

An Overview of the Architectural Methods Used to Manage the Variable Environmental Influences on Buildings in the Mediterranean Region

Nikos Papamanolis*

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*Corresponding author: Nikos Papamanolis, Department of Architectural Engineering, Technical University of Crete, Building K4, University Campus, 73100 Chania, Greece, Tel: 302821037106; E-mail:

important influence that the variability of environmental conditions has on the environmental and energy performance of the buildings in

The above comments indicate the expediency of a separate category of tools for the sustainable design and construction of buildings in temperate climate regions with common characteristic the management of the variable environmental influences. These tools can be either passive or active, with the former being simpler and more elegant in their operation. However, in buildings in temperate climates it is common to find more than one system and also, more generally, architectural practices that are intended to manage different (often contradictory) effects of the same environmental factor. For example, solar gain and solar shading systems can coexist in the same building. This phenomenon, as a consequence of the wide variability of environmental effects, does not exist in other climate zones.

Methods for Controlling the Fluctuating Environmental Influences on Buildings in the Mediterranean

The building technology of local architecture in the Mediterranean region, as observed in both traditional and more sophisticated modern architectural examples, is directly affected by two main factors: (a) the climatic conditions and (b) the availability of building materials. The basic characteristics that these two factors entail for buildings in the region can be summarized as follows: a) extroverted (i.e. open to the

buildings in the Mediterranean region meet the requirements for

use of mechanical systems that enable a building shell to alter its physical geometric characteristics; its structural elements and/or its façade elements in response to environmental changes. This approach includes kinetic systems integrated within a building's structural or cladding elements that are controlled by advanced technological systems and assemblies. Examples of such systems are shading systems that are controlled by shape memory devices or other technologies [25-27]; as well as systems that control the effects of wind on a building's shell [28]. This category also includes systems inspired by nature [29]. The second approach involves the use of smart materials for building surfaces that can responsively change their physical or energy properties according to the prevailing climatic conditions. Typical examples in this category are the Phase Change Materials (PCMs) [30] and the cool pigments. Schemes of this kind, which at present is rare; represent, for the near future, the most promising choices regarding the management of the variable environmental influences on buildings in temperate climates. On the other hand, a number of more specialized research efforts have to be made in order to clarify the details of the integration of these schemes into the overall sustainable design and construction features of buildings. This observation is especially applicable to the Mediterranean EU states where the relevant legislation imposes strict standards on the sustainable performance of buildings; the most characteristic piece of legislation being EU Directive 2010/31/EU; which requires member states to ensure that by 2020 all new buildings are, in the words of the Directive, 'nearly zero-energy buildings' [31].

Conclusion

The methods used to control the fluctuating environmental impacts on buildings play an important part in the overall design and construction features of buildings that aim to adapt to local climatic and environmental characteristics. Their responsiveness makes a direct contribution to the overall energy and environmental behaviour of the buildings in which they are applied. This is more valid in areas located in temperate climates.

The Mediterranean countries are geographically located in an area where the climatic conditions present significant fluctuations; in such a way as to have a distinct impact on indoor comfort conditions. The application of measures and practices that can manage and regulate

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