

Plasters for increased indoor air quality and comfort

Summary

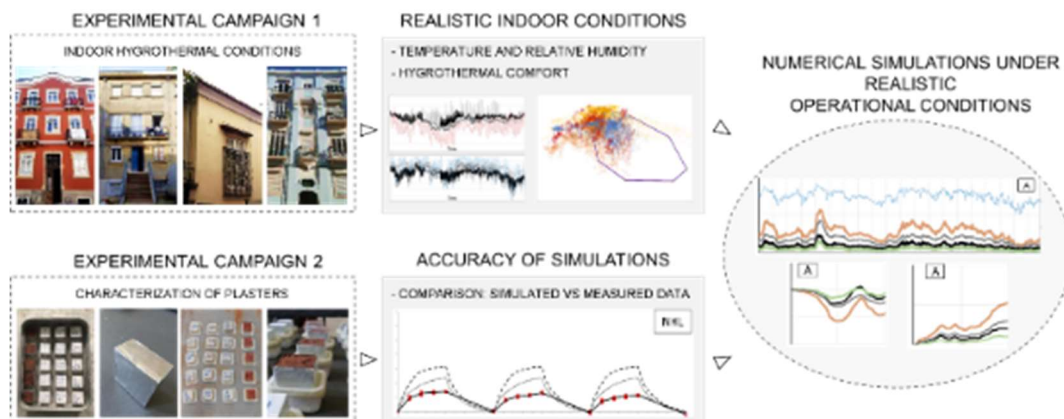
Plastering mortars are a mix of one or more binder, water, aggregates and sometimes additions, commonly used to coat indoor walls and ceilings. Due to the big surfaces they usually cover, plasters can be used to increase indoor air quality and occupants comfort. The mechanisms involved are mainly moisture buffering and passive capture of pollutants. Moisture buffer is known to rely on plasters adsorption and desorption while pollutants capture capacity is still not shown by scientific evidence. According to the literature review earth-based plasters have the highest adsorption capacity and moisture buffering value (MBV) while the poorest response is observed by cement and gypsum based plasters. In between there are stabilized earth, lime and gypsum-lime plasters. Moreover, test methodologies applied to directly quantify both hygroscopic inertia and pollutant captation are still not well-established.

The study started by analysing the relative humidity dependant properties of the most commonly used plastering mortars in new and old constructions. With this purpose five mortars based on air lime, natural hydraulic lime, cement and earth together with three pastes based on gypsum and gypsum-air lime with different combinations, underwent multiple tests for direct and indirect quantification of the hygroscopic behaviour in static and dynamic conditions.

Once analysed the results, the studied plasters were coated by a commercial acrylic paint (for indoor) and the influence of the paint on the same properties was evaluated. With the aim of enhancing the system response to relative humidity, the paint was modified with the addition of five different fillers, considered of high hygroscopicity. The nude gypsum paste, which showed the poorer response to the previous characterization, was similarly modified by the addition of five different fraction of biomass, Acacia Dealbata an agro-industrial waste, showing positive results. The work is ongoing and a contribution for eco-efficient plasters is expected.

Keywords

Plasters, moisture buffering value, hygroscopic behaviour, indoor air quality, comfort.



Passive regulation of relative humidity. monitoring campaign and definition of the most frequent range of hygrothermal indoor conditions in unheated or intermittently heated bedrooms of southern european countries.



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