# BEST PRACTICE E PROTEZIONE DELLE SUPERFICI LAPIDEE: IL CASO DELLA TORRE DI PISA E DEL PROTETTIVO USATO PER LIMITARE I DANNI CAUSATI DALL'ACQUA.

SARA CHIRICO, ADA ROVAZZANI, ANTON SUTTER
Opera della Primaziale Pisana
arearestauro@opapisa.it

The present contribute intends to open a discussion on the possible "best practice" to follow in long-term monitoring the durability of protectives applied on stone surfaces. The study considers the outstanding case of the leaning Tower, which was interested by different restoration actions during last years; among them, ten years ago the marble surfaces were treated with a hydrophobic product (Rhodorsil H224) with the aim of protecting them from the external agent, specifically from water. Contact angle and contact sponge measurements were carried out on treated surfaces (located in correspondence of different architectural orders and facing) and reference data collected on mock-up samples over 5 years were used for comparison. After ten years, in situ measurement campaigns were carried out with the aim to define the conservation state of the surfaces and plan new restoration actions. The obtained results evidenced that the durability of the protective products is function of both product properties itself and micro-climatic conditions (exposure, sun, wind, etc.). The most critical parameter seems to be the surface exposure (outside vs inside/south-west vs north-east surfaces) and the height above the ground-floor level; thus, for a wide surfaces, the evaluation of long-term durability of a surface treatment has to be considered exposure-dependent, determining tailored monitoring approach for different surfaces, facing and exposure to external agents. Moreover, a short-time monitoring has to be preferred in order to better define the interplay among stone surfaces, protective products and environment. Overall, the monitoring campaign demonstrated that classical in situ methods, such as contact sponge and contact angle, represent the more efficient way in monitoring the durability of a protective products, even with the expected experimental limits due to the collection of single point measurements on wide surface areas.