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Decorative terracotta art in traditional architecture in Vietnam

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Abstract
Terracotta is a type of material with a rich history in the lives of the Vietnamese people, often used as bricks, decorative roofing tiles in architecture, and embellished with intricate sculpting and shaping techniques. According to the Vietnam Architecture history, some of the first explored earthenware artifacts are found around the Ly regime, Tran dynasty, and the Chinese colonial period (the 1st century BC) in Co Loa citadel (Dong Anh district, Hanoi) and Luy Lau citadel (Thuan Thanh district, Bac Ninh city). The relics such as carefully-made earthenware bricks and tiles reveal a thriving of this material in this era. After several hundred years, though some terracotta artifacts are no longer present on several ancient buildings, they are still kept as part of a precious heritage that contributes to the creation of system of unique figures and symbols of Vietnamese traditional architectural decorative art. Although those mentioned ruins are damaged, they provide favorable conditions for us to revive the ornamental art of terracotta in traditional architecture, which essentially contributes to the precious heritages system. This article touches on decorative terracotta art in Vietnamese architecture, exemplified by terracotta artifacts uncovered in national heritage sites such as Hoa Lu Ancient Capital, Thang Long Royal Palace, Hue Ancient Capital, which will allow us to see the role and value of terracotta in traditional architecture in Vietnam.

Keywords: material, terracotta, decorative art, traditional architecture, Vietnam

1. Introduction

Traditional Vietnamese architecture employs a wide range of natural materials in the creation, decoration, and arrangement of living space. Some of these materials include low durability ones like cogon grass, bamboo, leaves or high durability and long lasting ones such as earth, wood, stone, pebble, sand. These material mostly come from nature and processed by man. A suitable combination based on their individual characteristics results in a form of architectural decorative material that best matches the purpose and functionality of the building.

Among the aforementioned material, earth is special, as it has been in use from an extremely early age and can be processed in a variety of ways to be used in construction such as rammed earth, earth mixed with rice husk, straw, pebbles, bricks, animal bones… Natural clay, after undergoing a rigorous process of filtering, kneading, forming and heating, is transformed into a new material with a myriad of different uses – terracotta. It can be said that the birth of terracotta was a fundamental leap forward in the production of construction material. Initially, terracotta was mainly used to create household objects. Over time, as our knowledge and techniques of handling different material improved, terracotta made its entry into the world of architectural decorative art, lending buildings the beauty of a natural, sustainable and durable material. The surface-decoration technique is discovered on the primitive terracotta tiles at Luy Lau archaeological site, which proves the early appearance and development of this material.

The birth of terracotta changed construction itself, facilitating the assembly and combination of different material in a single architectural project. Terracotta is characterized by its ability to be shaped, molded and mass-produced as well as its ease of use in construction.

Furthermore, terracotta is highly resilient, able to withstand changes in climate and environment in natural conditions as well as being long-lasting and easy to transport [2]. In traditional architecture, terracotta is mostly used in bricks and roof tiles. These can be combined with wooden architecture alongside several types of binders such as molasses, mortar, lime to create buildings of greater heights. Furthermore, the fiery nature that gave birth to terracotta lends it a certain intimate warmth, fitting for human life

Fig 1: Surface-decoration terracotta completed from the 2nd to the 10th BC in Luy Lau citadel (Image source:National history museum)

Fig 2: Several decorative artifacts influenced by lotus in Luy Lau from the 2nd to the 10th BC (image source: Ph.D Dang Hong Son from the Archaeological Institute)

2. Materials and Methods

Definition: "Terracotta" or "Earthenware" is an architectural material made from fired clay. When clay is fired, it undergoes a series of chemical reactions, making the clay denser and harder. "Decorative earthenware" is a fundamental material for ornamentation in ancient art. It is also used widely as a decoration element in architecture.

To analyze the characteristics of architectural terracotta, an interdisciplinary approach including visual arts theory, historical and cultural symbol anthropology is implied attentively. Along with statistical and classification methods, the application of terracotta is prudently considered. As a result, the essential aspects of earthenware, for instance, forming method, function, and decorative regulation in Vietnamese ancient buildings are clarified, as well as the significant changes from bisque fired to glazed fired throughout history, which contributes to the distinctive beauty of Vietnamese aesthetic decoration in architecture.

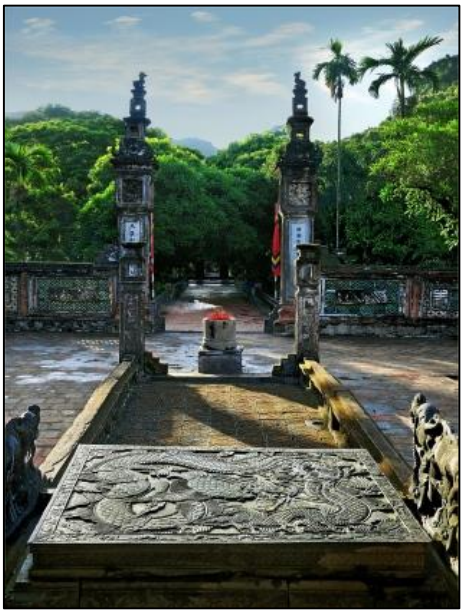
3. Results and Discussion

Terracotta in traditional Vietnamese Architecture

Terracotta is featured in most forms of traditional Vietnamese architecture, from forts, palaces, temples, pagodas, shrines, houses to tombs… Different forms of terracotta bricks include: building bricks, floor tiles and wall tiles, terracotta roof tiles include: conventional roof tiles and decorative roof tiles. For each type of building, different types of bricks and tiles are produced with different characteristics and in different formats. In the history of architecture and construction of the Vietnamese people, bricks and tiles were often mass-produced and supplied for conventional construction projects, but in some cases, they were specially ordered just for that building or were manufactured on-site.

Each form of terracotta brick or tile used in traditional Vietnamese architecture is further separated into multiple types. Some types of conventional roof tiles are: scalloped, lotus-shaped, sharp-tipped, round-tipped, scaled, double tiles, tube, square, etc;.These are used in basic construction. Decorative roof tiles were even more varied and are often placed in several specific positions on the buildings such as the ridge, the roof tips, the top of the roof and are decorated with religious figures and symbols in Buddhism, Confucianism… Artifacts uncovered in the Thang Long Royal Palace heritage site in Ha Noi revealed roof tiles themed after dragons, phoenixes, Plantago leaves, lovebirds, lotuses, chrysanthemums, confederate roses… which were placed around the building where the artisans saw fit. These decorative tiles will be further discussed in chapter 3 of the article.

Building bricks and floor tiles are equally varied. Buildings bricks are divided into two main types: 1 - rectangular brick blocks used to construct walls and thin brick plates used to tile the outside of the building; there are bricks whose shape is made based on the contour of grapefruit, used for arches; 2 - square bricks used as floor tiles (image 12-13-14). There are also specially shaped bricks based on the position, purpose and requirement for which they would be used. Floor tiles may or may not have been decorated based on where the tiles would be installed to create a system of internal pathways within the building. In important construction projects, the installation of decorated tiles was meant to elevate the architectural value for the building as a whole. For example, the row of lime flower-themed tiles from the Tran dynasty (13th century) in front of the Doan Mon Gate of Thang Long Royal Palace was meant to emphasize the most important entry point into the palace; The Dinh and Le dynasty shrines in Hoa Lu, Ninh Binh also featured the same row of tiles (image 1). This shows that bricks are more than just a type of construction material but can serve as an indicator of the importance of that building.



***Source*:** http://trangandanhthang.vn/]

Fig 3: The ancient palace entrance tiled with lime-flower themed tiles in front of King Dinh Tien Hoang's shrine

In Vietnamese architectural art, in some special buildings, bricks and tiles were more than just supportive components for the wooden frame or roof decorations but can be relied on independently for their durable nature. Terracotta took up 90% of all the material, structure and appearance of a building. It has completely supplanted stone in the construction of towers. Dau An Tower in Tien Lu, Hung Yen was completely made of terracotta bricks; another famous building in the history of Vietnamese architecture - Then Tower (also known as Binh Son Tower) in Lap Thach, Vinh Phuc was the same. These buildings are fairly recent historically speaking, with Dau An Tower being speculated to have been built during the Tran Dynasty (13th century) and renovated during the Le Mac Dynasty (16th Century). Binh Son Tower also dates back to the Tran Dynasty (Image 2 - 3). The defining feature of these towers is the artistic techniques on terracotta including shaping, molding and engraving. These decorative motifs lent a unique quality to the building as a whole. According to archaeologists, the shaping and heat treating techniques for the production of construction terracotta were taken from the Cham people and now, after many centuries, these towers still retain their ageless red color.

***Source*:** http://vinhphuctv.vn]

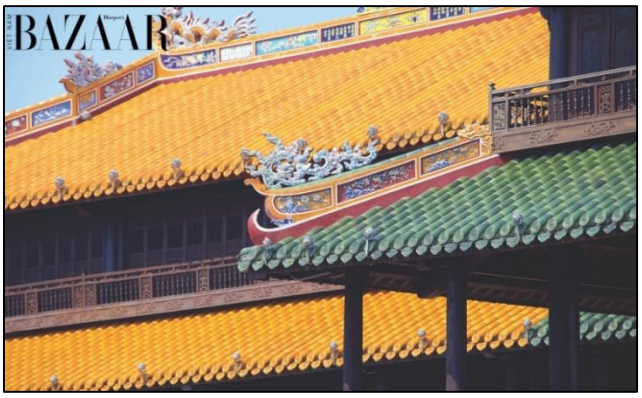
Fig 4: Binh Son Tower, Lap Thach, Vinh Phuc

***Source*:** http://vinhphuctv.vn

Fig 5: Dragon-themed decorative tile on Binh Son Tower

Besides simple terracotta with its signature reddish orange color, there is also glazed terracotta, the glaze itself being glass-based. This thin layer of glass is about 0,1 to 0,3mm thick and protects the base terracotta underneath while smoothening the surface, lowering its porousness and helping decorate the product. The quality of the glaze depends on the chemical composition, the amount of oxides present in the glaze, while the color of the glaze depends on the coloring oxide incorporated into it [6]. Glazed terracotta is superior to unglazed terracotta in its waterproofing capability and control over color. Glazed terracotta has been in use in traditional Vietnamese architectural art for a long time. It is featured in some parts of the Thang Long Royal Palace built during the Ly - Tran dynasty, besides other details tiled with normal unglazed terracotta. The glaze used here was usually monochromatic: white, blue, green, yellow. They were given beautiful names like "Kim ngõa - ngói men vàng" (hoàng lưu li) - "Golden-glazed tiles", "Ngân ngõa - ngói men bạc" - "Silver-glazed tiles", "Bích ngõa - ngói men xanh" (thanh lưu li) - "Jade-glazed tiles", "Uyên ngõa - ngói uyên ương" - "Lovebird tiles" and "Liên ngõa - ngói sen" - "Lotus tiles" [3]. The color of the terracotta represented beliefs related to fengshui or social standings, to royal opulence - "only royalty can use golden tiles for their roofs, officials and commoners

make do with grass" (An Nam tạp ký - An Nam Journal of Miscellany) [3]. Fengshui in terracotta choice is shown through the types of decorative glazed terracotta used for the Nguyen Dynasty architectural heritage buildings in Hue. The different interior buildings associated with wealth and power (lầu tía, gác son) and the gold, silver, jade roof tiles have become the predominant color for glazed roof tiles, working in tandem with the color of the wooden structure (Figure 4). (Glazed terracotta can sometimes be more than just a decorative touch but become an integral part displayed throughout the entirety of the building. For example, the well-known glazed terracotta tower in Tro Pagoda in Vinh Phuc built during the Tran Dynasty (14th century).

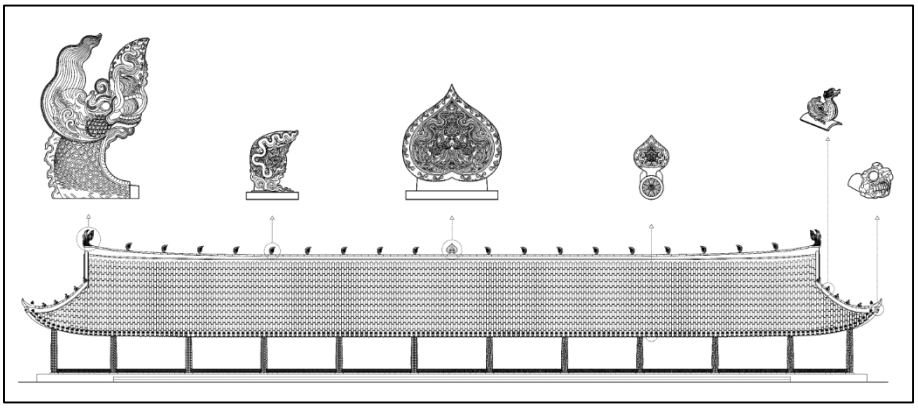


***Source*:** https://bazaarvietnam.vn

Fig 6: Hoàng Lưu Li - Golden glazed tiles and Thanh Lưu Li - Jade glazed tiles on the roof of Ngo Mon Gate in Hue

Visual art in decorative terracotta in traditional architecture art

The most unique form of terracotta with the most cultural and artistic value in traditional Vietnamese architecture is decorative terracotta. The intricacy of the type of decorative terracotta used is proportional to the importance of the building itself. The most beautiful terracotta products in the history of Vietnamese architecture mainly belonged to buildings in Hoa Lu Ancient Capital (Ninh Binh), Thang Long Royal Palace (Ha Noi), Hue Ancient Capital (Hue) and several aforementioned notable Buddhist structures. Some of these decorative details can qualify as works of art by themselves by today's standards.



***Source*:** Ha Noi Museum

Fig 7: Hypothetical diagram of the decorations used on the roof of the Thang Long Royal Palace during the Ly Tran period

Various types of decorative terracotta were used in ancient Vietnamese architecture. They were installed in various locations such as: the ends, the ridge of the roof, at the end of tube-shaped tiles, the walls, the ridge of the foot of the tower or the body of the tower… helping highlight the structure and put emphasis on the symmetry and composition of the entire design. A prime example of this is the set of decorative terracotta on the roof of the Thang Long Royal Palace built during the Ly - Tran Dynasty (Figure 6). From the artifacts uncovered in the heritage site, archaeologists have come up with a hypothetical diagram [4] of how they were installed as follows: the Plantago leaf-shaped terracotta piece was placed at the center and the highest point of the roof, with dragon-head and phoenix sculptures places symmetrically at the ends. Along the ridge laid tiles shaped like Plantago leaves but stylized to resemble flames, with dragon or phoenix motifs engraved on top. The ridges sloping towards each end were decorated with lovebird statues. Underneath the tip at the ends of the roof featured pieces with a tiger motif. The entire roof was tiled with double tiles. The tip of the ridges was tube-shaped tiles decorated with lotus/dragon/confederate rose motifs, with a Plantago leaf symbol engraved with a dragon or phoenix motif on top. Every detail on the roof from the general roof tiles to the decorative details were made from reddish orange terracotta giving the Ly - Tran Dynasty Palace a gorgeous brilliance. Through this hypothetical diagram, we can see that terracotta played a crucial role in creating the unique aesthetics of ancient palace architecture.

Visual art techniques involved in the creation of the

aforementioned architectural details were no less varied. Two commonly known styles are statue sculpture and reliefs. The type of relief technique used depends on the nature and format of the architectural detail in question. For smaller, repeated details, the artisan can use casting, molding or engraving. These techniques were sometimes used in tandem to produce the best effect in architectural decoration.

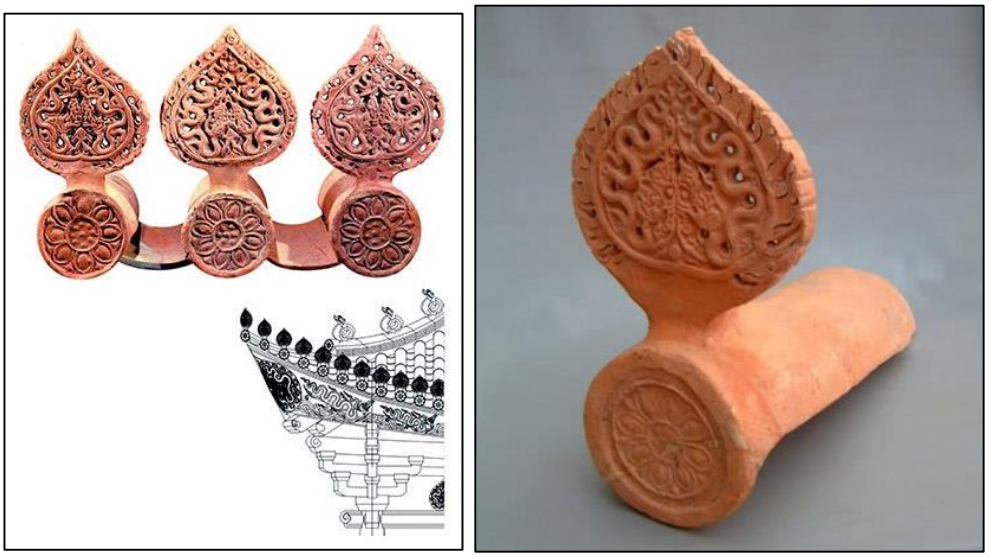
***Source*:** Figure 6: Nguyen Dinh - https://www.elledecoration.vn Figure 7: http://www.baotanglichsutphcm.com.vn]

Fig 8-9: Plantago leaf motif shaped to resemble flame using sculpting (left, from the 11th century) and casting (right, 15th century) techniques

Of the many roof decorations mentioned above, independent details such as: the central Plantago leaf, the dragon head, phoenix tip statues were all sculpted individually. However, the Plantago leaf-shaped tiles stylized to resemble flames could either be sculpted (Figure 6) or casted (Figure 7). After casting, the artisan can further adjust the product using sculpting, engraving techniques. This explains the many variations and changes between each tile even if they belonged to the same motif. The decorative tiles at the end of tube-shaped tiles were complete made by casting. The casts used to create these pieces were made from wood, then after casting, all the decorative motifs will be brought out. These end pieces usually featured lotus, confederate rose or coin motifs (Figure 8) or variations of the dragon motif.

***Source*:** Bui Thi Thu Phuong – Vietnam Institute of Archaeology

Fig 10: Decorative pieces at the end of tube-shaped tiles: lotus, coin and confederate rose motifs made by pressing the material into the cast to create raised patterns



***Source*:** Image 10 - Bui Thi Thu Phuong – Vietnam Institute of Archaeology; Image 11: https://www.hoangthanhthanglong.vn/

Fig 11-12: Decorated ends of tube-shaped tiles in Thang Long Royal Palace from the Ly - Tran Dynasty

For some complex structural assemblies, in order to simplify production, each detail is created separately then put together later, an example of which is the end of the tube-shaped tile decorated with a lotus motif with an additional Plantago leaf-shaped component engraved with a double dragon motif inside. Each of these parts would be shaped separately, then right before the heat treatment, the artisan would assemble them by kneading the clay edges together to create the complete decorative piece (Figure 11,12) [4]. This method of manufacturing greatly accelerated the production process.

The roof tip sculptures with dragon and phoenix motifs are iconic to the most sacred and dignified structures of the feudal age. The dragon head and phoenix statues (Figure 11-12) in Thang Long Royal Palace are rather large, averaging at 65cm in height. The great size of these decorations meant that the building that once stood there must have been equally massive. The figure of a dragon or phoenix holding a jade orb symbolized the sanctity, opulence as well as the wisdom and vision of the royal court. In the phoenix motif, the beak is raised revealing a jade orb between it while the dragon motif is stylized into a sine wave contained within the shape of a Plantago leaf, clutching the precious gem between its fangs. The mane of the dragon and feathers behind the phoenix are carved into an arc with wavy lines. When assembled, this method of sculpting lends a sense of flight to the entire structure. These decorations helped lend an air of prosperity to the structures belonging to one of the greatest eras in Vietnamese history.

***Source*:** https://www.hoangthanhthanglong.vn

Fig 13-14: Phoenix and dragon head statues-decorations used on the roof tips of Thang Long Royal Palace

The lovebirds motif is another vivid example of decorative roof tiles, in addition to the aforementioned phoenix and dragon motifs. While the ones found in buildings dating back to the Dinh Dynasty in Hoa Lu Ancient Capital (image 14) were fairly simple, those found in the Thang Long Royal Capital have been refined and improved greatly (image 15).

***Source*:** [5, 4]]

Fig 15-16: Lovebird motifs from the Dinh Dynasty and Thang Long Royal Palace

Along with roof tiles, bricks can also be valuable decorative components. Floor tiles, wall tiles and tiles on the foot and body of the tower. For bricks used for this specific purpose, casting and molding techniques were the most prominent. Various motifs were used for decorating these tiles such as lotus flowers, lime flowers, chrysanthemums or dragons (Figure 15-16-17) … They were designed in two ways: the first is to create the composition on each entire brick and the second is to assemble them from 4-5 individual bricks using the centerpiece as the focal point. A single tile in a lime flower motif would only be composed of a diagonal elliptical shape representing each petal with decorative chrysanthemum motifs around it. A complete lime flower motif requires 4 of them. (Figure 15).

***Source*:** https://www.hoangthanhthanglong.vn]

Fig 17-18-19: Embossed floor tiles with lime flower (15) chrysanthemum (16) and dragon (17) motifs from the Ly – Tran Dynasty

By going over the types of decorative terracotta used in traditional Vietnamese architecture through national-level heritage sites such as Hoa Lu Ancient Capital and Thang Long Royal Palace, it can be said that terracotta in decorative art has made the best use of its various strengths to create one of the most varied forms of decoration that can fully convey the values and message that their creators wished to convey.

Based on the various principles used in the construction of Hoa Lu Ancient Capital and Thang Long Royal Palace, the construction of the Hue Ancient Capital in the 19th century has made major leaps forwards. Golden and jade glazed tiles were utilized to make palaces during the Nguyen Dynasty in Hue shine (Figure 4). To decorate this royal structure, terracotta art had to move in a different direction. Besides common types of glazed ceramics such as double tiles and tube-shaped tiles, another type of ceramic was used in Hue – composite ceramic (both terracotta and porcelain) arrangements. Terracotta can now be combined with other material such as glass, paint powder and held together with binders to create a new form of beauty (Figure 18-19). Arranged porcelain paintings soon became a popular feature of traditional Vietnamese architecture after the Nguyen Dynasty. Not just in Hue, many shrines, pagodas and temples in Northern Vietnam adopted this format to decorate their three-entrance gates.

***Source*:** Le Bich

Fig 20: Decorate roof tip – Ngo Mon Gate – Hue Ancient Capital

***Source*:** Le Bich

Fig 21: Arranged porcelain, terracotta and glass painting – Chuong Duc Gate – Hue Ancient Capital

Discussion on Terracotta in Modern Architecture

Modern architectural art has evolved far beyond traditional architectural art on all fronts, such as functionality and aesthetics. New construction material like concrete, glass and steel have taken precedence over traditional material like wood, stone and terracotta. Methods of processing material have also evolved. Disregarding terracotta used in basic construction (for constructing walls and tiling roofs), decorative terracotta has fallen off in usage for major construction projects. However, current trends in architecture seeking unique, retro values or deliberately using terracotta to create a unique and personalized aesthetics for the building have given terracotta a new stage to shine on.

Terracotta in modern architecture is divided into two groups. The first is material produced using traditional methods. Roof tips or the aforementioned engraved floor tiles can be specially ordered as required. Even then, the methods for producing them have moved away from the manual laborious process in the past and moved towards industrialization in every phase, from mixing clay to casting. Newer products are more uniform, quicker to make but also lose their individuality.

The second group of material can be produced using completely modern methods to match modern architectural requirements. Modern forms of terracotta are more geometrical, simpler, but also more durable than traditional terracotta. They are no less varied than traditional terracotta, from tiles to bricks, glazed to unglazed, meeting most requirements set for them.

The use of terracotta in modern architecture also depends on the type of building itself. For renovation and restoration of ancient structures, traditional terracotta would be used to preserve the original values of the building as much as possible. For constructing new retro style buildings, a mix of traditional and modern terracotta could be used. The latter is divided into two main types: buildings that wish to retain their original functionality such as shrines, pagodas but rebuilt following traditional formats, and therefore would require exclusively traditional material, including terracotta. The second type includes new buildings that choose to adopt a traditional style. They are usually found in tourist attractions, resorts, cafes, restaurants [4] Architects employ terracotta here to create a relaxing, warm atmosphere.

For modern architecture, industrial terracotta is used to convey a different artistic language. That is the language of color. Underbaked or overbaked terracotta can be left as is, lending their unique blend of colors to the walls they are used in. Glazed terracotta also helps change the shade of the building to the will of the architect. Modern decorative terracotta mosaic is effectively used in tiling bathroom floors, pools, tanks or put on walls... Buildings that make use of them are fairly common but are usually those with specific cultural and historical values featuring large scale mosaics [4]. Terracotta arrangements are also used for décor.

Furthermore, in order to change the architectural language of the structure, architects may choose to change how they arrange and tile a single unit of terracotta to convey a different message for the surface of the building. In the same vein, different types of floor tiles, decorative ceramic, ventilating tiles, ceramic sculptures…are also utilized to

create highlights in modern architecture.

4. Conclusion

Terracotta is a traditional material with a long history and various advantages, commonly used in traditional as well as modern architecture. Studying traditional terracotta will play an important role in helping adopt advancements in technology and visual art to continue to make use of it in different forms of architecture. In modern architecture in particular, cross-referencing multiple sources might give architects more options in how to make the most informed choice of which material to utilize. Usage of terracotta in modern architecture helps add new value, not only in terms of beautifying buildings but in giving the language of terracotta a certain rusticity and warmth without losing any of its opulence.

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