

RISK ASSESSMENT AND PREVENTIVE CONSERVATION PROGRAM OF THE LIMESTONE QUAY “CAIS DAS COLUNAS”, LISBON, PORTUGAL

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The ‘Cais das Colunas’ is located on the border of Tagus River, integrating the ‘Terreiro do Paço’ - the royal square of the historical centre of Lisbon – and the ‘Baixa Pombalina’. The quay, erected after the great Lisbon earthquake of 1755, is an historical place and tourist mark of the Portuguese capital.

Due to the expansion of the underground lines of the city of Lisbon, the coastal monument was partially removed in 1997, in order to construct a tunnel beside its foundations. The deconstruction, or partial removal, took four months, in the Spring/Summer of 1997. During the deconstruction, each one of the 1500 limestone blocks was carefully removed, marked with a number and then transported to a safe place. Later, it was applied urgent cleaning treatments on part of the limestone blocks. The reconstruction project was initially planned to be completed in 1999, but accidents, during the construction of the new underground line, resulted in its postponement. During the summer of 2008 the historic quay was finally reconstructed. The monument was reconstructed using modern techniques and materials. Structural corrections were made but each of the stone blocks was replaced in its original localization.

Before the removal of the blocks, the main pathologies were identified, classified and mapped. Through macroscopic observation, 17 distinct pathologies affecting stone, mortar or metallic elements were identified and classified. From these, the most significant, in terms of occurrence, were mapped grouping the pathologies in four maps. Results demonstrate that the marine environment is responsible for most of the pathologies. East and west elevations reveal a different distribution of weathering forms, showing wind and solar radiation effects. Of particular relevance are the river polluted water and the biological attacks, as well as effects of air pollutants.

Since the quay’s reconstruction, which ended on August 2008, three years have passed. It is now time to evaluate the new materials and construction systems used on the XXIth century (re)construction. Do they contribute to increase the “durability” of the limestone quay? Or will they accelerate its degradation? Is Cais das Colunas a monument at risk? A “preventive conservation program” is being prepared. This includes systematic evaluation and monitoring procedures. The aim is to evaluate the effects of the marine environment on the weathering of the quays’ materials and structure and to clearly identify mechanisms and critical factors, in order to act preventively.

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Keywords

‘Cais das Colunas’, limestone, Lisbon, risk assessment, weathering