

Afghanistan Traditional Lime Plaster (Lime Render)

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Abstract

Afghanistan has its own tradition in architecture, construction and construction materials. In traditional construction materials, lime, gypsum, ash and other local materials have been used vastly. Though these days manufactured and imported building materials are commonly used in the construction industry, lime is one of the traditional building materials which has been used for many centuries in Afghanistan. It has been used in building foundation, wet areas in ordinary plaster and decorative plaster works throughout the country. Remains of lime used in building could be found not only in historical buildings but also in common buildings in all parts of the country especially in the old cities of Herat, Ghazni and Kabul.

In Kabul when Turquoise Mountain Foundation (TMF) was working in Murad khani Area (Part of the old Kabul city) they discovered application of lime as a main building material which was used in the Hamams (Traditional Bathhouse), room floors, under foundations and as final wall plaster on the external walls of courtyards.

Lime used as final finish layer on external walls has unique characteristics; it is used on the external walls with a thickness of less than 10mm, has a white color, metallic break sound, sufficient compressive strength, water resistant properties and high durability properties.

Samples from more than 150 years found in Murad Khani's Great Serai still looked new with sufficient strength.

Keywords: Hydrated Lime, Lime Render, Egg White, Stone Powder, Badagal (Gul-e-Lukh) and Water

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Introduction

Ingredients of White Color Tradition Wall Render

The plaster materials are composed of hydrated Lime, egg white, stone powder and a local bush fiber called "Gul-e-Lukh" or Badagal". The lime needs to be kept in water for at least 4-months and the older works the best.

Plaster Mix Preparation Methodology

When received from the wet storage pond, the lime is beaten sufficiently until all hard and solid particles are dissolved and the lime is turned into a paste. Then the egg white, stone powder and the gul-e-lukh are added slowly while continuously mixed. The mixing ratio of materials as rediscovered (after months of hard working, sampling

and repeated testing, by Engineer Rahmatullah Oryakhel and the skilled laborers who worked with him on the Great Serai) was 1 kg lime, white of one egg, 1kg stone powder and 3knodes of gul-e-lukh. While adding the ingredients to the lime it should be continuously mixed/stirred in a manner that the gul-e-lukh is mixed in the end in minor amounts and beating/mixing rigorously. The stone powder in the mix adds to the strength, egg white provides adhesive bonding to the mixing materials, and gul-e-lukh provides fiber bonding to keep all materials together and prevents cracking.



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Application Procedure

An important characteristic of this lime plaster is that, apart for fire bricks and concrete surfaces, it works best on mud wall surfaces. Before application of the plaster the wall surface should be scratched with sharp tools to make fine lines on the surface of the wall (better in horizontal direction), then the wall surface to be cleaned from loose materials. A filling layer is first applied on the wall surface and wetted in minor. After 24-hours the lime plaster should be applied using first wooden trowels and for finishing use steel trowels. The plaster should be applied in layers of (5-8) mm thickness. It has been found that a single wall face should be worked at a time without long breaks to avoid visible restart joints.

After application of the plaster it should be kept wet and humid for at least two weeks to avoid shrinkage and development of any minor cracks. After setting a clean white glowing wall surface is developed. The plaster is resistant to water, rain and minor shocks and hits. When gets dirty could be cleaned and wiped using a wet cloth.

Usage of Lime Plaster

Today, the aforementioned material will not be used for modern construction purposes, but it can be used widely - for repairing and renovation of historical building across the world, which means

recreating past memories and can be highly rewarding. Lime plaster with such characteristics might be very effective for different goals with great results.

Conclusion

This material was widely used at places where had high value & rich people could only use this material at their bathrooms because of good finishing and waterproofing.

Recommendation

Using this material at historical area will be more effective and reminds all past memories, in addition it is cost effective, durable, and waterproof. It generally recommends for places which exposed to water flow.

Biography

I am Gul Rahman Abdulrahimzai from Afghanistan, Head of Department of Civil Engineering at Kardan University with a demonstrated history of working in the education management sector.

I have skills in research, lecturing, teaching leadership, and curriculum development. With strong academic foundation of a bachelor of science (B.Sc.) focused on Civil Engineering from National Military Academy of Afghanistan, (NMAA).