

Earth plasters: evaluation of their durability and eco-efficiency

Summary

Earth plastering mortars have several aesthetic and technical advantages due to their natural color and the improvement in the comfort of the inhabitants of the buildings and the indoor air quality (IAQ) due to the hygroscopic capacity conferred by the clay. However, they are vulnerable in contact with water, requiring some protection in more exposed areas.

This PhD thesis aims to optimize the durability of earth plastering mortars, given their ability to regulate indoor humidity, possible capture of pollutants and environmental performance. For this, it is intended to optimize the formulation of earth mortars through additions, such as small amounts of current binders or industrial waste (with low embodied energy and CO2 emissions), and partial and/or total replacement of sand by wastes and by-products. On the other hand, it is intended to optimize the durability of earth plasters through the application of surface treatments or finishes, through biotreatments to promote bio-consolidation, or paint coatings and waxes based on natural products. For solutions that present the better physical and mechanical characteristics, the ability to contribute to hygrothermal comfort and IAQ is evaluated, through hygroscopicity and pollutant capture, such as CO2, and the embodied energy is quantified as part of an environmental and economic life cycle assessment (LCA).

The final objective of this work is to define the requirements that earth plasters must present to be suitable for the conservation and rehabilitation of the existing architectural heritage, but also its application in recent constructions, promoting comfort and IAQ to the inhabitants, associated with aesthetic and eco-efficiency advantages.

Keywords

Clayish earth, durability, eco-efficiency plaster.



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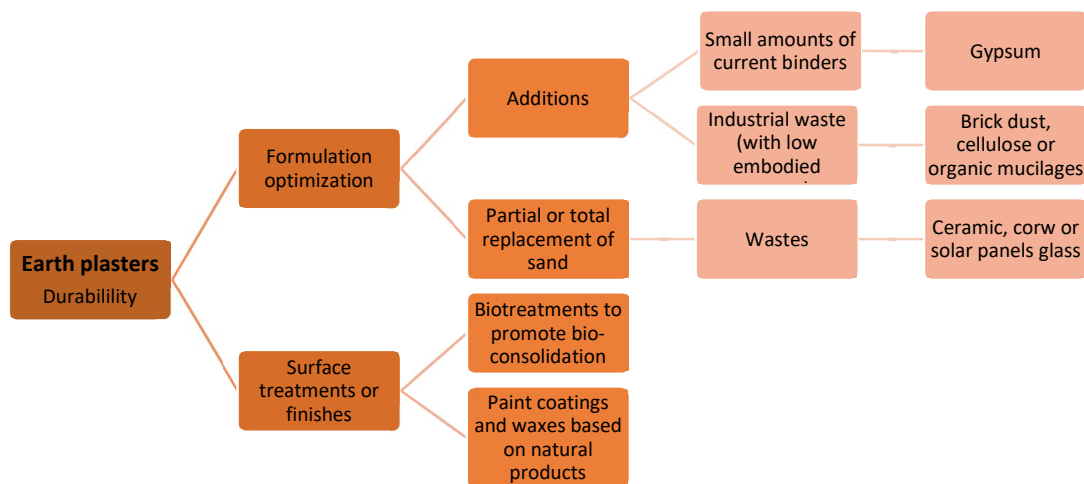
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Different specimens of different mortars.



PhD thesis methodology.