to be severely damaged by the earthquake of 1755 and the subsequent fire had a labyrinth-like medieval structure, showing a concentrated urban image. It had grown chaotically, while incorporating artistic and architectural treasures of considerable value. This structure can still be seen nowadays in the Castle Hill, which has been reconstructed in the same way it was before.

The central Downtown area of "Baixa", as well as São Francisco and Carmo Hills and a considerable part of the eastern area, including the Cathedral (Sé) and the Castle Hill were almost completely destroyed. Other areas of the city were also severely damaged. According to available data 10 000 to 30 000 of the 250 000 inhabitants were killed.

The reconstruction was made under the orders of the Marquis of Pombal, later Prime Minister of King José I, who began to take urgent measures to mitigate the situation immediately after the earthquake. The selected reconstruction plan, by Engineer Manuel da Maia, was the first systematic urban plan for Lisbon. The new urban structure was based on two squares (Rossio and Terreiro do Paço), linked by an orthogonal network of longitudinal and transversal streets forming right angles, organised according to a specific occupation or craft. It was a city for tradesmen. Although priority was given to the central Downtown area, other areas were included

in Pombal's plan of reconstruction, in order to give Lisbon a rational plan to control the city's growth.
The reconstruction was based on very strict principles of functionality and economy both of time and money and important technical innovations were introduced such as:

- The uniformity of construction, based on a mass production system, led to the adoption of models which were made according to previously programmed dimensions and structures, making the reconstruction faster.
- The need to develop safety systems to prevent major damages in case of an earthquake led to the adoption of a few devices in the new buildings, namely the "gaiola" or cage (a structure similar to a cage) a flexible wooden structure able to support both the roof and the floors in case of an earthquake and to prevent masonry from collapsing; and the chimney-board, built on the sidewalls of every building, rising above the roof to prevent fire from spreading to the neighbouring buildings.
- The number of stories in buildings was limited and the width of the streets was increased to prevent total blockage caused by the collapse of the buildings in the event of an earthquake.

Nowadays, the "Baixa Pombalina" (Lisbon Downtown area) is, like in the past, a busy commercial area that still remains with much of its original layout.

During the technical visits to Lisbon historical area, organised for the 15WCEE, participants will be able to walk along some of the most emblematic areas of Lisbon historical centre, where the main aspects of the city before and after the 1755 Earthquake can be very clearly observed. The itinerary will lead us from Carmo Hill, Chiado and the Downtown area ("Baixa") up to part of the Castle Hill. Many buildings and churches, either built before the earthquake and reconstructed according to the new rules or the ones that survived the seismic event will be observed. A Pombal style building showing the construction techniques applied after the earthquake will be visited.

A map with the itinerary of the visit will be available soon on the Conference website.

Please register for the visit until 10th September 2012. Please send an email to inesl@civil.ist.utl.pt and in the subject area please fill in "Visit to Historical Centre"

No fee is due to participate in these visits.