UDC 728.4 DOI: 10.56900/2312–6116_2025_12_18

Article

Modern Design of Ceramic Facades

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Abstract:

Great technical-technological progress in the production of innovative ceramic diverse elements for covering facade surfaces of architectural buildings has significantly influenced architects to make the design of physical structures in public space more aesthetically and visually interesting. Through ten examples of completed buildings from different parts of the world, the paper presents facades made of ecologically sustainable ceramic material that essentially modified the microenvironmental character of the area where they were created. They changed the physiognomy and identity of the exterior space of streets, squares and piazzas and influenced the design repair and development of wider urban territories. Attractively shaped facades with ceramic cladding, as the most integrative part, have significantly modified the images of the contemporary appearance of urban settlements. Cultural-historical genius loci of artifactual and natural structures were revived. The author's attention is focused on buildings with extremely beautiful facade figures, ornaments and details, which are an important, integral part of cultural and historical heritage, and whose protection from destruction due to progress should be unquestionable. In the same way, the eco-architectural-sculptural form of modern buildings was looked at, where the ceramic material on the facade envelopes had a key influence on creating the impression of new, high-quality creative-artistic transformations in the space.

Key words: ceramic material; facades; contemporary design; eco-urban architecture; transformations.

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Introduction

Due to their excellent physical and mechanical properties, ceramic materials are often installed in modern buildings because they have a timeless elegance and a connection with natural structures. It can be seen from the shown constructed buildings that the designers preferred ceramic material for cladding facade, floor and roof surfaces, as well as in places where it was necessary to emphasize the importance of details in the design. In the case of flexible exterior design, ceramic elements, most often ceramic tiles of different profiles, enabled the synthetic creation of continuity of building facades and their integration in public space. In addition, they have made it easier for architects and designers to experiment with relief details, textures and colors, creating new sustainable material solutions, better visual appeal of buildings and cultural-aesthetic, recognizable significant neighborhoods. The excellent functional properties of ceramic material in eco-urban architecture, ranging from interior tiles to complex active facade systems and roofing products, influenced the innovative thinking of creators on the artistic interpolation of complex forms, plastic-relief textures and the inclusion of artistic details with forms from nature.

Examples of Ecourarchitectional Ceramic Facades from the World

The facade of the Spanish Pavilion made for the world exhibition EXPO 2005 in Aichi, Japan, is characterized by a typical element of traditional Spanish architecture "celosia" with an irregular geometry of hexagonal ceramic glazed pieces. 15,000 hexagonal frames, made of Spanish clay, for the architectural design of the perforated shell - grid wall of the pavilion in order to establish the most attractive visual communication between the interior and exterior space (Fig. 1.)



Fig. 1. Facade covering, Spanish Expo-Pavilion, Aichí, Japan, 2005.
https://www.ceramicarchitectures.com/obras/spanish-pavilion-expo-2005/

The aim was to reinterpret the establishment of traditional lattice elements, very common in the history of Spanish architecture, in order to support the cultural hybrid connection between Christian and Islamic architecture. The circulation space of the pavilion is defined by a grid wall in order to better emphasize the "engava", an intermediate space present in Japanese architecture. With six hexagonal ceramic pieces in warm different colors, which imitate many characteristic elements from Spanish culture: wine, roses, blood (bullfights), sun, sand... the facade surfaces of the pavilion are shaped as a reinterpretation of arches, vaults, lattices and identified decorations, which is a common denominator between Spanish and Japanese culture (Fig. 2).



Fig. 2. The Jewish Community Centre. In the City of Mainz in Germany, 2010.
https://www.archdaily.com/133938/jewish-community-center-mainz-manuel-herz-architects

For the spectacular synagogue in Mainz, with an area of 2,500 m2, the designer conceived a building that will tangibly and physically reflect the Jewish liturgical expression Kedush (qdwşh), in German: a blessing for "sanctification" and "exaltation". On the site of the former main "Hindenburgstrasse Synagogue", an eco-architectural sculptural form of the building was built, played with a dynamic arrangement of smaller volumes and ceramic surfaces in a "horned" geometry, with diagonally placed rectilinear grooves on the facade. The facades are covered with three-dimensionally shaped TERRART glazed ceramic tiles, the quality of which is enhanced by a transparent green vitreous majolica coating. Depending on the daily changing light conditions, the high-gloss tiles produce an attractive visual effect with color-spectral shades. Glimmering in the sun and interesting play of light and shadows, the charm of the locality is further emphasized. The spatial and architectural quality of the synagogue can be read through the facades, which are harmoniously integrated with the design of the buildings in the artifactual and natural environment. From the observer's perspective, with a careful look from the street side, it is possible to read in the silhouette of the object, the Hebrew word "Kadushah" whose translation means: "raising" or "blessing". The fascinating holy building with pictorial symbols from the Judaic tradition and jagged steep contours is an outstanding architectural and artistic icon of the city of Mainz (Fig. 3).



Fig. 3. Museum of Culture in Basel, Hezog&de Meuron, 2011.
https://www.mkb.ch/en/museum/ueber-uns/architektur.html

For the new identity of the Museum of Culture in Basel, the redesign of the entrance area and the interior, expansion and addition of a new exhibition hall in the attic were carried out. The modification of the building was due to the large number of museum units in the funds, close to 300,000. The urban architectural attractiveness of the Museum is made up of a new multi-gable roof with a corrugated covering of 10,000 three-dimensional glazed ceramic hexagonal, dark green elements, specially produced for this construction intervention. The tiles are a contemporary remodeled abstract version of the classic "pepper" tiles from the historic roofscapes of the city of Basel. The special shape of the surface of the extravagant roof covering with different bevel angles, with unusual color and sculpturality, attract the attention of a large number of people, especially from the world of architecture and design. The designers most likely sought inspiration for a new form of roof resembling mountain peaks in the mix of medieval and modern architectural styles in the immediate surroundings (Fig. 4).

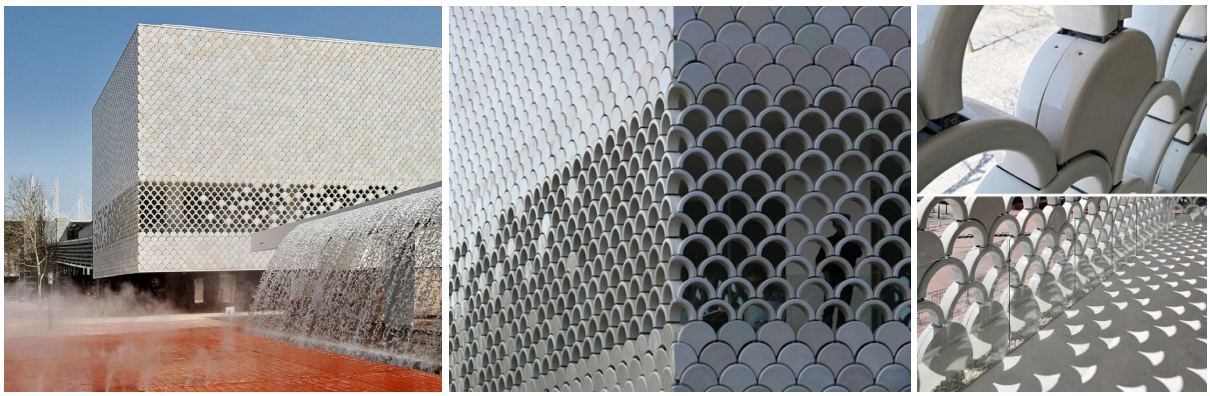


Fig. 4. Oceanium Lisbon, Portugal designed by Peter Chermayeff, 2011.
https://www.ceramicarchitectures.com/obras/aquarium-lisbon/

One of Lisbon's most popular attractions is the Oceanarium with Square, located in Parque das Nacoes. The expansion project was planned to expand the usable area so that the new volume is raised above the ground level, and the ground floor is free without visual obstacles with a square that is partially recessed below. Through the prism of the irregular form and the footbridge that connects the new structure with the old part, a unique hybrid entity was created in a harmonious dialogue with the fountains and organically contextually connected structures in the vicinity. The new facility contains functional rooms for temporary exhibitions, an auditorium, a restaurant and a central staircase. The most dominant is the exterior facade surface, a curtain wall with powerful artistic qualities that transform the building, as the designers say, "into a luminous, transcendent, wonderful environment." The calm appearance of the ceramic facade is reminiscent of the undulations of the surface of water touched by the sun's rays. It is composed by overlapping more than 5,000 ceramic pieces that are distinguished by small variations in color with a marble look, charming rows of "scales" of refined, simple semi-circular shapes. The central issue was the introduction of daylight into the interior space of the building. Skillfully designed forms of ceramic facade elements masked the glass openings in various recessed positions of the Oceanarium (Fig. 5).

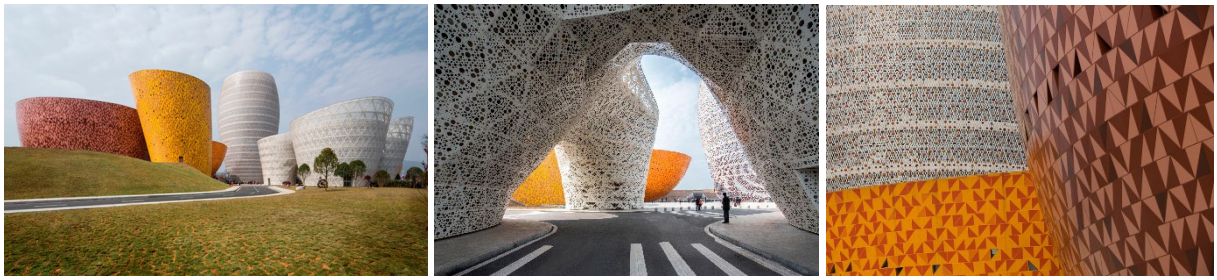


Fig. 5. Liling World Ceramic Art City. Liling / China / 2014.
https://www.aeiprogetti.com/en/projects/cittadella-dellarte-della-ceramica/

The eco-architectural complex Liling Museum of Ceramics, in Henan province, was created on a location with unlimited dimensions, on a total area of 210,000 m2. The complex is configured on flat terrain, in an area surrounded by strong vegetation and hills. It is composed of large vase-like volumes of various shapes. The multifunctional complex contains several buildings: two hotels, two museums and an entrance gate, with ceramic facade surfaces of an iconic character where the aesthetic-artistic synthesis of volumes is present in a unique geometric design. In Liling, known for the production of ceramic materials, innovative models have always been combined with traditional forms. Thus, the designers of this museum complex searched for and selected a compositional matrix in which the modern identity of the stylistically shaped buildings conceptually originates from ancient pottery production. The volumes in the exterior are always with concave or convex facade surfaces, with soft fluid lines in the contour. No sharp edges. The facades are covered with polychrome metal modules, which gives visitors the impression of original three-dimensional textures. The panels are made with triangular frames, according to the most advanced technological solutions with different finely nuanced colors that give a strong expressive identit (Fig. 6).



Fig. 6. The Center for Asian Art at the Ringling Museum of Art Sarasota, FL, United States, 2016.
https://www.machado-silvetti.com/story-ringling-facade

For the needs of the Ringling Museum of Art, in Sarasota, Florida, the existing gallery in the western part was renovated and a new pavilion in the form of a prism was added, for the display of exhibits of Asian art. It is raised from the ground level and supported on four very strong pillars. The concept of contemporary design of the new pavilion called into question the inherited cultural-historical urban architectural style of the campus. For the design of the striking envelope of the high-performance building, the designer applied ceramic elements similar to the decorative stone jade to achieve a contextual visual synthesis with the intense green colors in the gardens of the site. Ceramic elements with vitreous glaze and excellent physical and mechanical properties emphasize the sculptural form of the object. They are profiled according to the geometry of elements from the history of Asian architecture. With a slightly rotated position on the facade, they easily repel raindrops. In addition, the window openings are precisely integrated with the modular network of facade tiles, which in night conditions leave an interesting light-visual impression. The idea was

to build a monumental addition to the campus with a contemporary articulation of space. The terracotta facade membrane around the added building colorfully supports the nearby palm trees as well as the sublime drama of the public square (Fig. 7).

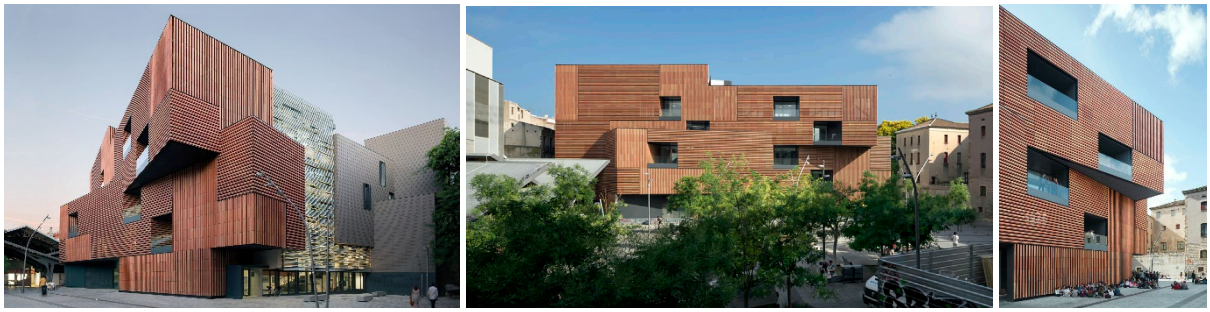


Fig. 7. Escola Massana. Art and Design centre in Barcelona, 2017.
https://www.archdaily.com/910633/escola-massana-art-and-design-center-estudio-carme-pinos

The Massana School, Center for Art and Design in Barcelona with 11010 m2 of usable area, floor plan P+P+5, was built with a dynamic urban exterior appearance. Horizontal prisms are harmoniously designed in combination with accented dark red covered ceramic facade surfaces. They are part of the significant planning process of the transformation of Plaça de la Gardunha, into the Raval neighborhood, the heart of Barcelona's historic district. Ceramic chipped elements, measuring 14x12x90 cm, are made by hand and resemble static brisoleis for visual protection and privacy of students in the interior space. They are shaped using white stoneware with the participation of iron oxide in order to achieve the high quality patinated color of the old district of Barcelona. Thus, a strong emphasis on the architectural and material aesthetics of the facades was made possible. In order to reduce the impression of the Massana School's bulky physical structure, the part of the building facing the square was designed with two rotated volumes and terraces, which affected its emblematic character. The decision for this choice of building form arose from the architecture of existing buildings in the immediate surroundings (Fig. 8).



Fig. 8. Bat Trang Pottery Museum's Architecture is ode to tradition, Vietnam, 2021.
https://www.archdaily.com/1008584/bat-trang-ceramic-community-house-1-plus-1-2-architects

As part of the "Vietnamese Craft Village Quintessence" project for the development of craft villages and the preservation of more than 500-year-old pottery traditions, an impressive Bat Trang Ceramic Community House museum building was built on an area of 3380 m², in Vietnam. The urban-architectural form of the five-story multifunctional building is inspired by seven connected rotating horizontal potter's wheels that cascade towards the upper zone. In the open exterior dynamic space, extraordinary facade interplay of light and shadow was created. Circular shapes are made by ceramists when working with blocks of clay, creating curved shapes and smoothing surfaces. The scenic volume of the building with attractive ceramic facades, harmonious proportions, is oriented towards the Bac Hung Hai canal and connected to the Red River. It is associated with Bat Trang's antique gourd kilns and pottery display racks that are featured daily at the Canal Pottery Market. Out of respect for tradition towards the village, the urban architecture of the Bat Trang Pottery Museum was realized from rustic rough ceramic material of dark brown-red color as

a narrative of the cultural identity of the village where the art of ceramics has been rooted for more than a millennium. The design of the museum, which goes beyond conventional frameworks, essentially reflects the craftsmanship of the potters, which is continuously passed down through the generations. In essence, the Bat Trang Pottery Museum is a unique masterpiece between tradition and architectural innovation, between past and present (Fig. 9).



Fig. 9. Ex Ceramica Lago Area, 2021.
https://www.world-architects.com/en/architecture-news/found/tiled-up-in-blue
https://www.laterizio.it/cil/progetti/710-area-ex-ceramica-lago.html

Inspired by the colors of the lake and the Laveno Blue ceramics that were traditionally produced in the ancient Pozzi-Ginori factory in the 1920s, the designer of the residential complex envisioned a rhythmic-contrasting architecture for the new buildings on the hill facing the shores of Lake Maggiore. The conceptual thought consists of four volumes, the lower floor parts of which are functionally planned for loggias towards the pedestrian path and parking spaces. The idea was created as a fusion between culture, imagination, technique and industry in dialogue with the beautiful environment. The concept project of the new part of the city of Lavena contains twenty-six residential units, ranging in size from 50 to 130 m2, located in a pedestrian zone of 2,400 m2, from where residents can enjoy the extraordinary relaxing landscape lake views. Specially designed pentagonal tiles were used to cover the facades and roofs of family houses in order to create a visual effect of the total participation of ceramic material. The tiles are blue in color, of different shades, irregular in shape, covered with a vitreous coating. The blue color was used as a great reminder of the Laveno Blue ceramics that were once produced within the ancient Pozzi-Ginori factory (Fig. 10).

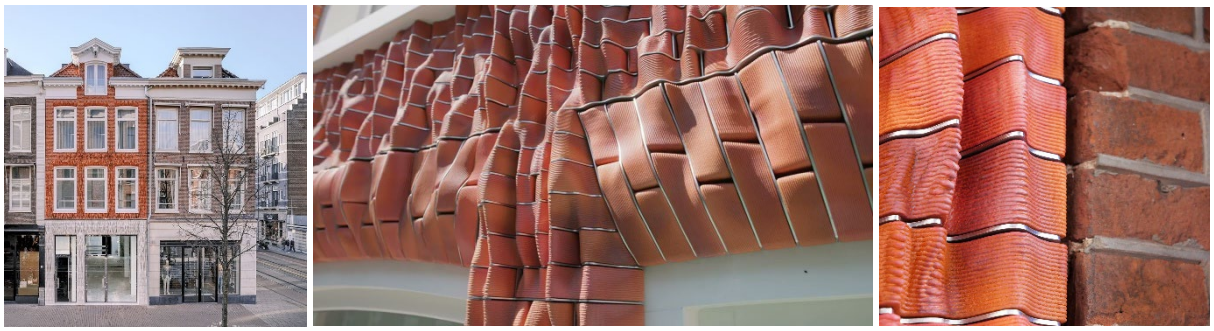


Fig. 10. 3D printed ceramic facade of the Ceramic House in Amsterdam, 2023.
Studio RAP reinterprets classic craft in a new way with an expressive 3d printed façade in Amsterdam
https://www.designboom.com/architecture/studio-rap-ceramic-house-amsterdam-with-3d-printed-facade-11-30-2023/

To create the 3D printed ceramic facade and storefront of the "Ceramic House" boutique, in a luxury shopping street in Amsterdam, the new computer design technology with digital production methods, from the Rotterdam firm Studio RAP, was used. By combining tradition and innovation, craftsmanship, computer design and modern digital production, an urban-architectural, artistic hybrid artistic facade expression inspired by the art of knitwear and knitting was created. Each glazed ceramic tile, approximately 40x20 cm in size, is individually printed. It is designed in a way that, with ties, folds and texture, resembles the modeling of textile fabrics. A different way of thinking was established in the research and implementation

of decorative glazed ceramic elements on facade surfaces. The new remodeled facade was made with a wealth of ornamentation and detailing, so that the organic undulating quality of the material blended harmoniously into the existing historical architecture of Amsterdam's famous street. The idea to design a facade with extraordinarily shaped ceramic panels printed with sophisticated tools in 3D technology, in order to perfectly highlight the identity of the fashion store on the ground floor, succeeded completely. Ter Hall, lead designer at Stidi RAP says: "These tiles are designed to be visually expressive at eye level. They seamlessly transition to another plane as they meet the ground, creating a harmonious and detailed aesthetic."

Conclusion

A look into the centuries-old history of construction, in which ceramic material was extremely influential and applied, shows numerous conceptual innovations of designers with the intention of adding functional and aesthetic-artistic components to buildings. Today's famous creators from the world of urban architecture included ceramics on the facade envelopes of their buildings in the desire to become iconic world-famous landmarks. The contemporary architectural achievements of Antoni Gaudí, Keng Kuma, Jerno Uzon, Santiago Calatrava and others show that facade ceramics were an impressive component in the construction of their most significant buildings in the world. These structures have become iconic landmarks and testify to the beauty of ceramics in architecture with groundbreaking influences on the further innovative development of architectural and design considerations. There is a tendency to shape the form of objects with a visually imposing and appealing sculptural character. Designers very often found inspiration for the idea of newly designed structures in traditional art from the distant past, in order to achieve highly successful creations with technologically perfected ceramic material. The latest 3D technologies with the printing of individual unique, decorative ceramic elements – figures, reliefs, ornaments, etc., have enabled credible reconstructions of important objects from the cultural and historical heritage. They articulated a significantly better relationship for a different materialization of architectural compositions in space, creating a new, modern urban history.

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Article Summary ***Design. Art. Industry, 2025*, Issue 12**

DOI: 10.56900/2312–6116_2025_12_18

Modern Design of Ceramic Facades [Современный дизайн керамических фасадов]

Аннотация:

Значительный технико-технологический прогресс в производстве инновационных керамических элементов для облицовки фасадов архитектурных сооружений оказал значительное влияние на архитекторов, сделав проекты общественных пространств более эстетичными и визуально интересными. На примере десяти реализованных зданий из разных уголков мира в статье представлены фасады из экологически устойчивого керамического материала, которые существенно изменили микросреду местности, где они были созданы. Они изменили облик и самобытность внешнего пространства улиц, площадей и площадей, а также повлияли на дизайн, ремонт и развитие более обширных городских территорий. Привлекательные формы фасадов с керамической облицовкой, как наиболее целостный элемент, существенно изменили современный облик городских поселений. Возродился культурно-исторический genius loci искусственных и природных сооружений. Автор уделяет особое внимание зданиям с чрезвычайно красивыми фасадными фигурами, орнаментами и деталями, которые являются важной, неотъемлемой частью культурного и исторического наследия, и чья защита от разрушения в результате прогресса должна быть неоспоримой. В этом же ключе рассматривался экоархитектурно-скульптурный облик современных зданий, где керамический материал на фасадных оболочках имел решающее значение для создания впечатления новых, качественных творческо-художественных преобразований пространства.

Ключевые слова: керамический материал; фасады; современный дизайн; экоурбанистическая архитектура; преобразования.

For Citation

Cekic Nikola. Modern Design of Ceramic Facades *Design. Art. Industry*: International Journal of Scientific Research Editor in chief N M Shabalina. St. Petersburg: Tekhne Publishing House, 2025, Issue 12, pp 18–25. https://doi.org/ 10.56900/2312–6116_2025_12_18