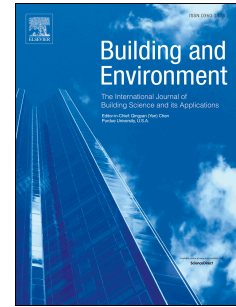


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Abstract

The main objective of this article is the measurement of the passive hygrothermal behaviour and indoor comfort in the traditional Basque architectural model as it has developed and evolved since the 15th Century. For that purpose, the traditional farmhouse architecture in the River Lea valley, located in the Historical Territory of Bizkaia (Basque Country, Spain) and characterized by a temperate-humid climate, was studied and evaluated.

Since the origin of the Basque farmhouse as an «architectural model» in the 15th Century, not only have its construction system, structure, architectural composition and construction materials evolved, but also the indoor hygrothermal variables, the Operative Temperature [°C] and Relative Humidity [%] have gradually evolved. In order to obtain the base behaviour diagnosis, computational models have been developed using Design Builder v.5.0.1.024 simulation programme. In addition, based on Olgyay's, Givoni's and ASHRAE's Standard 55-2013 conditions, three hygrothermal comfort ranges have been defined to determine the relationship between the two hygrothermal variables and indoor human well-being.

As a result, it is concluded that the evolution of the construction of the architectural farmhouse model has had a hidden or unknown but significant influence on the hygrothermal performance of the buildings and, therefore, on the level of human comfort; through their evolution they have become more comfortable buildings.

Keywords: traditional Basque architecture; construction evolution; passive hygrothermal behaviour; indoor human comfort.

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S_{mason,s} = sandstone masonry; S_{mason,l} = limestone masonry; MOR_{lim} = lime mortar; SB = solid brick; W_{oak} = oak wood; T = tile; S_{lim} = limestone; E_{comp} = compacted earth; G_{sg} = single glazing.

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