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**The effect of high thermal insulation on high thermal mass: is the dynamic behaviour of traditional envelopes in Mediterranean climates still possible?**

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**Abstract**

The paper aims at studying the effect of both high thermal insulation and high thermal mass techniques in buildings dynamic behaviour in Mediterranean climates. The two techniques can lead to conflicting requirements when considering winter and summer conditions, or even high daily temperature ranges. Therefore, the best solution for the summer can be the worst solution for the winter. Therefore, it is necessary to identify insulation measures that conserve the mass dynamic behaviour.

Experimental investigations were carried out on a single - family house to characterize the behaviour of two walls with different thermal inertia. Thermal simulations made it possible to explore different retrofit configurations also including dynamic strategies. The solutions were compared on comfort, energy savings and global cost.

The study shows that the most suitable intervention is the maximization of the internal heat capacity and the introduction of an external insulation layer sealed in wintertime and ventilated in summer, thus maintaining the existing massive envelope's seasonal dynamic behaviour by alternatively maximising thermal barrier effect and heat loss. Considering this, the authors introduced a recently patented

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