Resum de Tesi Doctoral

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DNI/NIE/Passaport	
Nom i cognoms	JORDI MARTÍ PASCUAL PELLICER
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(Mínim 1 i màxim 4, podeu veure els codis a http://doctorat.upc.edu/gestio-academica/impresos/tesi-matricula-i-diposit/codis-unesco)

Resum de la tesi de 4000 caràcters màxim (si supera els 4000 es tallarà automàticament)

The main objective of this Thesis is to determine the behaviour, the energetic and economic feasibility, and the comfort conditions in office buildings, specifically for solutions with high proportions of glazing on facades and for Mediterranean climate. Ultimately, it is to contribute to the reduction of energy consumption of buildings for tertiary use offices, providing clear guidelines for the different actors involved in the life cycle of buildings, especially the owners, designers and the competent authorities in drafting specific sector regulations.

Similarly to what happens in other latitudes, the office buildings is the second use in constructed area, and it is up an average energy intensity significantly above the residential sector. The sector is characterized by a business model of continuity between actors, which in recent years has begun to assess the environmental vector significantly in the new constructions. Yet all this clashes with a reality characterized by an out-dated building stock, and a profound lack of knowledge related to the energy, economy and comfort conditions which difficult to reverse the current situation. This is more relevant in a context in which, for various reasons, in recent decades has dominated the construction of glazing office buildings. This Thesis aims to overcome this ignorance with tools to assess, in a comparative way, some of the most common office building solutions, and determine the key elements that determine the energy bill of those constructions.

Thus, in regulation conditions and Mediterranean climate, office buildings with heavy structural solutions and more opaque facades result in lower consumption of primary energy and costs, both in investment and in life cycle, lower than for cases of lighter structures with larger proportion of glazing in facades, which derives extra difficulties to achieves de desired comfort conditions. Although notes the existence of some transparent designs (operated double skin) getting equivalent energy demands to those of opaque solutions, this is at the expense of a higher investment and operational life costs. These guidelines are valid even for improved scenarios in which, despite reducing the energy demand, the results become proportional to the different construction solutions. Thus, considering that the different limits designed for the scenario's analysis of the Thesis tend to narrow these guidelines, it's concluded that the transparent office buildings are inefficient, both energy and economically.

Although the aim of the thesis is demonstrative for the different actors, and therefore the display formats of results are considered for easily understanding, the procedure developed highlights the relevance of the field data and the potential of using coupled simulation tools. The current behaviour of this type of construction sheds consumption clearly superior to those associated with their regulations conditions of use, so the sensitivity analysis of these factors are believed important in the design of buildings for this purpose (more on solutions deeply susceptible to the environment, such as the glazed facades). For its part, the coupled use of dynamic simulation tools allows the observation of phenomena that affect comfort, thermal but especially luminous.

Although the results obtained are specific guidelines for office buildings in a Mediterranean environment, the same trends have been observed elsewhere (as in Madrid, through a broader PhD own subsequent study, http://Aiguasol.coop/2014/02/17/project-tobeem/).

Improve the performance of office buildings depends on the different actors involved in its life cycle. In the first instance, of the competent authority, but also of the owners and promoters, of the designers and of the end users. All this is more feasible in more opaque buildings with higher inertia.

Lloc BARCELONA Data

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