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Chapter

Introductory Chapter: Bricks between the Historical Usage and Sustainable Building Concept

Amjad Almusaed and Asaad Almssad

1. Introduction to the thematic area

Bricks are the most frequent ceramic product and may be found in antique and modern structures. Together with stone and concrete, they are among the most used building materials [1]. Reading through history, we may see that throughout the Stone Age, cave dwellers erected structures for a variety of reasons out of fragments of rocks and boulders of various shapes; Menhirs, dolmens, and cromlechs have survived to this day—stone constructs used for religious purposes. Dwellings and fortresses were constructed from unhewn natural stone, the shards of which were piled on each other without any order. Brick is a common antique building material that has been used from ancient times, such as in Egypt’s ancient dwellings, Rome’s Colosseum, and many sections of China’s Great Wall. One of the earliest construction materials is brick [2]. It was utilized in Mycenaean civilization, ancient Greece, Rome, Central America, and other ancient constructions. The oldest, used in prehistoric times, is dry masonry of irregularly shaped stones. Soil is a natural building material that can be seen everywhere, and it also has its unique style in traditional architecture. Like wood, stone has been the primary building material since ancient times. It has been used as a construction material since prehistoric times. The actual art of brickmaking may be observed in the great range of textures and surface treatments, which constitute a distinctive mark of each maker. Brick is now employed for resistant buildings, regular internal walls, interior or outside surface decorating, pavement, and even modern art installations. No other building feature provides as many opportunities for producing one-of-a-kind architectural effects. The most ancient type of bricks in the Western Hemisphere is a type of bricks as adobe [3]. Nicolas Durand et al. affirm that the precipitation of calcium carbonate is common in soils and regoliths, especially in soils of arid environments [4]. At the same time, calcareous porous clay can be found in dry regions worldwide but is mainly mined in Latin America, Mexico, and the southern United States are all included. Manzanilla et al. argue that the ancient Aztec tribe built the Pyramid of the Sun out of adobe in the fifteenth century and that it still stands today. In contrast to modern brick, ancient brick was square and flat (sides 30–60 cm, thickness 3–9 cm) [5]. There are generally two types of masonry: brick and stone masonry. Brick masonry: a type of masonry that uses bricks. However, masonry is further divided into “clay work,” which uses clay to fill various joints with bricks to build walls, and “cement masonry,” the cheapest type of masonry. Masonry: this is the art of building with bricks or stone. The ability of masonry to
support the load imposed by the structural elements above it is called strength. Bricks are made of clay, shale, shale, and other materials that are crushed and pressed manually or mechanically. After drying, they are burned with an oxidizing flame at around 900 degrees Celsius [6]. Calcined bricks have varying hues depending on the kiln temperature and are extensively used worldwide as a simple, sturdy, and economical building material. Dimensional standards make it incredibly adaptable, and structures of all sizes may convey a nice texture practically throughout human history. The ability of masonry to maintain its position under horizontal load is called stability. Chen think that in the clay-rich river meadows of the Nile valley, people began making artificial bricks from clay much earlier using molds, which were solidified by mixing in chopped straw and camel dung. This technique is probably around 15,000 years old [7]. Almusaed and Almssad, wrote that a significant leap in development occurred with the “invention” of burnt brick. One is sure today that already around 4000 BC. Bids fired in Mesopotamia were known around 3000 B.C [8]. Bricks of various hues might be manufactured. According to the findings of excavations in Mesopotamia, Egypt, and other “cradles” of civilization, there were brick constructions long before Christ. Egypt’s oldest burnt brick constructions are from the third and second centuries. They were constructed in Almusaed and Almssad, believe that the people who built such bricks simply took clay soil, soaked it, kneaded it, mixed it with different additions (straw, manure, chips, etc.), and dried the formed mass of butter in the sun after densely using the wooden forms with considerable force [9, 10]. After thousands of years of development, the brick has retained its virtues. Augustine Uche Chukwu Elinwa argues that when bricks were formed from silty soil with crushed straw in ancient times, and subsequently when low-melting clays and loams were mixed with sand, sawdust, ash, and other mineral components, the clay, water, and sand constituted the foundation of the “brick test” [11]. Brick has played a significant part in the history of world architecture. Construction methods employing bricks and stones are always changing. Brick’s productivity has increased with time, making it the most preferred building material. Brick structures were frequently employed in civic and industrial constructions in the eighteenth century. Later, brick buildings were used to create warehouses, factories, and other infrastructure [12].

This chapter will discuss and analyze historic and modern buildings that use masonry as the main construction material.

2. Brick components and classification

A brick is an artificial stone that is formed into bars. After the fire, it is made of mineral components and develops stone-like qualities that effectively construct quite large structures, particularly country low-rise cottages [13]. Clay bricks are created from local resources, are inexpensive and long-lasting, and provide benefits such as fire protection, heat insulation, sound insulation, and moisture absorption. They are frequently employed in civil building projects. Initially, clay was utilized as a raw material to create bricks, but red clay with poor fertility was used in agriculture. This red clay brick is highly durable, and laterite bricks may have been found in many early human civilizations. However, because of the expansion of the industrial revolution and the emergence of environmental concerns in the twentieth century, people began to employ new raw materials to manufacture industrial bricks that did not require fire. Silicate brick, according to the production procedure, controls around 10% of the market. This type of brick is made by pressing a combination of slaked lime and quartz
sand into a hardened lime mortar in an autoclave. Silicate brick comprises 90% lime, 10% clay, and a tiny number of additives [14]. Bricks come in various hues, including blue, green, and purple. A specific number of pigments must be added to accomplish this. However, silicate brick’s natural coloring is white or light gray. The advantages of such a brick are its inexpensive cost and capacity to give a range of shades. However, there are considerable limitations, including that it is a big brick, not robust enough, readily transfers heat, and is not water-resistant. This sort of brick is only utilized in the construction of partitions and walls. It is inferior to ceramic bricks in this regard [15, 16]. Brick made of ceramic. It’s made by heating clay. Strength, fire resistance, good soundproofing, durability, the capacity to balance temperature variations, and not absorbing dangerous elements from the environment are all advantages of this type of brick. According to the application’s features: Construction. Load-bearing walls and partitions are constructed using bricks, which are then encased, plastered, and painted. Facing (front, façade) (front, facade). It features large voids in the “body,” contributing to the brick’s improved thermal insulation capabilities. These bricks also offer great soundproofing capabilities [17]. A textured brick has a relief pattern on the surface. This type of brick is used to finish interiors and exteriors. Textured brick and shaped are two variations. Textured side faces have an irregular relief or a consistent geometric design. Shaped bricks occur in various forms: angular, beveled, semicircular, and notched. You may use this kind to create columns, vaults, and arches, as well as beautifully embellished cornices and windows. Furnace. This type of brick is constructed from refractory clay. It comes in a wide range of sizes and shapes [18]. Regarding the process of using the waste and broken bricks can be utilized as concrete aggregates. It produces lightweight, high-strength, hollow, and considerable blocks to address the disadvantages of typical clay bricks, such as small size, self-weight, and soil consumption [19]. Lime-sand bricks are created in proper proportions of lime and quartz sand, sand, or fine sandstone, which are pulverized, combined with water, semi-dry pressed, and autoclave cured [20]. Fly ash bricks are created by batching, molding, drying, and roasting using fly ash as the major raw material, combined with coal gangue powder or clay and other cementing materials, and may make full use of industrial waste left over while saving fuel.

3. A review on the historical use of bricks in high-value buildings

3.1 Brick work in old cities

Bricks, also known as masonries, are cuboid construction elements burned from the earth and were known as smelting tiles in ancient times in Mesopotamia and Egypt. Bricks, often gray or red brick in color, can be used as ornamental patches on walls or as accurate load-bearing structures and are the primary building materials for local residences, churches, and institutions in earthquake-prone locations. Brick represents the first product specially made for construction, where the first bricks—mud bricks—were clay bars, which were molded in wooden frames and dried naturally in a hot climate. The oldest find, indicating the demand for brick construction, dates to the eighth millennium BC [21] (see Figure 1). These bricks were discovered in the Middle East, and structural research revealed that they were formed of clay, mud, and resin; the bars were molded by hand and dried in the sun. Mud bricks were manufactured in ancient Egypt and Mesopotamia from clay silt gathered from a few rivers. According to Pinakin Dhandhukia et al., tiny pebbles and chopped straw were added
to the raw material to boost the strength and prevent shrinking [22]. The Egyptians built the wall with dried bricks and a liquid clay mortar, while the Assyrians employed newly molded material that was subsequently bonded into a monolith. Because raw brick was so strong, it was used to build large structures. It was frequently paired with stone or charred brick. By the way, the latter was chosen not just for its greater strength but also for its natural longevity. Burnt bricks were used to construct palaces, temples, and other places of worship. According to Han, Lim Chung, et al., clay burnt bricks are commonly utilized as filler between structural frames in the building industry. Builders employ this approach because it is well-known, simple to construct, and does not necessitate the use of skilled personnel [23]. Mesopotamian cities were constructed with hewn-dried bricks and lime and gypsum mortar. Many localities have employed clay mortar [24]. Pozzolana, a hydraulic binder, was used for construction mortar in ancient Rome. It was built with hewn stones and ceramic brick masonry; residential homes and other domestic constructions were built with various additions of dried, unburnt clay bricks. The petrology of these samples can disclose a plethora of information, not only about the processes occurring in these lime-ceramic combinations but also about the nature of the pottery employed as an ingredient [25].

According to Kadim Hasoon, the ancient population of Mesopotamia in Iraq (from the Stone Age, 150,000–8000 BC) is one of the earliest civilizations known. After that, they were Old Stone Age (Paleolithic) (150,000–12,000 BC): Around 100,000 years ago, humans lived in caves in northern Iraq and made their instruments out of stones. In Sulaymaniyah, the oldest caves are Zerzi cave and Hazar Murd cave. 1 The entrance of one of the most famous caverns in the Zagros Mountains, “Shanider,” is 8 meters high and 25 meters wide. From the interior, it measures 40 meters long and 53 meters broad. 2 Clay brick masonry is one of humanity’s oldest and most lasting construction methods [21]. Brick burning was invented by the ancient Sumerians thousands of years ago. Images from South Iraq demonstrate how bricks were collected and constructions were built with them. Furthermore, the difference between that and the construction location is not considerable. The ancient Sumerians utilized a triangle to check the correctness of the wall building, according to Rossi C. and Almusaed, and the bricks were worn on the yokes [19, 26].

The underlying notion of building construction has remained virtually unchanged [27]. In China, for example, there are two primary forms of masonry used as
construction materials: sintered bricks (clay bricks) and non-sintered bricks (lime-sand bricks and fly ash bricks). Clay bricks, according to Amin Al-Fakih et al., are formed of clay or shale, with coal gangue powder as the significant essential ingredient. To manufacture it, it must go through mud treatment, molding, drying, and roasting operations [28]. “Bricks and tiles from Qin and Han”! This is because ancient China’s Qin and Han dynasties were periods of outstanding architectural adornment. The technology, manufacturing size, quality, and decorative variants of brickmaking have all advanced significantly [29]. Opus maxima is the last kind of Roman stone-work (layered masonry). This idea means that the wall was constructed of various materials, often alternating layers of brick and stone (see Figure 2).

The use of brick in Mesopotamian and Ancient Roman architecture is highly significant, particularly in the province of Ancient Italy ruled by the Etruscans. They constructed their temples from raw bricks and embellished them with terracotta features. Brick in such structures is already taking on a more recognizable elongated form for us. Bricks are unusual among Mesopotamian artifacts because “textual evidence attests that they integrate standards of length, area, volume, capacity, and weight—a very uncommon combination in the history of pre-modern metrology.” Different laying methods were utilized in Greek dwellings for a thousand-year BC (according to Homer) and were made from raw dried clay bricks. For many years, burnt brick was the dominant building material in Roman and Byzantine architecture. Brick work was completed on lime mortar with crushed brick chips added. Occasionally, stone rows would alternate [30]. Europe gratefully absorbed the experience of peoples and millennia. On the territory of Germany, brick gave its name to a whole style of architecture—brick Gothic dominated here during the twelfth to sixteenth centuries. Bricks were first acknowledged in Europe in the fourth century. According to Dmitriy Yakovlev et al., it was used to build castle walls, temples, towers, and furnaces. Plinths were thin, heavy slabs of varied sizes used in the eleventh and twelfth centuries. In the fifteenth century, a brick in the shape of a bar arose, like the present one [31]. Many European towns have historic brick cathedrals that serve as examples of European architecture. The material’s reach was enlarged in the Middle Ages; it was
also employed as a decorative and expressive means: craftsman constructed patterned brickwork from curved (shaped) glazed bricks [32]. As an example, let us cite the European patterned architecture of the sixteenth to seventeenth centuries. In the middle of the nineteenth century, production was nevertheless mechanized: a belt press was used for molding, and a ring kiln was used for firing. In the same years, the dimensions of the brick stabilized (the format, however, with some rounding, has been preserved to this day). Most brick buildings in Europe were constructed from crudely processed natural stone in the tenth to twelfth centuries; brick was only employed in a few facilities to level the masonry. With the advancement of brick manufacturing technology, the use of lime mortar for clay laying is becoming increasingly frequent. According to Maldonado, Noemi, and others, the masonry of the time was marked by a significant thickness of the seam: the masonry mortar was created from broken bricks and was noted by exceptional strength. Until the sixteenth century, as brick construction technology advanced, the ways of installing hewn natural stone continued to improve everywhere [33]. By the early seventeenth century, brick had firmly established itself as the primary material for the construction of residential structures. The size of the brick was practically current for the period but varied from maker to manufacturer. Even back then, builders and producers began to consider the necessity for a single-size standard for bricks. According to Joseph and Tretsiakova-McNally, it was conceivable to make a uniform raw brick in the second half of the nineteenth century: a set of standards for state-owned companies arose, limiting the size of an already fired product rather than a raw brick [34]. Emmitt and Prins consider that in the 1930s, it was also considered necessary to fill the vertical joints

Figure 3. Shows the St. Pancras Renaissance London Hotel & St. Pancras railway station designed by arch. George Gilbert Scott.
of the masonry with mortar, which guaranteed wind proofs: this work was detailed and required a lot of time and effort [35]. In the United Kingdom, the neo-Gothic style was evident in Victorian architecture, including railway stations, residential structures, government buildings, public institutions, and cathedrals. Isabelle Cases confirms that the distinctiveness of Victorian architecture originates from the fact that it still accounts for a significant amount of Great Britain's current constructed history. Many well-known public facilities, churches, and stations, as well as entire streets and neighborhoods and even specific urban planning decisions, were built during the Victorian era [36]. One of the most striking examples of this direction is the Midland Grand Hotel (today the St. Pancras Renaissance London Hotel), which also serves as the facade of St. Pancras railway station. Architect George Gilbert Scott designed it with the participation of engineer William Barlow (see Figure 3). The hotel's main façade is made of unbaked brick and covered with chimneys and crenelated gables, thus contrasting with the station's minimalist landing stage [37].

### 3.2 Brick used in early modern architecture

With the resurgence of cities around the end of the tenth century, brick apartment structures on two or three stories with workshops and stores below began to be erected. Patterned masonry was created, and it frequently employed brick with a figured surface that was coated in a strong, lustrous finish. True, it was expensive, and only wealthy clients—monarchs, monks, and great feudal lords—could afford it. Brick has been employed as a fundamental aspect of architecture by architects across the world and throughout history. Great exponents such as Antoni Gaudí, Puig i Cadafalch, and Domènech i Montaner developed a place with its own individuality in the Mediterranean: a land of bricks [38]. Today, Spanish contemporaries such as Rafael Moneo, “brick magicians” such as Uruguayan Eladio Dieste, and recent Pritzker laureates such as Paulo Mendes da Rocha and Glenn Murcutt employ brick as a building technology. Brick's ability to act as a structure and an enclosure is one of the “keys” to understanding it as a modern material. For most of architectural history, these two jobs were carried out by masonry: the building of a supporting structure that has steel or concrete reinforcement. Architects and theorists held different viewpoints on the brick in the twentieth century as a result of the division of duties made feasible by the end of the nineteenth century.

Nevertheless, use of the brick persisted throughout the twentieth century, and it was integrated into virtually every architectural style. Nevertheless, numerous paths and methods of valorizing the “traditional” brick in connection to modern materials such as steel and concrete may be recognized. A first tendency is the reinterpretation of brick in the spirit of modernist ideas, even if it is employed in load-bearing walls, with a preference for basic, relatively plain surfaces; Daniel Burnham's design for the Monadnock Building in Chicago 1889 exemplifies this direction as shown in Figure 4. From the Wainwright Building, a second, more detailed direction may be observed (Louis Sullivan, St. Louis, 1890) [39] because the bricks have been built such that they might propose a hotel timetable from behind. Sullivan's approach, viewed as an example of “sincerity in design,” had a tremendous effect on early twentieth-century architecture (see Figure 5).

A third option was influenced by the design of nineteenth century enterprises with load-bearing brick walls. The constructions in this category are distinguished by large flat brick surfaces, functional volume distribution, and specific load-bearing components, such as “pillars” made of wood or cast iron. Their architecture combines
classic and contemporary elements. In the context of “expressionist” architecture of the early twentieth century. Between the wars, a youthful school of European Modernist architects experimented with new spatial notions based on Cartesian orthogonality, intersecting planes, and abstract cubic forms using brick. When the
bearing brick was employed in Modern architecture, it was usually coated with a smooth coating of plaster. Architects in the United States appeared less engaged in the ideological conflict between emerging Modernist aesthetics and the usage of traditional materials. Brick was employed as the primary building material (American Standard Building, 1923), but it was also used in conjunction with steel (Crysler Building, 1930). Following WWII, the use of brick—both in load-bearing walls and in enclosures—was “revitalized” because of a new interest in raw materials that may be represented in a very direct and forceful manner [40].

The load-bearing brick, whether wall, pilaster, or arch, had a little influence on twentieth-century architecture. It is critical to understand how architects employed bricks throughout history, a technical study of brick manufacture and masonry, and an essay on architectural and cultural history. The brick approach was used by modernist architects such as Louis Kahn, Alvar Aalto, and Renzo Piano to provide rich content. In addition to cathedrals, country residences, temples, and mosques are shown. Louis Kahn for example built his own profound, mystical, and everlasting work style over 50 years, steadily ascending to the ranks of architectural masters. He built more than 10 masterpieces in the last 15 years of his life, which established the size and standard of American architecture and dramatically affected the evolution of American architecture. He didn’t leave many structures, but practically everyone has become a “Mecca Holy Land” for architectural aficionados. They are breathtakingly gorgeous, with clean geometric designs, raw and honest materials, and lovely light-created spaces. His career was not prolific, but his best works were unique and displayed their beauty in shocking new ways. “You asked Brick: ‘Brick, what do you want to be?’” he wrote on his use of brick in his work. “I adore arch coupons,” Brick told you. “Look, I also want arch coupons, but arches are costly; I can purchase them if you put a concrete lintel above the opening,” you remarked to Brick. Then you ask, ‘Brick, what do you think?’ “I adore arches,” says Brick.” Louis Kahn’s. Dan and Dianne Chrzanowski, originally from Cleveland, had the opportunity to live out their love after more than 20 years of studying Frank Lloyd Wright’s work by becoming the owners of the Wright-designed Dobkins House, a house in which the architect employed brick to express its message [41].

Brick was most noticeable in non-load-bearing enclosures in the postwar period. Industrial structures of the nineteenth century with load-bearing brick walls Modernist works accepted the evident brick closure as a compromise; the historical resonance of its texture is completely absorbed into the Modernist language. “Post-modernism” makes exaggerated or humorous allusions to the tradition represented by the brick in the second half of the twentieth century; architecture is less bound by modernist formal aesthetics and more openly related to the historical past [42]. In Europe, different postmodernism arose, as opposed to the United States: the “essence” of bricks—weight, resistance to compression, solidity—were recognized and employed in an old component synthesis framework.

3.3 Brick in post-modern and contemporary architecture

Brick manufacturing frequently uses a lot of natural resources. Reusing industrial wastes to create sustainable bricks is a recent development in research and application that aims to lower the carbon footprint of the brick production sector [43]. Nevertheless, brick remains a popular and commonly used building material. But to develop a chic and distinctive place, interior designers and decorators are constantly rediscovering him. Brick is now frequently utilized as a decorative element in the shape of a brick wall, which may make an interior stylish and pleasant. It should be
mentioned that not everyone likes indoor brickwork. Some people think brick in the inside is too rough; others think brick in the interior looks dreary.

On the other hand, most enthusiasts of mixing solidity and unfettered creativity are content to employ a brick wall inside their structure. This innovative method is appropriate for practically any home design. Nonetheless, the brick wall is frequently the focal point of the living area. Surprisingly, it will serve as a good foundation for current technologies (e.g., a plasma TV). Furthermore, a fireplace will seem quite natural next to a brick wall. Because brick is a raw material, it is safe to use in the bedroom and nursery. You may create the sense of a medieval cell in the bedroom by decorating the wall at the head of the bed with a brick. Because of its heat resistance, a brick wall will be helpful in the interior of the buildings. Brickwork, for example, may be utilized in the kitchen, where it symbolizes a new value in modern design, and it is also fitting because stoves and chimneys are typically installed there. A brick wall is usually the focal point of the space (see Figure 6). Preliminary heat treatment is applied to this construction material. As a result, the brick isn’t terrified of mold [44]. Such a wall will look excellent and preserve its original aspect even after many years.

The use of a brick wall in the inside of a building is one of the most popular decorating ideas. Most importantly, such a decorative feature is appropriate for both rural and loft designs. The growing popularity of old industrial buildings aided in the growth of brick interiors, and the brick wall formed the foundation for the loft design. Brick is frequently utilized to accent one wall in modern homes that must be noticed. A brick wall remains a dynamic part of the interior even if it is not red brick, but rather yellow, white, or gray. Facing brick is one of the most popular materials for completing unique and unusual interiors. It might be matte, aged artificially, or glazed. To adhere the brick to the wall, use the same glue as you would when working with imitation stone. The seams must be sealed with a tone-matching tile grout. Because facing brick is lighter and thinner than natural brick, it conserves usable area and is ideal for facing tiny rooms and thin walls. There are several methods for decorating rooms with bricks. Still, when designing your interior, choosing a strategy that suits the room’s original data, the eventual aim, and your financial capabilities is preferable. Traditional load-bearing masonry building technologies encountered

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**Figure 6.**
*Shows modern Kitchen brickwork.*
new structural and environmental control systems and new functional, spatial, and aesthetic criteria over the twentieth century [45]. Nevertheless, the brick has continued to be used mostly for closings, despite competition from more contemporary and technologically complex materials, demonstrating that its “non-structural” features are still valued: cost-effectiveness, flexibility, durability, impact resistance, and, last but not least, appearance. Furthermore, in the context of current concerns for “sustainable” architecture, the “ecological” qualities of ceramics—as a “healthy” material with a low environmental impact—as well as the ecological control capacity of the massive wall, bring the single-layer masonry back to the forefront, but based on products with improved performance.

4. Bricks between traditional using and environment

The designer should recognize the need to return to healthy construction materials. Construction materials must be made or processed in the near neighborhood, requiring the shortest possible transit pathways. When producing building materials, as little energy as feasible is consumed. The rawer materials that are changed, the more electricity is required. Brick is a common raw material in Scandinavia, and its durability and low cost make it one of the most extensively used and recognizable raw materials in Scandinavian architecture. Modern architects frequently include conventional construction materials and modern discoveries and technology into their buildings. On the other hand, materials such as brick, wood, and stone have long been utilized to produce both basic and distinctive structures. Brick has distinct qualities that contribute to its continued use as one of the most frequent building materials [46]. A human views ordinary brickwork differently from a concrete wall. A concrete wall conveys monotony, but a brick wall conveys vitality. Throughout history, brick has been used to bring beauty and utility to places by providing protection for internal spaces while allowing natural light and circulation to penetrate. Today, architects and builders have many options when it comes to building cladding materials, and no matter which option they choose, they must find a balance between their architectural vision and the needs of their customers. Durability, minimal maintenance, and long-term sustainability have always been essential assessment factors, in addition to the aesthetics and qualities of the chosen materials.

The brick wall perfectly withstands such loads. This material is also suitable for constructing walls and interior partitions. Various hinged structures and objects are well attached to such walls with the help of dowels and nails. A brick wall is characterized by high thermal inertia; it cools slowly and warms up slowly. This means that the air temperature does not change much in houses with such walls during the day. Walls below the level of waterproofing can only be made of clay bricks, well-fired. And the corrugated surface of the brick is an excellent basis for applying plaster and bonding various mortars together. To create complex architectural forms, the construction of buildings with columns and vaults, and solid bricks are also used. In this case, it is necessary to construct supporting columns for the burials of towers and domes. The strength and durability of brick make it the best material for this purpose. Therefore, both earlier and now temples and churches are built of brick. Brick is also an ideal building material for building basement walls. A feature of basements is the frequent contact of their borders with soil and groundwater. Therefore, the walls are subject to constantly changing temperatures, moisture, etc. Material properties such as strength, resistance to moisture, and other natural influences make it ideal for building basements of buildings.
Brick new construction Ceramic and silicate bricks are the two varieties employed in constructing new brick constructions. The more costly ceramic brick performs admirably, being incredibly resilient to heat and moisture. Although silicate brick is substantially less expensive, it cannot withstand high humidity and extreme temperature changes. Currently, hollow bricks are the most common type. Their low weight and superior thermal insulation are their key benefits. The brick material, which is extensively used across the world, is not only recyclable and extremely resistant to natural dangers such as fire, storm, and moisture, but it also has a high degree of ease of use in size, form, color, and texture, as well as a cheap cost and high adaptability. Environmentally friendly building materials are given less attention. It is difficult to achieve environmentally responsible construction without employing ecologically friendly goods and resources. Brickwork is starting to be used for larger projects and public buildings and complexes; new materials and forms are appearing and being created, and construction site robots are faster and more precise than humans. All types of bricks, in comparison with concrete, are environmentally friendly and contain a minimum number of additives. Moreover, all additives in the material’s structure are non-chemical, with a low carbon footprint. According to many specialists, brick buildings are the most comfortable—they have high rates of heat resistance, hygroscopicity, and sound absorption, and environmental friendliness is also at its best.

5. Conclusions

Since the beginning of civilization, humans have been responsible for producing and using a component that has been essential to developing cultures and civilizations. There are times when we tend to forget that man cannot carry out his ambitions without the most fundamental tools. When we think about the house of our dreams, the one in which we will raise our children and enjoy the company of our grandchildren, we think about the fundamental and unbreakable labor of the brick, which settles into our lives and becomes a testament to our life. When we look at this house, we think about the fundamental and unbreakable labor of the brick. Clay bricks are currently facing technological challenges and are uncompetitive when compared with materials such as concrete, where rising environmental concerns about the accumulation of unmanaged wastes from agricultural or industrial productions have made these promising candidates for incorporation into building materials to improve their performance. Over the long history of brick existence, the primary method of creating burnt ceramic bricks has remained unchanged: clay extraction and preparation, preparation of a mixture, shaping, and, lastly, fixing the resulting shape and structure. Since then, nothing has changed in regard to the fundamental ideas of building structures. Adobe brick was once widely used in the West. It was made from porous lime clay with the addition of minerals such as quartz, resin, and other materials, and the resulting “bricks” were then sun-dried. In this chapter, we looked at bricks as a primary building material, where they are used in modern architecture, their significance in historical and contemporary architectural styles, how they are used in modern architecture, and various projects of different kinds, such as private and public facilities in various climes and other places.
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