

SISTEMI PASSIVI E ATTIVI PER LA DIFESA DEI PIANI TERRA DI VENEZIA DALLE "ACQUE ALTE". L'EVOLUZIONE DELLE TECNICHE DI INTERVENTO ATTRAVERSO ALCUNI CASI DI STUDIO

CLAUDIO MENICHELLI*, ROMEO SCARPA**

* Libero professionista architetto, ** Libero professionista ingegnere

* arch.menicelli@gmail.com, ** r.scarpa@zero4uno.it

Abstract

The phenomenon of *acqua alta* (exceptional high tide) is part of the history of Venice, but in recent times it has become a problem of particular importance, due to the combined effects of eustatism and subsidence. Continuous increases in flooring have partially solved the problem over the years, to the detriment, however, in the using of ground floors, which in many cases have lost their residential function. In the last century, alternative technical solutions were introduced to solve the problem, based on passive and active operating principles. The first includes the so-called *vasche* (tanks), which consist of horizontal waterproof diaphragms with vertical perimeter flaps, all in reinforced concrete, able to block the entry of water. the second includes the *drenaggi attivi* (active drainage), consisting of sub-floor piping systems, that intercept the growing water and convey it, by pumps, outside the buildings, towards the canals, throughout the duration of the tidal phenomena. Each of the two types of interventions is characterized by strengths and weaknesses, which can be summarized in the greater reliability of the *vasche*, compared to the *drenaggi attivi* systems, but with a decisively higher invasiveness. Over time, the construction techniques and materials of both systems have evolved, in increasing efficiency and reducing the impact on architectures. An example is represented by the case of Palazzo Grimani of S. Maria Formosa, where the two techniques were combined. Further evolutions are the intervention in the "ex Adriatica" and other cases, where the concrete reinforced vertical walls have been eliminated or reduced in thickness, using other materials. However, all the "defenses" will become insufficient if phenomena such as that of 12 November 2019 or greater become no longer exceptional.

Keywords: *high tide, eustatism, Venice lagoon, active drainage, invasiveness*