

Modern thin-layer applications of clay plasters for sustainable coloured interiors

Thin-layer clay coatings are clay mortars applied at a thickness of up to 3 mm. Typically, these are coloured clay plasters, clay paints or clay fillers. In Germany, France and England, they are among the most strongly promoted earth-building products in the manufacturers' ranges, featuring prominently on their homepages and trade fair stands. Some producers, such as the market pioneers Lesando and Tierrafino, even specialise exclusively on this product segment. Together with traditional thicker clay plasters, thin-layer clay coatings account for a significant proportion of turnover in the modern earth-building market.

Plastering systems for use in combination with the thin-layer clay coatings are playing an increasingly important role. These usually comprise fine-finish or reinforced plaster mortars for creating an even substrate often in combination with clay panels or wood fibreboards.

An example for the sustainable conversion of an existing building is the United Nations Climate Change Secretariat (UNFCCC) building in Bonn. The interior was refitted with clay drywall boards as a base for a coloured clay plaster finished to Q3 surface finish quality level.

The growing interest in thin-layer coatings was reflected by a test of different manufacturers' products in the popular German consumer advice magazine ÖKOTEST 08/2014. However, in the run-up to the tests, it became clear that the testers were not adequately aware of the specific properties of thin-layer clay coatings. For example, it makes little sense to test the wet abrasion resistance of clay plasters that are by nature water soluble. The DVL board member Prof. Dr. Christof Ziegert and his laboratory at Ziegert Seiler Ingenieure GmbH in Berlin worked actively to close some of the gaps in the testers' knowledge

Thin-layer clay coatings on wood fibreboard mounted on a timber subconstruction



Photo: Claytec®

Photo: Claytec®



Photo: Michael Sondermann/Bundesstadt Bonn



Photo: Claytec®

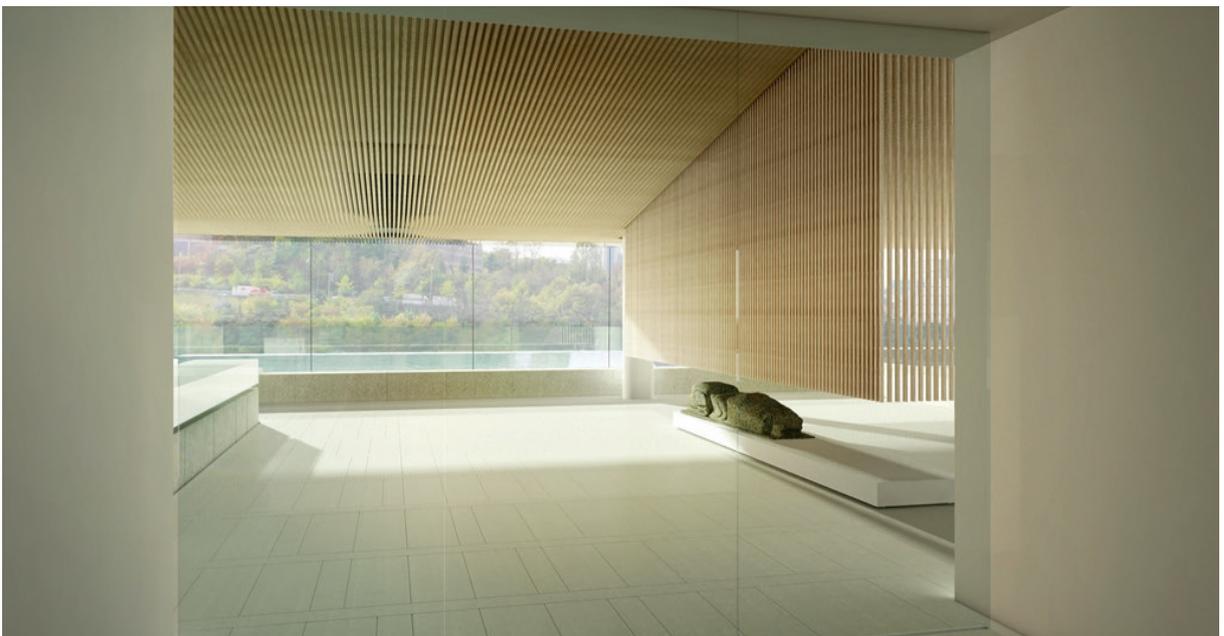
The building complex of the UN Climate Change Secretariat in Bonn. Bottom left: The white building in the foreground is the UNFCCC building. Top: Office wing in the UNFCC building during construction showing the clay panels and thin-layer clay plaster coating. Bottom right: Corner detail in an office in the UN Climate Change Secretariat.

and help define appropriate testing procedures. As a consequence of this, the DVL drew up and published Technical Datasheet TM06 on thin-layer clay plaster applications that sets out a clear definition of this group of earth building products and defines important quality requirements for thin-layer clay plaster applications, for example with respect to abrasion resistance and vapour sorption in combination with earth-based substrates and subconstructions.

In addition to the colourfast properties of clay plaster surfaces, the beneficial effect of adequately large clay surfaces on indoor room climate remains a key advantage of earth-based materials over conventional plaster products. This aspect is therefore also covered by DVL Technical Datasheet TM06. According to TM06, coloured clay plaster coatings must demon-

strate the capacity to buffer indoor humidity through the absorption and desorption of water vapour molecules in the plaster and its underlying construction. Manufacturers should provide corresponding proof. Another paper at the LEHM2016 presents the results of the Ecossee EU research project, which examines the measurement of moisture buffering penetration depths in clay plasters [1].

However, the main reason for the demand in thin-layer clay coatings is neither the physics of the material nor the building technique but the magical qualities of the material's colour and depth. In Europe, coloured clay and earth surfaces do not have a long tradition. Instead, the structure and construction has traditionally featured more strongly, for example in half-timbered construction, rammed earth walling or



Photos: Claytec®

Oben: Reconstruction of a Japanese house in Robertville, Belgium (by Druwid / Michael Thönnnes). Bottom: CJ Lounge Samsung, South Korea (Architect: Jungo-Hoon Kim).

wall linings. In Asia, by contrast, there is a long tradition in clay plaster surfaces, and the technique has been taken to a degree of perfection.

By way of example, the following photos show the reconstruction of a Japanese house in Robertville, Belgium, built by DVL member Michael Thönnnes from Druwid in Belgium.

These surfaces are now being rediscovered for modern architecture, for example in this lounge within a Samsung office headquarters in South Korea, realised by the architect Jungo-Hoon Kim, a Claytec partner in South Korea.

For many architects, the specific quality of plasters made of coloured clays offers new design possibili-

ties. They choose them to achieve a particular colour or spatial effect. The colours of the earth from different geological formations have a special warmth and sense of depth that lasts without fading, peeling or ageing. Such interiors are both sustainable and colour fast. They are also easily repaired, making them ideal, for example, for museum spaces with changing exhibitions. The Swiss architect Peter Zumthor sought a coloured plaster for the Columba-Museum in Cologne that could be applied seamlessly over large and high wall surfaces and was easy to repair. Zumthor selected a special grey tone that gives the spaces a calm, almost profound atmosphere that underlines the sacral character of the exhibition. Applied in painstaking detail by the plastering firm Stuck & Akustik Weck GmbH in Cologne, the particular colour is a blend of clay minerals custom-mixed by Claytec



Kolumba Museum, Cologne (Architect: Peter Zumthor).
 Top: Gallery space. Top right: Stairway. Bottom right:
 Exterior view

in cooperation with the architect. The product colour has since been dubbed “Kolumba Grey” and has been used as far away as Abu Dhabi.

There are no special fixings for paintings or exhibits on the walls. When an exhibition changes, the holes for screws or nails are simply refilled. Because the clay plaster can be replasticized with a little water, the exhibition technicians at the museum can repair surfaces easily. This unique quality of clay plasters makes it possible to repair holes and damaged surfaces, restoring the surfaces to their original quality.

The various different techniques for creating a suitable plaster base has made it possible to use earth building products on almost all kinds of internal wall surfaces, whether made of concrete or clad with plasterboard or composite-wood panels. For the end user, however, a key criteria is the quality of the visible (thin) surface. The effect of the material in the overall spatial concept or within a room now plays as important a role as its building biological and ecological credentials. The healthy and environmental qualities of earth and clay building products are now well known, and for many the ecological argument for earth building products - as for other natural building materials - is taken as given. It is therefore increasingly the aesthetic qualities of earth and clay surfaces that set them apart from other materials.



Photos: Claytec®

The Holistic Living Plus-Energy Houses in Wannsee in Berlin, designed by the international architecture office GRAFT Architects takes a holistic approach that marries modern architecture with innovative and ecological building facilities. The central functional space and design element of the respective living areas is a combination of fireplace and staircase, plastered with CLAYTEC® clay plasters, specifically the YOSIMA® clay-design plaster in a golden ochre colour (BRGE 2.2). The plaster was applied by earth building company Ökologische Werkstätten Günter Wlosnewski in Brandenburg an der Havel.

Such projects show that earth building products have transcended the domain of historical, traditional



Holistic Living Plus-Energy Houses, Berlin. Exterior view and living room (GRAFT Gesellschaft von Architekten, Berlin)



Photos: GRAFT Gesellschaft von Architekten, Berlin



Photos: Hamish John Appleby

Familienhotel Weimar: Apartment with wood and coloured clay plaster. Bottom left: Exterior view. Bottom right: Bedroom with coloured clay plaster walls.

building and are equally at home in modern domestic architecture.

Other applications in hotels, art galleries and shops show that thin-layer clay coatings have contributed significantly to the growing popularity of earth building materials and the new possibilities they offer for the design of interiors.

Clay plasters in hotel environments

The Familienhotel is located directly next to Goethe’s famous house on the Frauenplan in Weimar, Germany. The owner wanted to use natural materials wherever possible in the construction of the building, and the hotel is a timber panel construction plastered with clay plaster. Peter Multhauf, a DVL member, plastered the clay undercoat plaster with integral

wall heating with YOSIMA coloured clay plaster. The family-apartments comprise at least two rooms with integral kitchen. The clay plaster wall surfaces have survived several years of intensive use and remain robust and easy to repair.

A less well-known example of the use of clay plaster in hotels is the 4-star bora HotSpaResort in Radolfzell am Bodensee, Germany.

The timber structure of the hotel was designed by the Milanese architect Matteo Thun, while the Munich-based architecture office Bruno Franchi designed the interiors. After extensive trials, the foyer and wellness areas were plastered with Claytec YOSIMA coloured clay plaster by the local plastering firm Volker Kaufmann from Kisslegg. In the spa area, Bruno Franchi



Photos: Claytec



Bora SPA-Hotel, Radolfzell am Bodensee. Top left: Exterior view. Bottom left: Wellness area with white-coloured clay plaster on typhaboard . Right: Foyer with coloured clay plaster in the bar area

specified typhaboard, a comparatively new product made of compressed typha reed, as a plaster base. In combination with a suitable primer, YOSIMA clay plaster, applied here as a 2 mm thick coat of white plaster, proves to be an ideal partner for this unusual plaster base.

The consistent colour and quality of the clay plaster surfaces throughout the interior of the hotel has proved to be a winning formula for both the designers and the clients. And thanks to the competent application of the plasterers and technical advice from the manufacturer, both teams of architects – Matteo Thun and Bruno Franchi – have expressed greater confidence in earth building materials.

Clay plasters in art galleries and museum environments

Munich has many well-known museums but the Lenbachhaus is a gallery of world renown thanks to its unique collection of works by the group of artists known as the Blaue Reiter, including paintings by *Alexej Jawlensky*, *Wassily Kandinsky*, *Gabriele Münter*, *Franz Marc*, *August Macke*, *Marianne von Werefkin* and *Paul Klee*. After extensive conversion and renovation works designed by the British architects Norman Foster Associates, the Lenbachhaus was re-opened in new glory in 2013.

As part of the conversion works, two rooms of the collection were given an application of CLAYFIX brush-applied plaster by the Claytec partner Hermann Gärtner. The clay plaster wall surfaces and the



Photos: Claytec

Lenbachmuseum, Munich. Exhibition spaces showing the paintings of the Blauer Reiter against coloured clay plaster walls in grey and gold-ochre.

paintings and artworks produce an interesting aesthetic interplay through the contrast between the discreet colour and texture of the earth tones and the expressive shapes and colours of the works of art. The plaster build-up of undercoat clay plaster, top-coat clay plaster and coloured clay fine-finish plaster also helps to regulate airborne moisture, contributing to the long-term protection of the priceless artworks.

This project illustrates the clear advantages that clay plasters offer for such situations, and the end result is a unique colour concept within the overall concept of the exhibition spaces.

A question that often arises is whether such surfaces can be painted over if the original colour is no longer desired. The Lenbachhaus is a case in point: the new

museum direction decided they did not wish to continue exhibiting the Blauer Reiter paintings against the coloured clay plaster background, and painted the surfaces white. Although somewhat disappointing, this demonstrates that it is possible to paint over a clay plaster with a new colour. The following images give an impression of the expressionist paintings against the background of the coloured clay plaster prior to painting over.

Clay plasters in retail environments

It is in the nature of clay plasters and coatings that their beautiful but subtle surface qualities are seen and appreciated in passing but not always noticed as being clay plaster. To the untrained eye, one may never know if not told or if not written about in a publication. As such, the author was surprised to notice clay plasters on the walls of not one but two Apple Stores:

- London – the Apple Watch Store in Selfridges department store, 400 Oxford Street, London W1A.
- Brussels – the Apple Store in Gulden Vlieslaan 26–28, 1050 Bruxelles

Research turned up an article in "ausbau+fassade 06/2016" in which the interior outfitter for the Brussels Apple Store, Uwe Marko reports: "For the new

Photo: Dezeen Magazine (by Jereon Verrecht)



Apple Store, Brussels (above) and Apple Watch Store in Selfridges, London (right)

Photos: Lemke



Apple Store in Brussels, we were asked to make the interior surfaces correspond to the organic forms of the external facade using dry lining boards. According to specifications by the Apple's British designer Jony Ive, we created a smooth, natural surface using Claytec YOSIMA® clay design plaster. Four splayed pillars, each 2 metres in diameter and 11 metres high, were clad in a double layer of 6 mm thick plaster-board. A particular challenge was the need to create a uniform 4 mm gap between the walls and the floor." The arcades either side of the windows (foreground and right) are coated with YOSIMA® clay plaster.

In London the white clay plaster surfaces heighten the minimalist exterior of the retail concept especial-

ly designed for the Apple Watch. Unlike the store in Brussels, where clay plaster is part of the overall store concept, this was for a shop-in-shop concept.

The shop window areas are clad with a special white tone from the YOSIMA® palette of clay plasters. The contractor was Calfe Crimmings in London, and this was the first foray into using clay plasters for Andrew Crimmings!

The colours and haptic material quality of clay plaster surfaces have been incorporated into the overall concept of wood tables, plants and a corresponding stone wall surface in Brussels and stone floor in London.

Conclusion

Thin-layer clay plasters and coatings made of natural, geologically-occurring minerals from different sources are durable, easy to repair and exhibit lasting colours. The broad range of colours now available for clay plasters and coatings has made clay products attractive to new market sectors with a stronger design focus. The colours of clays have become a motor for marketing other clay plasters and earth building techniques and products.

References

- [1] Maskell, D.; Thomson, A.; Walker, P.; Lemke, M. — BRE University of Bath; ModCell, Bristol; Claytec e.K, Viersen, UK/D: Messungen der Eindringtiefe von Feuchtigkeit in Lehmputzen bei der Feuchtepufferung – Ergebnisse aus dem EU Forschungsprojekt EcoSee