

Cattail-reinforced Clay Plasters in the Sustainable Building and Spatial Planning



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ABSTRACT

The addition of innovative, almost invisible and mold-resistant natural plant fibers for the reinforcement of clay plasters is the central topic of our research project at the Fraunhofer IBP. The usage of *Typha* in the production of high efficient reinforcement fibers for building materials plays a key role in this concept: The fluffy seed mass of it could be used for this purpose, improving also the mildew-resistance of the building materials. The clay plasters show an excellent adhesion to various natural surfaces, absorb rapidly large amounts of water vapour and control thereby permanently the indoor climate. They are 100 % recyclable as well. This present work documents a study, which considered different compositions of clay plaster mortar, studying their typical characteristics and supplies a statement about this, how clay plasters are to be applied in the present building – whether in the historic preservation's application and in the establishment of climatically optimized living rooms in the new buildings. Comparing the *typha* reinforcement fibers with other common reinforcement materials, the study explains the benefits of this new clay reinforcement system, noticing also the environmental and ecological impact of the *typha* plant. *Typha* grows in fen and swamp areas, also in the slow-flowing rivers' periphery, and is active in their phytoremediation. The *cattail*-plant creates nutrition-rich habitats for various species. It has also a high-efficient mechanical stabilization function for its habitats and because of this fact, it could be used to create natural dams. The main goal of these investigation series was to apply a 4-5 cm layer of clay plaster in one working step without to use any additional mechanical reinforcement layer in the façade system. Another goal of the study was to improve an easy-to-apply clay plaster, which could be applied by a plastering machine in a short period of time, without the need of a high-qualified craftsmen. This application would be very helpful in the restoration and the repairing of old and historical buildings. The successful usage of the *typha*-reinforcement into the production and application of indoor plasters should be understood as a main theme of this work. *Typha* is able to change our understanding for a good functioning spatial system: high-quality urban natural building environment, nature-friendly and economical efficiently used rural areas, as well as 100% easy-to-recycle building materials.

Keywords: Sustainable building, clay plasters, *Typha*.