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A Study of Ornamental Craftsmanship in Doors and Windows of Hui-Style Architecture: The Huizhou Three Carvings (Brick, Stone, and Wood Carvings)

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Abstract: The ornamental craftsmanship of the doors and windows of Hui-style architecture demonstrates the centuries-old, intangible culture of Huizhou, of which the Huizhou three carvings (brick, stone, and wood carvings) have received increasing attention from researchers in recent years. This study aims to identify the characteristics of the Huizhou three carvings of doors and windows in Hui-style architecture in order to better preserve and develop this ornamental craftsmanship. To achieve this aim, an ethnographic design was used. The study found that the history, process, and location of Huizhou three carvings have obvious regional characteristics. This study can be useful for all stakeholders (scholars, architects, and craftsmen) in Hui-style architecture.

Keywords: Hui-style architecture; Huizhou three carvings; ornamental craftsmanship



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1. Introduction

Traditional villages in the Huizhou region of eastern China are found close to rivers and mountain ranges. Ancient people moved from the central plains to these regions to avoid war and embrace a secluded way of life. They founded communities with a traditional clan social structure and created a new culture called the ‘Huizhou culture’ [1]. Huizhou culture is a traditional and distinctly regional Chinese culture, and Hui-style architecture is the material embodiment thereof [2]. Huizhou culture originated in the early Qin Dynasty (221 BC–207 BC), developed in the Southern Song Dynasty (1127 AD–1279 AD), and flourished in the Ming and Qing dynasties (1368 AD–1911 AD). Although it began to show signs of decline in modern times [3], Huizhou culture is still regarded as a typical regional culture in China [2]. The traditional Huizhou architecture, mainly Huizhou dwellings, is an important part of Huizhou culture [4]. Hundreds of massive historical buildings of the Ming and Qing dynasties remain relatively intact in the Huizhou region [5]. Due to the mountains in the Huizhou area, there has never been an abundance of agricultural land, and feng shui principles were used in the planning and construction of the villages. Feng shui is a classical Chinese practice that focuses on how structures interact with their surroundings [6]. Due to a lack of resources, landowners find it difficult to adhere to the regulations for the preservation of architectural styles in traditional rural towns. They are unable to meet the guidelines outlined in the Principles for the Protection of a Heritage Entity, which stipulate that only minimal changes should be made to any structure [7]. Thus, the preservation of cultural ornaments becomes difficult. Moreover, with the integration of world culture, the preservation and perpetuation of traditional Chinese culture are challenging. Based on the study of the peculiarity of Huizhou architecture—to awaken memories of Huizhou culture and promote both its history and culture—those who aim to preserve it should adapt to the developmental requirements of the times. As a result, we must continue to explore and innovate in the research and design of new Hui-style architecture to make it more green and sustainable [8]. Furthermore, there has been an

exodus from rural areas due to urbanisation and urban growth. The preservation of intangible cultural assets, as well as the next generation's material and cultural environment, are being lost [9]. Traditional decorative architectural techniques, such as the Huizhou three carvings (brick, stone, and wood carving), must be preserved and protected so that we can remember, understand, and commemorate those who were involved. However, the ornamental craftsmanship of the doors and windows of Hui-style architecture, which are essential elements of Huizhou culture manifested in architecture, has gradually declined in recent times [10]. Therefore, in order to pass on and develop this ornamental craftsmanship, the Huizhou three carvings have become the focus of research by experts and scholars from various disciplines, such as architecture and city planning. In the field of Chinese architecture, for example, there is now a genre called 'new Hui-style architecture'. Chinese carving art has a long history, and it has not only endured but also flourished and evolved throughout its extensive history. Chinese carving art differs significantly from its Western equivalent due to vast cultural differences, and artists skilfully carve out certain icons, such as humans, animals, plants, and landscapes [11]. The ornamental craftsmanship of the doors and windows of Hui-style architecture is mainly reflected in the Huizhou three carving techniques. 'Huizhou three carvings' is the general term for three kinds of craftsmanship techniques: brick, stone, and wood carving [12]. For a long time in traditional Hui-style architecture, Huizhou folk artists took advantage of the natural resources in the area, such as brick, stone, and wood, to skilfully carve the ornamental structures of the doors and windows of Hui-style architecture [13]. This carving technique has developed into a highly skilled, regional architectural ornamental craftsmanship. The Huizhou three carvings are decorative carvings found in Ming- and Qing-era buildings in Huizhou that exhibit considerable regional cultural influences. The term 'Huizhou three carvings' refers to carvings made of wood, stone, and brick, and all three carving types are examples of Huizhou traditional art. She County, Yi County, and Wuyuan County are home to the best examples of the three types of Huizhou carvings, as these counties have well-preserved carvings. The three types of Huizhou carving are mostly used to adorn buildings, such as homes, ancestral halls, temples, and gardens. Additionally, they can be found in compotes, screens, pencil vases, and furniture with an ancient appearance [14]. The Huizhou three carvings date back to the Song Dynasty (960–1279 AD) and were particularly popular throughout the Ming (1368–1644 AD) and Qing (AD 1644–1911 AD) dynasties, which frequently chose carving themes with traditional symbolism, such as birds, flowers, auspicious dragons, tigers, lions, gardens, and opera figures [15]. The Huizhou three carvings combine the typical characteristics of Chinese painting with traditional arts and crafts [16]. They concentrate on the combination of the characteristics of the materials, the techniques of the craftsmen, and the culture of the folklore in Hui-style architecture to form the basic craftsmanship of Hui-style architecture [17]. These three carving types hold special cultural status in Huizhou [17]. The first impression of Huizhou culture, particularly residential buildings, is presumably made by the black and white doors, windows, and walls. This combination of colours is not selected arbitrarily. Essentially, it is related to Huizhou's politics, culture, natural resources, and environment. The carvings demonstrate how Chinese decorative architectural carving methods have been passed down since the Han and Tang dynasties. Additionally, they represent the influences of various artistic genres within Huizhou culture, such as the Xin'an Painting School, Hui School of Woodcutting, Huizhou Seal Cutting, Huizhou Inkstone Carving, and Inked Mould Carving, on the types of decorative architectural carving in Huizhou [14].

Historically, throughout the development of traditional Chinese architecture, the craftsmanship of carving has played a vital role since the birth of Chinese palace architecture [18]. Chinese palaces first appeared in the early years of feudal society, likely in the 16th century BC, and architectural structures with carved work were built on them at that time [19]. The craftsmanship of carving is usually classified into two categories: architectural construction and ornamental function [20]. This study, however, focuses on the ornamental craftsman-

ship of doors and windows in Hui-style residential architecture, which is common in the Huizhou region, and a wealth of carved work has been preserved.

This study identifies the characteristics of the craftsmanship of Huizhou three carvings through qualitative research. First, through a literature review and field survey, the history of the three carving processes is analysed to explore their development in the Huizhou region. Second, through fieldwork and interviews, information regarding the production process of the Huizhou three carvings is collected. Third, through digital modelling and deconstruction in SketchUp, the position of the Huizhou three carvings and the use of doors and windows in Hui-style architecture are analysed. Through these research steps, the craftsmanship characteristics of the Huizhou three carvings can finally be identified. At the theoretical level, this study will enrich the research on Hui-style architecture, while the study of the process and application of such carving will facilitate future research for those examining the craft of Hui-style architecture. At the practical level, this study can offer guidelines on craftsmanship for practitioners of Huizhou-style architecture and support the preservation and development of the Huizhou three carvings.

2. History of the Huizhou Three Carvings

The Huizhou three carvings are a technical system based on folk handicraft techniques [21]. They form a special craftsmanship category that gradually arose as a result of the widespread use of three kinds of building materials – brick, stone, and wood – in Hui-style architecture [22]. This is because the Huizhou region is mountainous and rich in these raw materials, which is convenient for local craftsmen. Additionally, the three carvings are considered the result of the development of residential construction techniques and craftsmanship standards [23].

The ornamental craftsmanship of Huizhou three carvings was bound by both feudal rituals and moral values, and it embodied certain characteristics of its time [24]. However, Huizhou merchants, with their wealthy families and vast industries, had a great obsession with the pursuit of dwellings. They wanted to build luxurious and elaborate houses to display their wealth through fine decoration [25]. Thus, within the constraints of social hierarchical norms, a category of decorative craftsmanship with strong regional characteristics gradually developed. Moreover, the development of the three carvings in Huizhou also greatly enhanced the overall expressive and cultural capacity of Hui-style architecture [12].

The development of the Huizhou three carvings also greatly enhanced the overall ability to convey the regional cultural values of Hui-style architecture [12]. The related handicrafts that derive from the ornamental craftsmanship of Hui-style architecture have become an essential element of the social productivity and economic status of the Huizhou region [26].

2.1. Before the Yuan Dynasty (Before 1271 AD)

As the residential buildings that contain the Huizhou three carvings have not been well preserved, most no longer exist, and information on these craftsmanship techniques were mostly obtained from the literature review. Before the Yuan Dynasty, the development of the Huizhou three carvings followed a similar path to that of traditional Chinese carving. According to historical records, and evidence of excavated artefacts, during the Qin Dynasty (221 BC–207 BC) when extravagant funerals were popular, large stone carvings of tomb channels appeared in the burial chambers [27]. These stone carvings were majestic and conveyed a sense of strength and power. During the Han Dynasty (202 BC–220 AD), auspicious inscriptions often appeared in the carvings, and ornamental motifs were dominated by scrolling cloud patterns, which symbolise luck and auspiciousness (ibid.). Additionally, most of the carvings in the tomb paths were flat, similar to bas relief carvings, a technique that combines painting and carving. During the Tang (618–907 AD) and Song (960–1279 AD) dynasties, carving techniques were further refined with the emergence of deep relief and semi-circular carving. These techniques were widely used in architectural

decoration during the Tang Dynasty, especially with the spread of Buddhism, and stone statues and carved products from wood or brick were commonly used to decorate Buddhist buildings, such as temples and pagodas [28]. It is difficult to find Huizhou three carvings before the Yuan Dynasty (1271–1368 AD) due to war and other factors, and little information can be obtained from ancient classical literature, so it has been impossible to examine the Huizhou three carvings before the Yuan Dynasty in depth [29]. However, the Huizhou three carvings combined the boldness of the Central Plains region and the ebullience of the Jiangnan region before the Yuan Dynasty, and they gradually formed a craftsmanship with regional characteristics [30].

2.2. Ming and Qing Dynasties

The prime of Hui-style architecture influenced the development of the Huizhou three carvings, leading to their increased use in architecture. This is also due to the socioeconomic climate of the Huizhou region at that time. The Huizhou merchants made their fortunes during the Ming and Qing dynasties, and Hui-style architecture gradually became increasingly extravagant with the increased use of Huizhou three carvings [31]. During the Ming Dynasty, the Huizhou region witnessed unprecedented prosperity among the Huizhou merchant community, and, as the diligence of the Huizhou merchants brought wealth to Huizhou, their prosperity prompted local residents to improve their quality of life. However, the strict feudal hierarchy in ancient times greatly restricted some of the officials and merchants who had low political status [32]. Thus, in order to fulfil their desire to display their prosperity, they found another way incorporate Hui-style decorative architecture, and the Huizhou three carvings became increasingly important to Huizhou merchants at the time due to their desire for architectural decoration [33].

It should be noted that although the Huizhou three carvings have a strong regional Huizhou character and align with the overall aesthetic of Hui-style architecture, there were some differences in the presentation and style of the three carvings between the Ming and Qing dynasties [31]. The Huizhou three carvings of the Ming Dynasty had simple carving icons, and they were rough in style, raw in form, symmetrical in pattern, and plain in motif. The layout was relatively simple and elegant. The icons selected for carving were mostly flowers, dragons, phoenixes, beasts with auspicious meaning in traditional Chinese culture, and other auspicious and symbolic motifs (see Figure 1). The carvings were generally created through bas relief or round carving techniques to express the main body, with fewer layers and more subtle expression [34]. In the late Ming Dynasty, the carving style gradually became more detailed, and an attempt was made to develop a technique with regional flair, thus laying the foundation for the development of the Huizhou three carvings in the Qing Dynasty [35].



Figure 1. The Huizhou three carvings of the Ming Dynasty—brick, stone, and wood. Note, the first image from the left is a Ming Dynasty brick assemblage with flowers and artefacts; the second is a Ming Dynasty stone carving of a deer with plum blossoms; and the third is a Ming Dynasty wood carving of a mythical beast. (Photos of Huizhou carvings from the Ming Dynasty taken from the Huizhou region by an author).

In the Qing Dynasty, the Huizhou three carvings differed from the characteristic simplicity of those in the Ming Dynasty, with more refined carving techniques, a flexible composition style, and varied icons. The layout was compact, and the shape was exquisite. Most of the icons in the carvings were characters from stories, with an emphasis on plot and integrity (see Figure 2). They were unique in terms of pierced relief and openwork carving, and they illustrated the skilful carving techniques of the craftsmen. There were more variations in composition and perspective, and the spatial levels of the brickwork were more typical than those in the Ming period with intelligent layouts. Moreover, the craftsmen at this time were adept at combining various carving techniques and styles. The patterns and motifs were more elaborate and detailed, conveying a sense of realism. However, occasionally, they focused excessively on details, resulting in an over-reversed style of the carving as a whole [36].



Figure 2. The Huizhou three carvings of the Qing Dynasty—brick, stone, and wood. Note, the first image on the left is a Qing Dynasty brick carving of an ancient scholar taking an imperial examination, which symbolises success; the second is a Qing Dynasty stone carving of bamboo leaves and plum blossoms, which symbolises happiness and health; and the third is a Qing Dynasty wood carving of the Huizhou drama ‘Xue Rengui’s Journey to the East’, which symbolises praying for peace. (Photos of Huizhou carvings from the Qing Dynasty taken from the Huizhou region by an author).

2.3. Modern Times

In modern times, with the rapid development of the modern construction industry, use of the Huizhou three carvings has gradually declined. Social progress combined with economic development has fundamentally changed people’s habits, and modern buildings are mostly constructed with modern technology, resulting in the gradual abandonment of the handicraft techniques of the Huizhou three carvings [34]. It is difficult to convey the meaning of the Huizhou three carvings and even more so to pass on the culture of this ornamental craft, because industrial emblem carving is too intermingled with high-tech methods and mainly produced in bulk. These carvings have a simple aesthetic but do not exhibit the cultural connotations of the craft [10]. Moreover, the incompatibility of the Huizhou three carvings with modern aesthetics is an obstacle to its development [37]. The patterns and styles of the overly traditional Huizhou three carvings do not meet the aesthetic needs of contemporary audiences. They are too complex, as most modern people prefer a minimalist style. Therefore, people’s interest in exploring the artistic value of the Huizhou three carvings is limited, which has led to difficulties in the continuance and development of the craft, and, if it is not taken seriously, there is a risk of its loss [34]. Therefore, in recent years, an increasing number of scholars have focused on the preservation and development of the Huizhou three carvings [10,34,37]. Studies on the production process of these crafting techniques is one area of exploration, which will be discussed in detail in the following section.

3. Production Process of the Huizhou Three Carvings

The reason why the Huizhou three carvings have survived for hundreds of years in architecture without rotting is that the craftsmen selected the best materials according to their needs, which subsequently underwent several complex processes. They also used delicate carving techniques to achieve longevity [38]. In this section, the production process of the Huizhou three carvings—brick, stone, and wood—will be discussed by answering three questions.

In addition, to gain insight into the craftsmanship of the Huizhou three carvings, local carvers in Huizhou will be interviewed. Fang Rujin and Fang Bin are provincial craftsmen in Anhui Province [39] (Anhui Provincial Government, 2010), with decades of carving experience, who have been working on carvings in Huizhou. Wang Shunsheng is a local cultural worker in Huizhou who has been involved in the compilation of two authoritative local books [40,41] and has extensive knowledge of Huizhou craftsmanship. The comparison of the three carvings is summarised in Table 1.

Table 1. Comparison between the architectural decoration in Huizhou architecture [8,10,42–44].

Property	Brick Carving	Wood Carving	Stone Carving
Colour	Black bricks	Natural texture of the wood	Mostly black stones
Architectural form	Window, front gates, arches, frames, doorsteps, eaves, and roofs	Street space Decorates building features, such as beams, screens in the garden, windowsills, handrails, and even beds and chairs	Ma Tau wall Pillars, corridors, archways, and tombs
Carving style	Flat, relief, and three-dimensional	Flat to multilayer carving, which creates an intense 3-D image with figures, landscapes, flowers, animals, insects, and fish	Flat carving with images of animals, plants, and calligraphy arts
Patterns	Various auspicious patterns	Various auspicious patterns	Does not have as many varieties as wood and brick
Material used	High-quality clay	Local woods that have a clear texture, such as pine, cedar, catalpa, camphor, cypress, and ginkgo	High-quality local stones. Mostly made from high-quality Yixian green and tea garden stone. Additionally, white hemp stone and red hemp stone
Modern material used	Brick	Glass	Steel
Disadvantages	<ul style="list-style-type: none"> Has a long process and requires firing. Needs to be prepared in advance More durable than wood but less durable than stone 	<ul style="list-style-type: none"> Subjected to deterioration and is less durable. Complex and delicate process. A special material with both hardness and elasticity is required. Less durable than stone 	<ul style="list-style-type: none"> Hard to shape Minimal patterns used Unsophisticated Slightly lighter and whiter than wood, sometimes milky white, and black when exposed to water
Advantages	<ul style="list-style-type: none"> Sophisticated 	<ul style="list-style-type: none"> Easy availability of materials 	<ul style="list-style-type: none"> Good quality and durability

3.1. Brick Carving Process

A type of highly carved architectural ornament known as ‘brick carving’ is used on solid bricks created specifically for this purpose in Huizhou. It lends buildings a sense of elegance and seriousness, and it is widely used in archways, entranceways, purlins, beams, roofs, and other structures. It is a key element of Hui-style architecture, which has gained popularity since the Ming and Qing dynasties. Brick carving can be done in three different ways: flat, relief, and three-dimensional. In Hui-style architecture, themes (as shown in Figure 3) with distinctive traditional elements are frequently chosen, such as

birds, flowers, lucky dragons, tigers, lions, gardens, and opera figures [15]. The process of making the brick carving (see Figure 4) includes preparing the material, selecting the production method, finishing the bricks, and, finally, carving the bricks. Each process is detailed below.



Figure 3. An example of Huizhou brick carving [15] (photo of Huizhou brick carvings taken from the Huizhou region by an author).

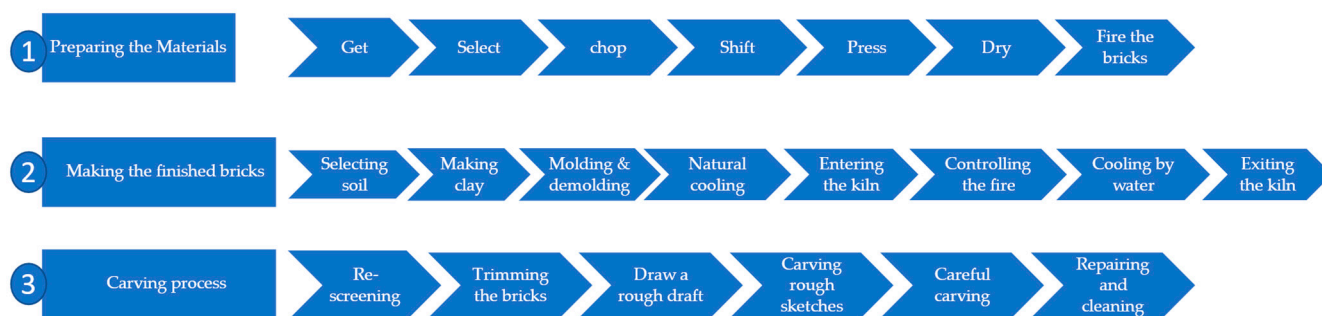


Figure 4. The process of brick carving (produced by the author Zihao Cao based on interviews).

3.1.1. Preparing the Materials

Most of the materials used in Huizhou brick carving come from the local clay of Huizhou. Huizhou brick carving uses high-quality clay that has been deposited at the bend of the river for many years or sedimentary clay in the fields. The clay has drifted and been deposited, and its constant scouring by the river has ground it finely. It is also mixed with organic material and other impurities. Therefore, this clay has good plasticity but poor fire resistance – generally below 1350 °C [45,46]. Once the artisans have obtained good quality material, they select (select clay suitable for making bricks), chop (cut up the clay with a special knife), sift (sift through a sieve to find clay that can be used to make bricks), press (place the clay into a mould and press it firmly), dry (leave to dry naturally), and fire (heat the clay over a fire to dry out any excess water) the bricks before they move on to the next step [47].

3.1.2. Method of Making Bricks in Huizhou

There are two basic approaches to the production of Huizhou brick carvings. One is to make the bricks from clay and then carve and fire them. The finished product has an appearance that is similar to that of a direct patchwork made using clay. The second approach is to fire the bricks and then carve them. This is more delicate than the first approach, but it also has high skill requirements in terms of both the carving techniques and the materials. Comparing these two approaches, the former is usually used to decorate the façade of a building, while the latter is used to decorate key areas and details to make them more vivid, which better reflects the exquisite craftsmanship of brick carving. Moreover, the second technique is predominant in surviving Hui-style architecture, where the carving texture gradually progresses from shallow to deep, resulting in the common forms of shallow relief, deep relief, and openwork carving [48].

3.1.3. Finishing the Bricks

The process of brick carving includes the firing of special bricks and the actual brick carvings, which is done in two stages and usually takes more than 20 steps to complete. In the process of firing the bricks used for brick carving, from the selection of the raw materials to their release from the kiln, several steps are required, such as selecting the soil (selecting dry clay that is suitable for making bricks), making clay (adding water and mixing it into a paste), moulding (making the appropriate size mould and adding the clay paste), demoulding (waiting for the clay to take shape and remove the mould), natural cooling (setting it aside to let it cool naturally), entering the kiln (putting it in the kiln for firing), controlling the fire (the artisan must control the size of the fire at all times depending on the progress of the firing), cooling by water (after firing to a certain point, quickly place in water to cool), and exiting the kiln (after the previous steps, if the desired effect is achieved, it can be removed from the kiln, otherwise it must be fired again). After the bricks have been watered, they must be set by heat for about two days before they can be removed. When the finished bricks are removed from the kiln, unsuitable bricks, such as burnt, cracked, and deformed bricks, must be strictly screened. The best colour for the bricks is green-grey, and, apart from the colour, there are specific requirements for the quality of the bricks as well. For example, the bricks should not be too brittle or hard, or they cannot be easily carved, nor should they be grey in colour, as this will negatively influence their durability. Typically, the wastage rate is around 20% during complete firing [46,49].

3.1.4. Carving Process

This is the final stage in the brickwork carving process. First, the brick must be selected again. Brick carvings for arch gates are usually of a very high quality with certain specifications, such as no fragments on the surface of the brick. The artisan will use metal to gently strike the surface of the brick, evaluating the grade of the brick by the crispness of the sound. Second, the brick is polished with water to ensure that its four corners are smooth. In the third step, a sketch is drawn, usually by a reputable local painter or calligrapher, after which it is reproduced on the brick's surface by the craftsman. The craftsman must then copy the sketch onto the brick, using a needle to follow the lines of the sketch, and then pierce them into the surface of the brick and use a 'powder bag' containing black powder to gently powder the surface of the bricks so that the sketch line can be perfectly copied according to the direction of the holes. The fourth step is the rough draft; here the craftsman uses a carving knife to carve out the general composition of the picture on the brick and outline the layers of the scene to determine the distribution of the image. This process requires a very delicate knife technique as well as other skills. The fifth step consists of detailed carving, which is the most important part of the carving process, based on the rough draft. The final stage is the repairing and cleaning process, which involves filling in any gritty holes or glued areas on the surface of the brick, and then cleaning the surface of the brick to remove any dust [46,50].

3.2. Stone Carving Process

In Huizhou, stone carvings can be found in both urban and rural locations. In temples and homes, they are primarily used to decorate the hallways, doorways, walls, and arches. Stone carving has a solid reputation as a form of circular carving and relief sculpture. However, it is less sophisticated than wood and brick carving because of the limitations imposed by the medium itself. The focus is primarily on plants, animals, and calligraphy (see Figure 5). Landscapes and images that convey a narrative are uncommon, and the patterns frequently blend together in stone sculpture; thus, it is elegant yet straightforward and uncomplicated [15]. The steps involved in carving a stone are described below and shown in Figure 6.



Figure 5. An example of Huizhou stone carving [15] (photo of Huizhou stone carvings taken from the Huizhou region by an author).



Figure 6. The process of stone carving (produced by the author Zihao Cao based on interviews).

3.2.1. Preparing the Materials

Most of the materials used for stone carving in Huizhou are high-quality local stones. Huizhou has a unique geological structure with various rich stone resources [10]. Among the local stones, there is a black ‘Yixian green’, which is suitable for high-quality stone carvings. ‘Yixianqing’ is a carbonate marble with limestone as its main component [51]. It is very hard and smooth after polishing, and it is considered the highest quality stone in the region [52,53]. Moreover, this stone has a very unique characteristic: its appearance is white when it is dry, but it takes on an ebony colour once it comes into contact with water [54]. Using this stone for stone carvings not only enhances the beauty of the product itself but also guarantees its quality and durability; therefore, they are very popular [51]. Apart from ‘Yixianqing’, the local tea garden stone, white hemp stone and red hemp stone are also commonly used as carving materials for the exterior pillars of buildings, although they are slightly softer than Yixian green. These local stones are excellent materials for stone carving and have facilitated the development of stone carving in Huizhou [55].

3.2.2. Carving Process

Stone carving in Huizhou differs slightly from brick carving due to the differing hardness between brick and stone. The process of making stone carvings is similar to that of brick carvings, but the process of firing is omitted. In the first step, the stone must be selected and trimmed. The second step is to sketch a rough draft, which involves using white chalk to draw the image outline on the stone and make notes or simple carved lines. The third step is to carve the rough draft, for example, by using a large carving knife to chisel out the general lines of the pattern. The fourth step is to create the deep groove; it is usually more difficult to carve this deeper into stone than brick because of the hardness of stones. The fifth step is detailed carving; however, stone carving is not as detailed as brick carving. The final step is the repairing and cleaning process, which completes the stone carving [43,52,56].

3.2.3. The Difference between Stone and Brick Carving

It is not always easy to distinguish between stone and brick carvings visually, but they can be distinguished in two ways: stone carvings are usually unitary, while brick carvings can resemble patchwork". Another difference is that stone carvings are slightly lighter and whiter, sometimes milky white, and black when exposed to water [43,56].

3.3. Wood Carving Process

Almost every surface in a home has wood carvings, including beams, screens, windows, railings, beds, tables, and chairs. People, landscapes, flowers, animals, insects, fish, clouds, Chinese characters, and other symbols of fortune are included in the diverse subjects represented in Huizhou wood carving. Hui-style wood carving started to progress in the early Ming Dynasty, with unsophisticated flat carving as its primary technique. Subsequently, when the Huizhou merchants' financial power became more apparent, wood carving advanced as well, and the more difficult multilayer carving replaced the more popular flat carving (see Figure 7) [15]. The steps involved in wood carving are described below and shown in Figure 8.

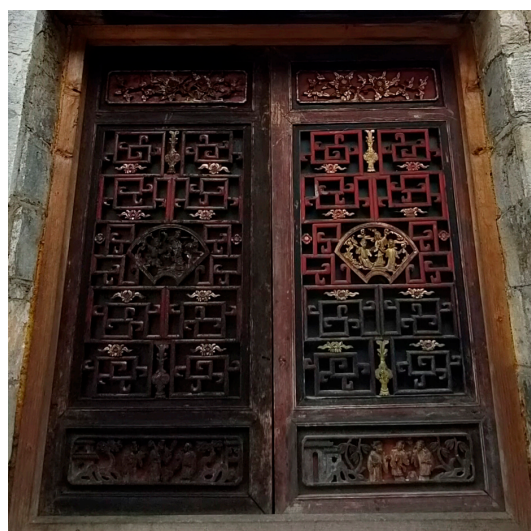


Figure 7. An example of wood carving [15] (photo taken from the Huizhou region by an author).



Figure 8. The process of wood carving (produced by the author Zihao Cao based on interviews).

3.3.1. Materials

Due to Huizhou's rich forestry resources, most of the material used for Huizhou wood carving consists of local, high-quality wood. Wood carvings are usually made from local wood that has a clear texture and is soft and easy to carve, such as pine, cedar, catalpa, camphor, cypress, ginkgo, and other soft wood materials [42]. Compared to bricks or stones, wood has the unique quality of being both hard and elastic. Huizhou wood carving does not have specific requirements for materials but rather for the subject matter and exquisite craftsmanship, thus reflecting a strong artistic component [37]. The easy availability of materials has made it possible to decorate almost every household with wood carvings [10]. However, this has also led to many wood carvings being made from ordinary wood, which is less durable [10].

3.3.2. Process

Wood carving is a complex and delicate process. Unlike brick and stone carving, which must be prepared in advance, wood carvers usually search for suitable wood directly in the Huizhou mountains according to their needs. The next step is to draw a sketch, which is performed either directly onto the wood or, for example, by means of a topiary. The third step is rough carving, where a rough outline of the design is chiselled into the wood and the layers of the overall form are distinguished. The fourth step is detailed carving. The fifth step is polishing, where the carving is fully repaired and polished. The sixth step is the application of tung oil to preserve the carvings. The last step is lacquering, which is performed as required, and, for those who value aesthetics, the carver will have the piece gilded according to aesthetic needs [43,46].

4. Locations in Which Huizhou Three Carvings Are Used

The products of the Huizhou three carvings will eventually be used as the components of Hui-style architecture to illustrate the artistic value of this decorative craft. In this study, SketchUp modelling software was used to produce the shape of a Huizhou-style architectural door (as in Figure 9) and window (as in Figure 10), with indications of the locations of the Huizhou three carvings provided in the model.

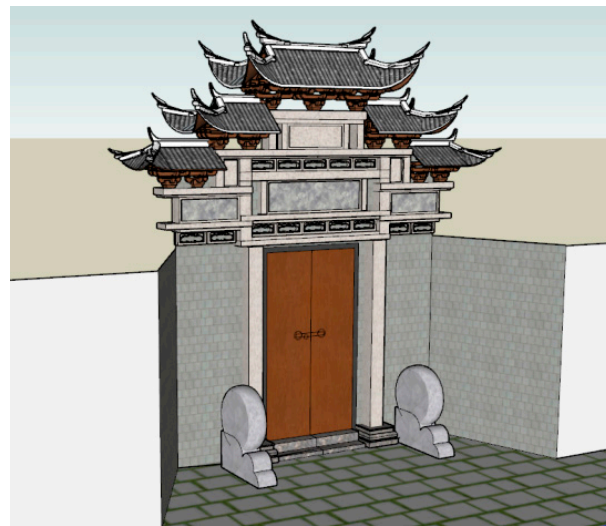


Figure 9. Door of Hui-style architecture modelled using SketchUp.

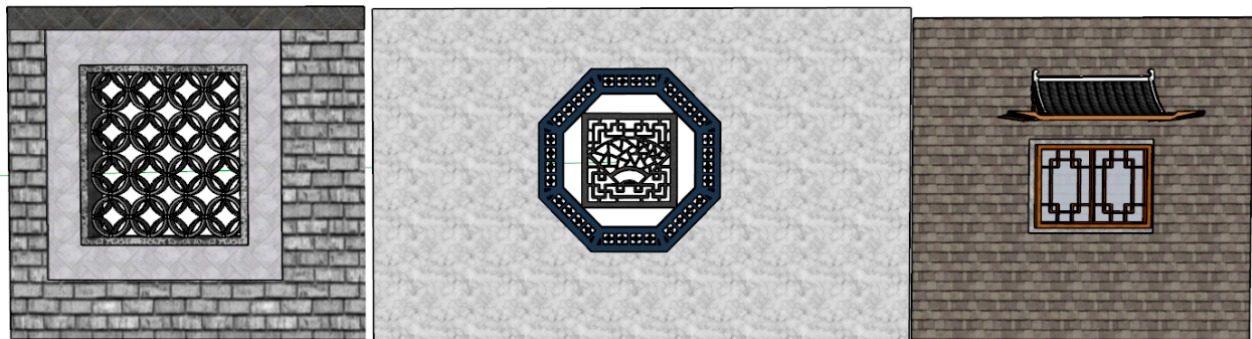
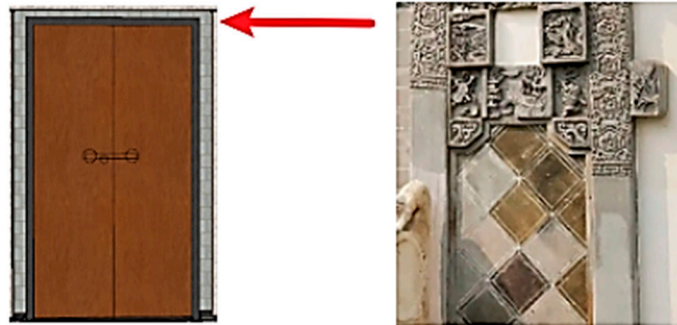


Figure 10. Windows from different materials for Hui-style architecture modelled using SketchUp.

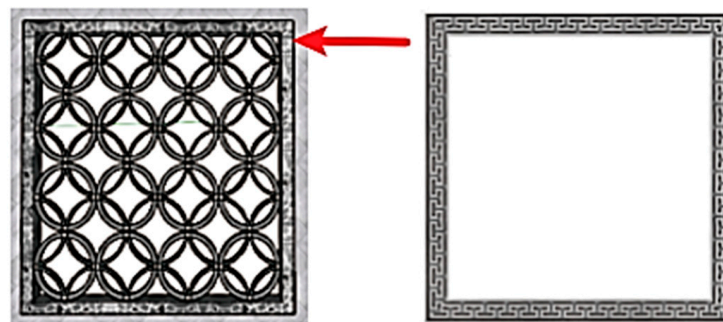
4.1. Position of Brick Carvings

Brick carvings are mostly used to enrich the detailing of the façade of Huizhou-style buildings. In terms of the spatial structure of the house as a whole, it is also a small-scale use of decoration.

In the door and window hoods, brick carvings are usually beautifully carved and serve to decorate the doors and windows, as shown in Figure 11. In the brick windows of the courtyard wall, the brick carvings mainly reveal a combination of assembled homogeneous patterns that serve to separate the interior from the exterior and block the view of the space, as shown in Figure 12. As for the brick carving of the gatehouse, from the regularity of the building as a whole, the brick carving plays the role of displaying the entrance image in space. Due to the size of the bricks themselves, large-area brick carvings rely mainly on a patchwork approach, while smaller brick carvings are mainly produced through dot carving, as shown in Figure 13.



Brick carving of a door hood



Brick carving of a window hood

Figure 11. Brick carving of door and window hoods.

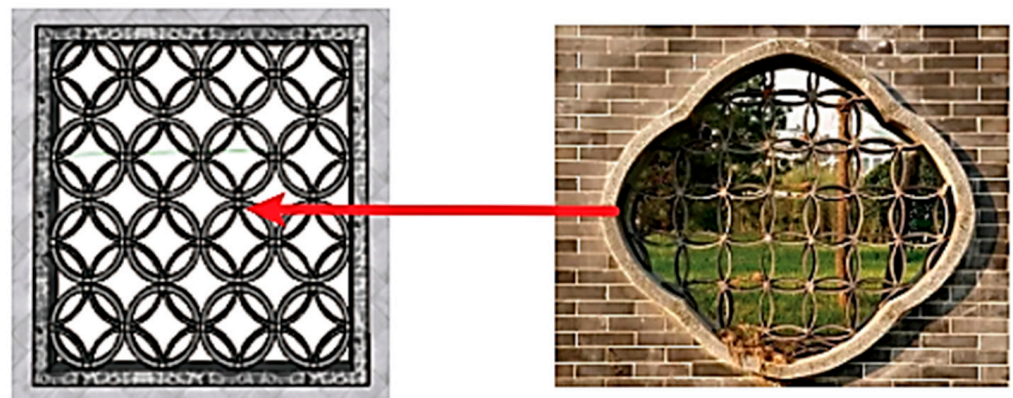


Figure 12. Brick carving of a window.

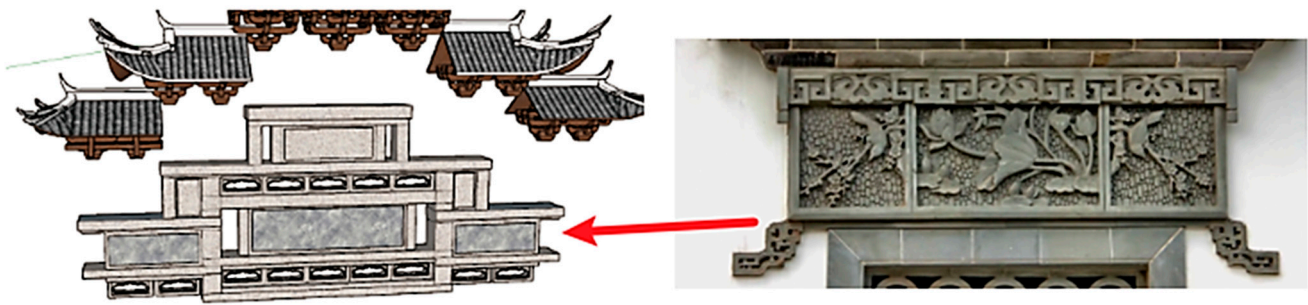


Figure 13. Brick carving of the arch gate.

4.2. Position of Stone Carvings

Stone carvings can be considered ‘intermediaries’ for brick and wood carvings. Most stone carvings are not only found on the façade of the building but also extend to the interior of the house, thus connecting brick carvings (hard material) and wood carvings (relatively soft material) in a way. Stone carvings also play a weight-bearing role in the doors and windows of Hui-style buildings. Most stone carvings are often found in the lower and middle parts of the building’s doors and windows, covering the stone door frames, abutments, door-holding stones, and stone openwork windows in the building’s door and window system.

Moreover, the stone door frames play both a load-bearing and decorative role, and stone carvings constitute the main large decorative elements. In the abutment section, stone carving is mainly used to shape the stone base of the door’s ground floor, as shown in Figure 14. Stone carving of door-holding stones is a common ornamental feature of Hui-style gates, mostly in the form of a beast of prey or auspicious motifs, as shown in Figure 15. In the stone carving openwork window of the courtyard wall, the stone carving mainly serves to ventilate the air and increase the aesthetics of the wall as shown in Figure 16.

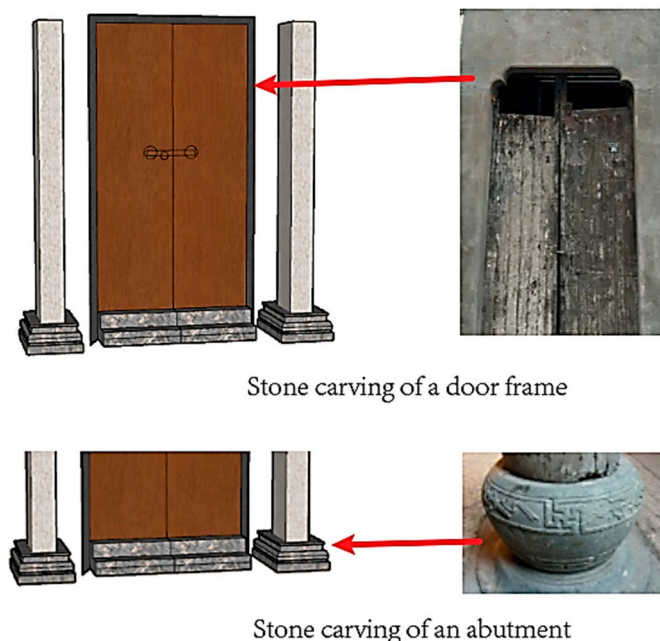


Figure 14. Stone carving of a frame and an abutment (photo taken from the Huizhou region by an author).

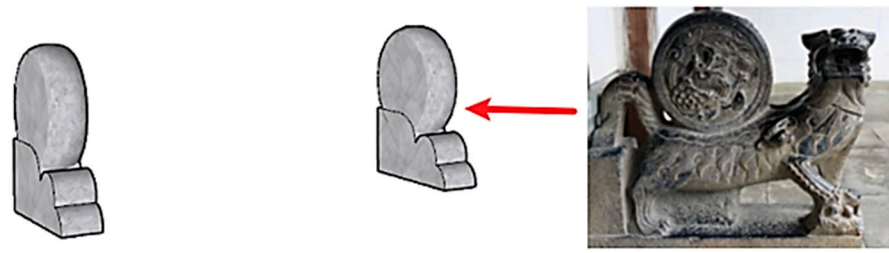


Figure 15. Stone carving of an abutment (photo taken from the Huizhou region by an author).

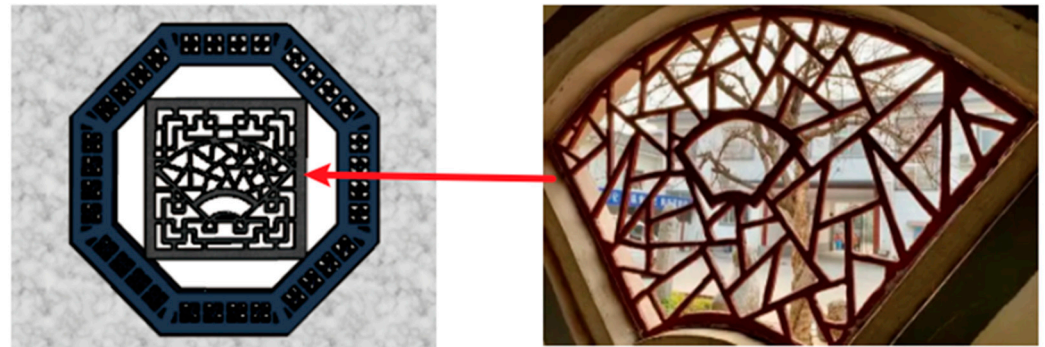


Figure 16. Openwork window with stone carving.

4.3. Position of Wood Carvings

Wood carving is visually ‘softer’ than brick and stone carving, and it usually forms the main body of the doors and windows of Huizhou-style architecture. Most of the doors and windows in this style have movable carved wooden structures as the main body, including wooden door panels, windows, window frames, rafters, and other structures.

Wooden door panels are usually carved meticulously, and wood-carved mortise and tenon structures are added to the door locks on door panels to provide both security and aesthetic appeal, as shown in Figure 17.



Figure 17. Wood carving of door panels.

Carving of wooden openwork windows is common in the interior of buildings. The main body of windows in Hui-style architecture mainly consists of a carved wooden openwork window with an oiled paper pasted on the inside to act as a space divider. The wooden window frame connects the wooden carved openwork window to the wall. The window frame must be carved strictly according to the size of the openwork window and the wall in order to connect them tightly. This provides reinforcement and protection from insects, as shown in Figure 18.

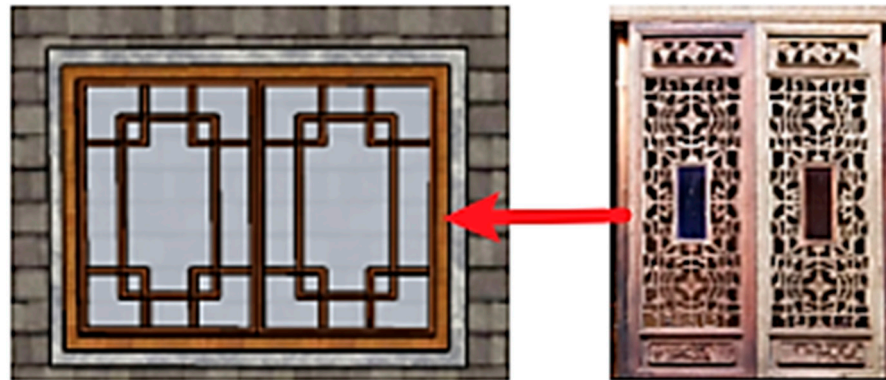


Figure 18. Wood carving of openwork windows.

Most of the wooden carvings in the arch gate are used on the rafters below the eaves, which mostly consists of a mortise and tenon construction. Through skilful carving techniques, the wooden structures not only fit closely onto each other, but the rafter structure also displays a strong sense of traditional Chinese architectural beauty, as shown in Figure 19.



Figure 19. Wood carving of rafters.

5. Conclusions

The Huizhou three carvings all form part of ornamental craftsmanship and they have a long history. Although their production processes are quite different, they all have a strong regional identity in Huizhou. The artistic value of the ornamental craftsmanship of the Huizhou three carvings is not only reflected in the fact that they form ornamental parts of the doors and windows of Hui-style architecture, but also in the fact that they are works of art that can exist independently. Although the production process of the three carvings is complex, they should be valued as products that exhibit regional ornamental craftsmanship. The history, process, and locations of the three carvings deserve to be carefully documented and shared with people from around the world. They also deserve to receive more attention and preservation policies, whether officially or privately, or nationally or locally, so that this traditional ornamental craftsmanship can be further developed.

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