

How Do Building Materials Obtain Their Multiple Cultural Meanings Through Architecture

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Abstract: Building materials are transformed from ordinary objects into significant cultural symbols through the work of designers in architecture. The cultural significance embedded in these materials can be perceived through the buildings constructed from them. At present, most of the research on the meaning of materials is concentrated in the field of design, while most of the research on building materials stays on the discussion of the use of materials themselves. This article will analyze two representative buildings from different cultures and materials: the stone Sainte-Foy Church from medieval Europe and the wooden Hall of Supreme Harmony from Ming Dynasty China. By examining architectural structures, cultural backgrounds, and other relevant information, rich meanings associated with stone and wood can be derived. This analysis shows that building materials have been imbued with multiple cultural significance through thoughtfully designed architectural forms and their respective cultural contexts. This conclusion enhances the understanding of the important role of building materials in architecture and showcases the endless creativity of human society.

Keywords: Architecture materials, stone, wood, material meaning.

1. Introduction

A stone lying silently on the ground may seem like just an ordinary object, despite its hardness and tenacity. However, when it becomes part of the majestic stone bricks of the Great Pyramid, it evokes a profound sense of eternity. Today, architects utilize a diverse array of materials—earth, stone, wood, brick, tile, cement, and more—to create a multitude of buildings. Some architects skillfully exploit the cultural significance of these materials and their architectural contexts, allowing the same material to convey various special cultural meanings across various structures. The Acropolis of Athens in ancient Greece created with marble, which still stands today, give marble a sense of eternity; the Westminster Hall in the UK built with stone make the stone solemn and majestic; the sleek design of the Sydney Opera House, with its white concrete shell, harmonizes seamlessly with modern architectural ideals. How do building material's get their multiple cultural meanings through architecture?

There has been a substantial amount of research on how to assign meaning to materials within the design community, primarily focusing on the materials of everyday objects [1][2]. However, studies that explore how people attribute meaning to building materials are relatively scarce. Most existing research on building materials tends to concentrate on their physical applications, lacking a deeper examination of their cultural and symbolic significance [3][4]. Small number of relevant studies often

analyze a single building material within a specific structure, with no comprehensive articles summarizing the meanings of multiple building materials [5]. Therefore, this article aims to explore one method of how people assign meaning to building materials by analyzing two typical building materials from different cultural contexts. Through this analysis, it is intended to fill the existing research gap and provide new insights for future design practices.

This article will examine this process by focusing on exemplary structures made from two typical materials: the stone Saint-Foy Church and the wooden Hall of Supreme Harmony.

2. Meanings of Stone in Church of Saint-Foy

Stone is one of the oldest natural building materials provided by nature. Its strength, durability, and rich colors and textures often make it a primary choice for construction. This widely available material is commonly used to create shelters against wind and rain, particularly in Europe. As churches developed, stone was used to build many important architectural works, among which the Church of Sainte-Foy embodies a unique understanding of the aesthetic and symbolic value of stone [6].



Figure 1: A map of the French routes of the Camino de Santiago. [7]

In the fifth century AD, Dulcidius, bishop of Agen, built a stone church to house Sainte Foy, a little girl who was beheaded for defying the Roman authorities for Christianity. The Sainte-Foy Church was built on the site of her martyrdom in Conques in southern France, which was also on the Camino de Santiago, a pilgrimage road, in medieval France [7]. For those medieval pilgrims, life was a spiritual journey. Visiting holy places meant getting closer to God. If you get closer to God in this life, you'll be closer to God in the next [8].

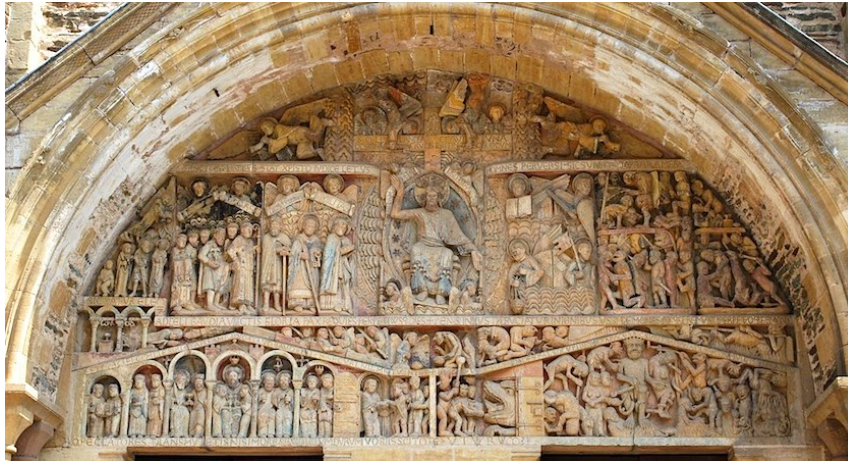


Figure 2: Last Judgement tymanum at Church of Sainte-Foy. [9]

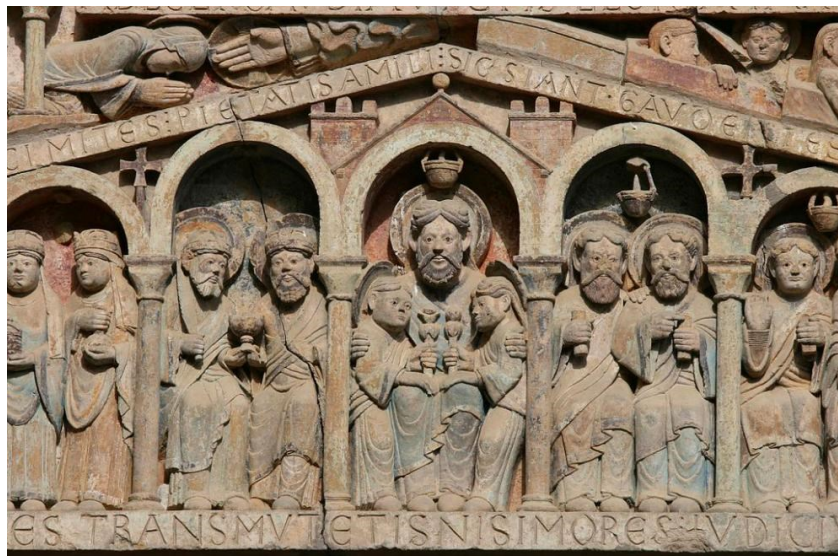


Figure 3: The blessed under the arcade. [10]



Figure 4: Hell. [11]

After several days of trekking through mountains, forests and rivers, when pilgrims arrived at this Romanesque pilgrimage church that attracted countless pilgrims in the second half of the Middle Ages, the first thing medieval tourists would do is to straighten their bent bodies and look up at the tympanum above the church entrance [9]. On the tympanum is a relief of the Last Judgment. Jesus is in the center, surrounded by the symbols of heaven. This laid the foundation for the Second coming of Jesus: Christ descended from heaven to judge the dead [12]. His right hand points to heaven, while his left hand points down to the curse in hell. Immediately on Christ's right are Mary, Peter and an entourage of other saints. It is interesting that below these saints, a small arcade is covered by a pediment, meant to represent the House of Paradise [10]. These are the blessed, those have been saved by Christ and who will remain in Paradise with him for eternity. The arcade offers them a comfortable setting, allowing them to gather in peaceful groups, creating a harmonious tableau. The stone arches not only provide protection but also signify their sanctity, akin to the halos that grace their heads. In stark contrast, on the opposite side, under the same pediment, the sinners in hell—the pagans and the fallen who defied the doctrine—are depicted with contorted bodies, as though they have succumbed to the relentless agony of their punishment [11]. Lacking an archway above, they appear to be devoid of support, their faces seemingly calm yet concealing the profound fear and regret that torments their souls [13]. We can see that in the two relief scenes, the craftsman highlighted the difference between the stones in heaven and hell by the presence or absence of the arcade. In heaven, the stone serves as an auspicious foundation, uplifting the paradise; whereas in hell, it becomes a heavy burden, weighing down the damned. Thus, the stone can have two meaning at the same time, as both light and heavy, a blessing and a burden. Furthermore, this arched structure extends beyond the relief at the door, resonating with other parts of the church.

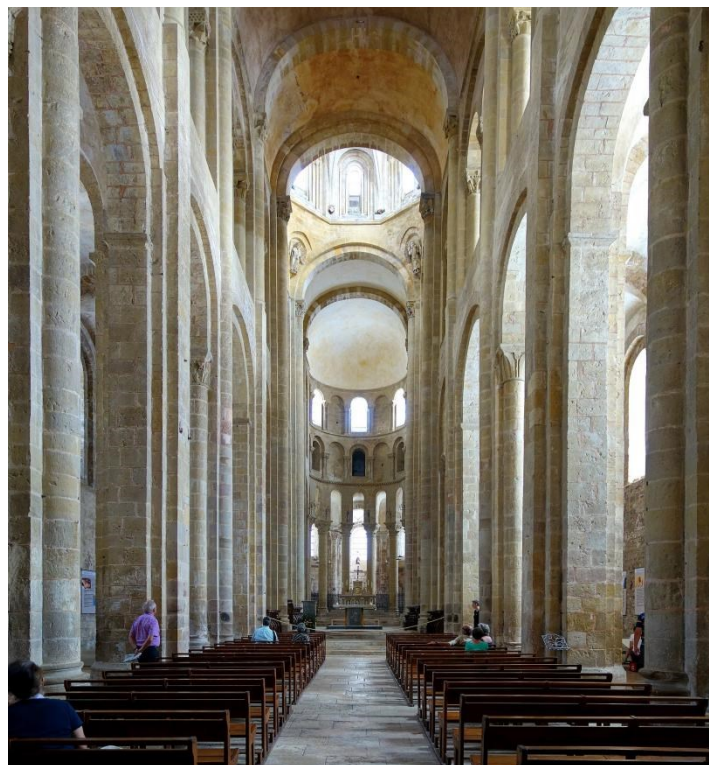


Figure 5: Church of Sainte - Foy. [14]

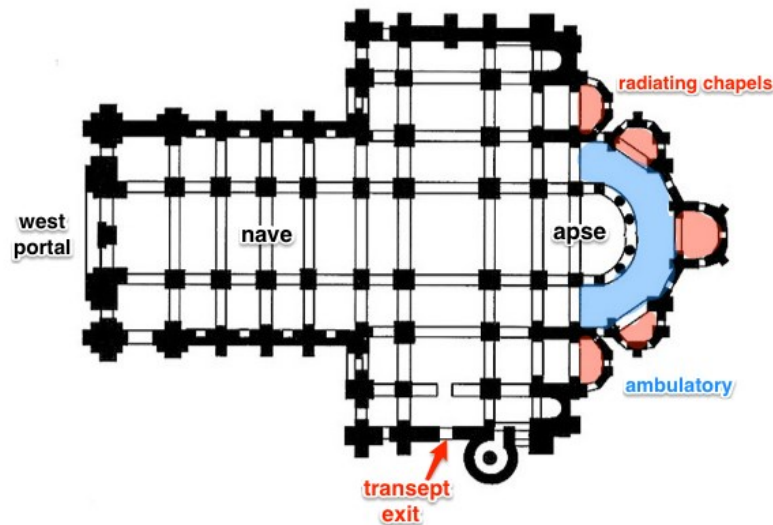


Figure 6: Plan of Church of Sainte-Foy. [15]

Beneath this exquisite relief lie two doors. Pilgrims approach the church through the door beneath the depiction of hell on the right, carrying their sins with them. As they traverse the ambulatory, they are enveloped by the soaring heights of the stone barrel-vaulted nave, which reaches towards the heavens, where God resides [14]. The arcades of the cloister echo the arcade of the tympanum, creating an ethereal passage that invites the faithful to feel as though they are truly in heaven. As they pause to pray before each radiating chapel, one by one, all their sins are absolved, freeing them from suffering and granting them salvation through divine grace [15]. There is a continuity in the meaning of stone from sculptural two-dimensional surface to third dimensional space, which also claims how the meaning of stone is not fixed but shifts. In the corner of the church, there stands a Baptismal Font, crafted from stone that shares its origins with the other stones in the structure. This font embodies the same sacred essence. As Foucault remarked, "Adjacency is not an exterior relation between things, but the sign of a relationship, obscure though it may be. From this contact, through exchange, new resemblances arise." [16] The water held within this stone possesses healing powers, a gift bestowed by its sacred adjacency with the stone. Believers kneel beside the font, bowing their heads in silent prayer. They gently touch the water with their fingers, seeking to adjacent with stone's divine essence. With reverence, they carefully scoop water into a bottle, taking it with them as a tangible reminder of God's blessings, ensuring that the divine presence remains with them always. Ultimately, they exit through the door beneath the relief of paradise, completing their sacred journey within the stone archway of this celestial haven.

The stone arch structures depicted in the reliefs and the churches designed during the Middle Ages symbolize a celestial realm that offers protection to the faithful and the stone font allows the divinity of the stone to bless the believers through water. This makes stone as light, heavy, liquid and solid all at the same time. Stone doesn't have a fix meaning, as someone like Louis Kahn would claim [17]. Through the unique cultural background of civilization and the artistry of architectural elements such as stone arches and fonts, people have ingeniously infused rich and layered meanings into these materials, transforming stone into a powerful symbol of both divine protection and moral consequence.

3. Meanings of Wood in The Hall of Supreme Harmony

Not only durable stones are used in construction and given special significance, but naturally grown wood is also influenced by people's culture, especially in East Asia. East Asia is mostly temperate

and subtropical monsoon climate, with a variety of tree species and large forest areas. There is a rich source of wood for people. At the same time, wood has strong toughness and processability, which allows wooden structures to be more stable and delicate. In particular, ancient China developed a mortise and tenon structure based on wood. People cleverly used concave and convex structures to connect wood together to achieve the effect of building a stable structure without any nails [4]. This structural technology also enabled Chinese craftsmen to create a great wooden building complex, the Forbidden City, to show the significance of wood to Chinese culture. In this city, the most representative and highest-specification palace is the Hall of Supreme Harmony.



Figure 7: Hall of Supreme Harmony. [18]

In 1403, during the early Ming Dynasty, Emperor Yongle decided to relocate the capital to Beijing after usurping the throne from his nephew. He then ordered the construction of the Forbidden City. Within this complex, the most significant building for the emperor was the Hall of Supreme Harmony, where he conducted important ceremonies, celebrations, and meetings [18]. Naturally, this hall was positioned at the center of the complex and constructed to the highest standards in the country.

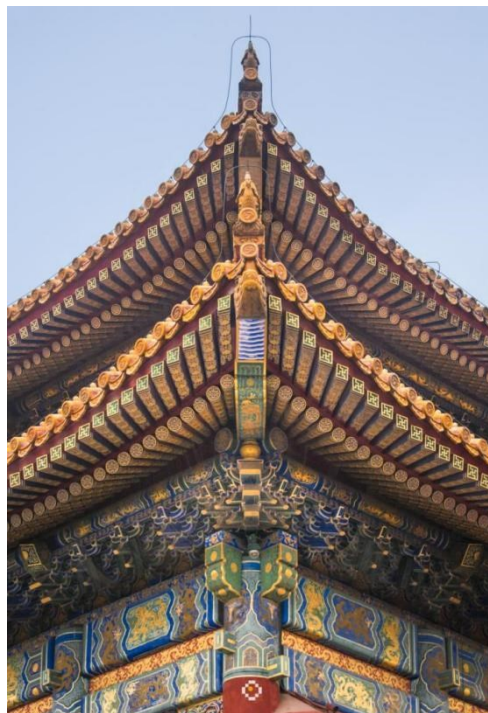


Figure 8: A corner of the brackets of Hall of Supreme Harmony. [19]

This magnificent wooden building, covering a construction area of 2,377.00 square meters and standing 26.92 meters tall, faces south [18]. All ministers would enter from the south when they came to see the emperor. Since the sun is in the south in the northern hemisphere, this layout reflects the natural law that trees grow toward the sun. Additionally, as the ministers approached the front of the hall, they would look up to admire the exquisite and beautiful structure of the brackets [19]. The bracket system consists of multiple bucket-shaped wooden pads connected by mortise and tenon joints, serving to link the beams and columns. This ingenious structure can bear the weight of the upper roof frame, transferring the load to the columns and crossbeams while enhancing the building's seismic resistance. Furthermore, the brackets protrude outward, not only facilitating load transfer but also serving as decorative elements. Their layered structure, which ascends gracefully, resembles a tree growing upward, infusing the entire wooden structure with vitality. This design is closely aligned with the Chinese concept of harmony between humanity and nature. The renowned Chinese thinker Laozi once stated, "Humans follow the Earth, the Earth follows Heaven, Heaven follows the Dao, and the Dao follows nature." [20] This philosophy illustrates the importance that Chinese culture places on the organic integration of the natural environment with human artistic expression. Just as all plants grow from the earth, architecture—being the product of human creativity—should fundamentally harmonize with nature [21]. Thus, through the overall layout and bracket structure, the woods in Hall of Supreme Harmony embody the essence of coexisting harmoniously with nature.



Figure 9: The beam painting of Hall of Supreme Harmony. [22]

What is striking is that the wood of the entire building is painted with rich colors. What we see now is of course restored, but it is basically a reproduction of the original painting [22]. The overall color uses high-brightness red, green, and gold, which are all symbols of auspiciousness and wealth. In addition, these colors and patterns reflect the strict hierarchy of the Qing Dynasty in China. The decoration on the beam of the Hall of Supreme Harmony is the Hexi color painting, which contains the golden dragon and the seal. This content is the highest level of architectural decoration painting and can only be painted in high-level places used by the emperor, such as the Hall of Supreme Harmony [23]. Painting these exquisite paintings and colors on wood makes these woods become the spokespersons of the emperor's lofty status.

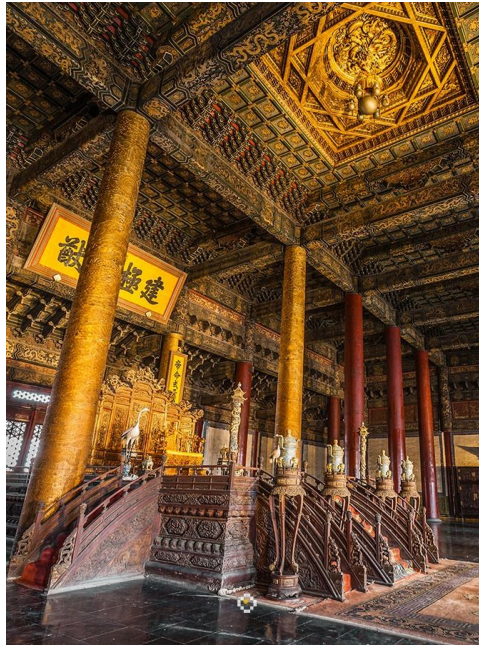


Figure 10: The interior of Hall of Supreme Harmony. [24]

When the ministers walked into the hall, the most conspicuous feature was the huge pillars, which serve as the main load-bearing structures of traditional Chinese wooden architecture [24]. Each pillar in the Hall of Supreme Harmony is crafted from a single, complete nanmu tree, 9.5 meters high, and 1 meter in diameter [25]. Those standing beneath these towering pillars can feel a profound sense of pressure, as the wood conveys the emperor's majesty. Moreover, these straight pillars evoke many virtues revered in ancient Chinese culture. Just as these woods stand upright and self-reliant, so too do they symbolize the qualities of a gentleman—straight, noble, and honorable [21]. The virtues reflected in the wooden pillars naturally extend to the emperor, portraying him as a figure of gentlemanly character. Thus, through these majestic pillars, the wood embodies the grandeur of the emperor while simultaneously celebrating the virtues that define leadership and nobility.

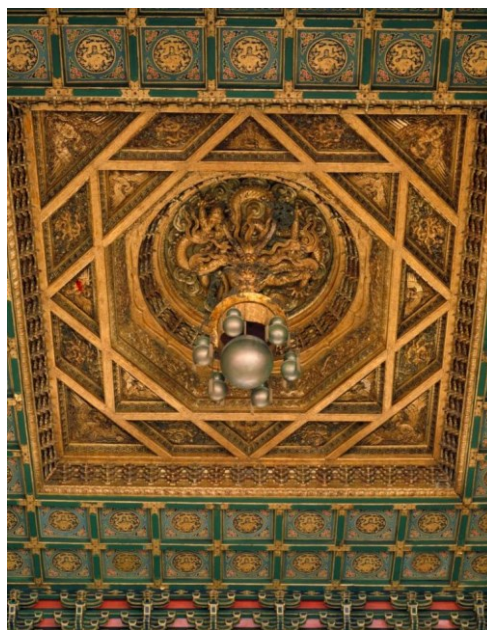


Figure 11: The ceiling of Hall of Supreme Harmony. [26]

Furthermore, there exists a special wooden structure concealed in the ceiling of the main hall that often goes unnoticed: the caisson [26]. It is widely believed that the caisson originated from the ventilation and lighting openings found in the roofs of ancient cave dwellings and serves important structural functions. Comprising multiple layers of wooden components interconnected by mortise and tenon joints, its shape resembles a well, which is why it is referred to as "caisson," meaning well in Chinese. As aesthetic concepts evolved and production techniques advanced, the caisson transitioned from a practical building element to a decorative feature. By the Ming Dynasty, it had fully transformed into a purely ornamental structure. The caisson in the Hall of Supreme Harmony, recognized as the highest-level caisson in the country, is imbued with rich philosophical significance.

Firstly, in the context of the five elements in Chinese philosophy—gold, wood, water, fire, and earth—these elements build up the world and interact through a cycle of generation and restraint. Wood generates fire, indicating its flammability; thus, craftsmen designed a well-like structure in the ceiling using wood to mitigate fire hazards, adhering to the principle that water can restrain fire. To enhance safety, they altered the properties of the wood within the caisson, imbuing it with water-like qualities, thereby providing psychological reassurance against potential dangers in housing. Additionally, the caisson is deeply embedded in the ceiling, which elevates the hall's appearance and creates a sense of spaciousness. This design fosters a meditative atmosphere, encouraging believers to transcend distracting thoughts and distance themselves from the mundane world [27]. Finally, the caisson's design is meticulously crafted, consisting of two main layers: the outer and inner layers. The outermost layer is square, followed by several layers of squares spiraling inward. The inner layer culminates in a golden dragon gracefully swaying at the center of a circle. This design reflects the ancient Chinese concept of a round sky and square earth, where the outer circle symbolizes the earth and the inner circle represents the sky. These elements are interconnected through the wooden structure, forming a harmonious world of heaven and earth. This signifies those trees, which grow upward, are perceived as messengers linking heaven and earth. And the golden dragon, swaying in the center, symbolizes the emperor's absolute sovereignty over the nation. Through this seemingly simple caisson, we can discern that wood embodies multiple philosophical roles: as a symbol of safety, a guide for souls, and a messenger connecting the realms of heaven and earth.

The Hall of Supreme Harmony, constructed from wood, features a meticulous layout, majestic beams and columns, unique brackets, and caisson structures that exemplify royal grandeur and profound thought. Through this exquisite architectural design and its rich Chinese cultural context, wood don't hold one single pure meaning but have the ability to change meaning, or harbor multiple meaning depending upon their location and form.

4. Conclusion

Stone and wood represent two distinct architectural traditions, with stone being predominantly used in Europe and wood in East Asia, but architects from both civilizations have imbued these materials with unique cultural significances, more specifically, multiple meaning depending upon what shape, location, it acquires. The stone arch structure of Sainte-Foy Church, along with Christian traditions such as the Last Judgment, allows stone to convey themes of salvation and punishment within Christianity. In contrast, the various structures of the Hall of Supreme Harmony, influenced by traditional Chinese cultural concepts like Taoism, enable wood to embody the idea of harmonious coexistence between humanity and nature. This illustrates how architectural forms and cultural narratives transform simple materials like stone and wood into vessels of profound cultural significance. Similarly, other building materials can be imbued with unique meanings shaped by diverse cultural backgrounds and architectural styles. This rich symbolism positions building materials as ambassadors of culture, illustrating the intricate experiences and remarkable creativity inherent in human civilization.



Figure 12: Guggenheim Museum Bilbao. [28]

In today's society, we have access to more new materials, and contemporary designers are increasingly combining modern concepts with architectural design to make them richer. For instance, the streamlined steel exterior of the Guggenheim Museum creates a sense of fluidity within the space, where the rigidity of steel feels as soft as water [28]. This duality is primarily metaphorical. While the steel's aesthetic qualities may suggest softness and fluidity, it remains a rigid material in its physical properties. Designers often use such metaphors to challenge traditional perceptions of materials, allowing them to convey emotions and concepts beyond their inherent characteristics. This interplay between appearance and materiality enriches the viewer's experience, creating a space that feels dynamic and inviting, even though the materials themselves do not change their fundamental nature. Additionally, architects have repurposed steel discarded by heavy industry to construct this artistic museum, imbuing the material with a profound sense of rebirth [29]. As society evolves, building materials continue to iterate, yet they remain deeply intertwined with civilization. Generations of materials convey the thoughts and values of their time, while civilization, in turn, expresses infinite creativity through these materials.

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