

THE ART OF PATTERN CARVING OF THE TRUSS (DAUKEO) ON A WOODEN HOUSE STRUCTURAL SYSTEM IN HUE AND THU DAU MOT CITIES

Hieu TD^{1*} and Ky ND²

¹ Faculty of Architecture - ThuDauMot University, Vietnam

² Faculty of Cultural Industry - ThuDauMot University, Vietnam

Abstract: It can be said that the quintessence of wooden house architecture in Vietnam in general and in Hue and ThuDauMot cities, in particular, is reflected in the motifs of wood carving patterns in the interior. Especially the motifs are decorated on the Daukeo with various, diverse, highly artistic themes and show the characteristics of each house, as well as feel the aesthetic level of the house owner. From those values, the contents of the article focus on bringing out the artistic values of this unique decoration in the architectural structure of wooden houses in these two localities. The author has carried out a survey and investigated nearly 200 details of Daukeo carving in wooden houses in a total of nearly 100 wooden houses to recognize and better understand the motifs of carving art on Daukeo in the architecture of traditional wooden houses and modern wooden houses. So to bring into play the architectural value have a national character that may be gradually lost, to find the core values, or to want to find the original form of the Daukeo, as well as the meaning of this art of wooden carving, contributes to preserving the delicate traditional patterns of the national culture in general and the beauty of the wooden house in particular.

Keywords: ruang wooden houses in hue, traditional wooden house architecture in binhduong, wooden truss carving in hue and binhduong

The Introduction

General issues

The history of traditional wooden carving

Vietnamese wooden carving, developed from Ly Dynasty (1010 -1225), experienced over thousands of years to reach the peak of art reflected in the architecture of houses, palaces, and pagodas all around the country. Being a nation located in the tropics, wood is a relatively abundant source of raw material in Vietnam and suits the crafting industry; therefore, wood was chosen to become the main material which indicates craftsmen's thought, essence, and ingenuity through turning inanimate wooden blocks into a plethora of works of art, from flowers, plants to animals and other images according to people's vivid imaginations. The outlook of nature and people with the Eastern philosophy of "heaven-earth-human" are indicated clearly and concisely through the pictographic

*Corresponding Author's Email: hieutd@tdmu.edu.v



method, which includes seeds, fruits, dragon-phoenix, and water clouds are carved on building components such as blade heads, beams, trusses, roofs of communal houses, palaces, temples, and pagodas.

From the earliest time, the art of wood carving as well as other traditional materials, has been known as wooden engraving. It means that drawing a picture - removing a layer of wood (3) - emerging the drawn pattern, then engraving, separating the detailed contours of the leaf's rib and veins, and these works only see one side. The "Flower - Western" patterns, imported from the Occident, contains stylized art, the pictographic of leaves and flowers, but not specifically what leaves and flowers are. Up to now, "Flower - Western", is still utilized on a variety of items and materials, including pottery, porcelain, stoneware, bronze, painting embroidery, paintings, and so on, presents in most decorative products, from simple to complex, with many different styles and textures. Particularly, in the wooden carving of spiritual works, "Flower - West" is carved on most of the detailed surfaces of wooden building components.

With the craftsman's rich imagination, the layout of lines and patterns becomes the image of rolling Dragon, worshipping Dragon, dancing Phoenix, letter-carrying Phoenix, reunion Dragon-Phoenix, and so on. Moreover, the skillful hands of craftsman create a new carving technique called "Kênh-Bông" which built a multi-dimensional space making the flora details like flying but still keeping the original basic image of the "Flower - Western" pattern through patterns and lines which are twisted and more winding in shape, contain both left and right sides, front and back sides. [5].

The architecture of the Ruong wooden house

'Ruong' house, 'Rường' house, or 'Xuyên Trính' house will be called based on each region. The central people call Ruong house, and Xuyen Trinh house is utilized by southerners. The structure of the Ruong house's column has two-column in the center since the column of the first row lies on either side of the symmetry with the top purlin. A crossbar connects these center columns. In some cases, the above crossbar space equips the planks running all the way through the center of the house or has a short pillar supporting the roof. The above naming was explained in a dictionary by Alexandre De Rhodes in 1651; therefore, these architectural forms must have existed since about the middle of the seventeenth century. Furthermore, 'Ruong' and 'Rường' are words derived from Chinese, on the contrary, 'Trính' word derived from the local language, which is unfound in Chinese vocabulary. Therefore, there is a conjecture that the name of the 'Xuyên Trính' house derives from the Southern area before the Vietnamese came to this place. [4]

The Ruong wooden house has existed for many centuries, and Daukeo is one of surviving and rarely changed vignettes which is a testament to the value of history and lifestyle of the brilliant period during the feudal period of the Nguyen Dynasty. Moreover, Daukeo represents a stylized style and creativity in the ancient art of carving. Specifically, the Daukeo vignette contains a highly vital role in the decorative art of traditional wooden structure houses in Hue and ThuDauMot cities because of the inherent harmony not only in Daukeo's shapes but also in proportions. Furthermore, the Daukeo pattern inspires craftsmen to have a passion for the job through many generations to the present day.

On the other hand, almost the newly restored Ruong wooden houses in Hue and ThuDauMot of today have innovations in the Daukeo vignette. In addition, the whole rebuilt structure is also modified and expanded.

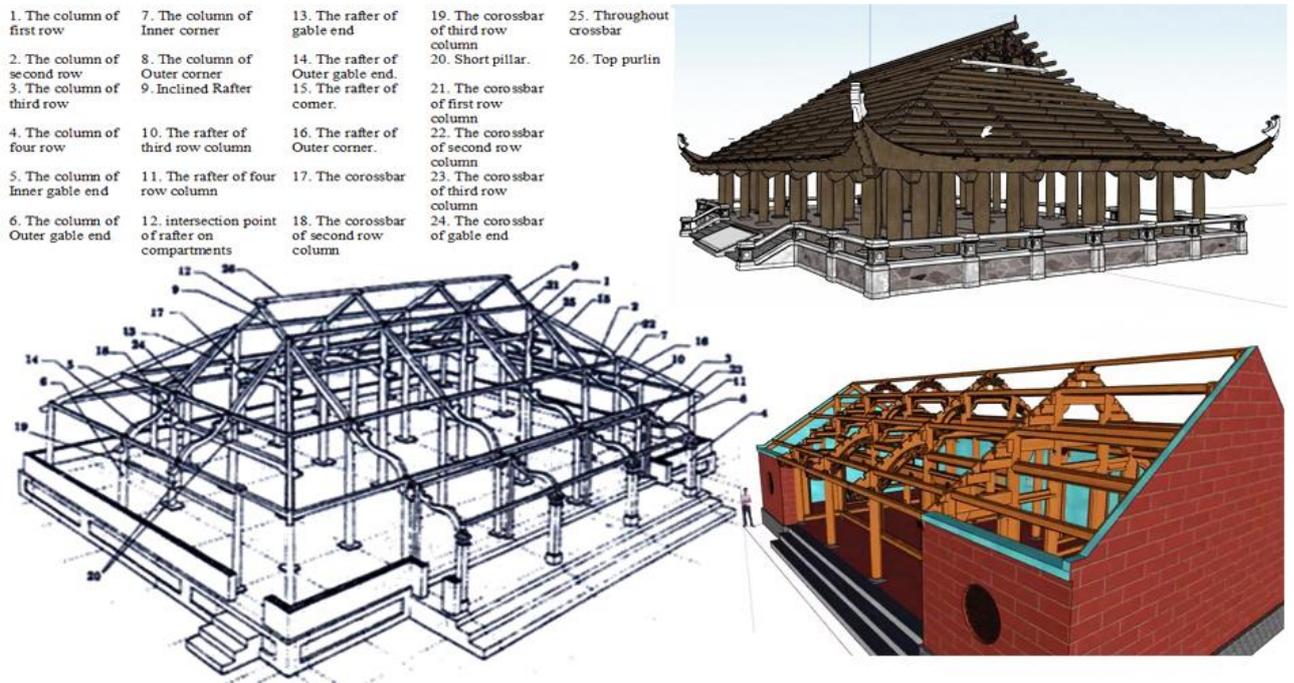


Figure 1: Model showing the structure of the Ruong wooden houses (source: author).

The research general for wooden houses and type of carving decoration in two locations

The wooden houses and type of carving decoration in Hue city

Housing is valued by the Vietnamese; therefore, it is more invested, especially in wealthy families or aristocracy in society. In the olden days, the size of housing in Hue for the middle class and above, built according to the style of the Ruong house, depended on the owner's economic ability to make the house size big or small and whether the decoration was finicky or simple.

The Ruong house in Hue city is extremely elaborately carved expressed through each purlin, rafter, inclined crossbar, and so on and the inside of the house is actually a relief painting. Based on the owner's inclination and taste or more precisely depending on the job skills of craftsmen to decide and create a diversity of vignettes utilized in the house including Four Benevolent Animals, Eight weapons, four seasons, flowers and plants, and so on.

When referring to the Hue Ruong house, Chuson cultural researcher made an interesting opinion that: "Kings live in the Ruong house; The Royal Family likes to live in the Ruong house; The mandarin live at the Ruong house; The wealthy people live in Ruong house; Buddha and Saints live in the Ruong house;...Grandparents and ancestors live in the Ruong house; Children and grandchildren are also at Ruong house." The sentence of the Chuson cultural researcher shows that the Ruong house was an essential thing in the life of the people of Hue at that time. [1].

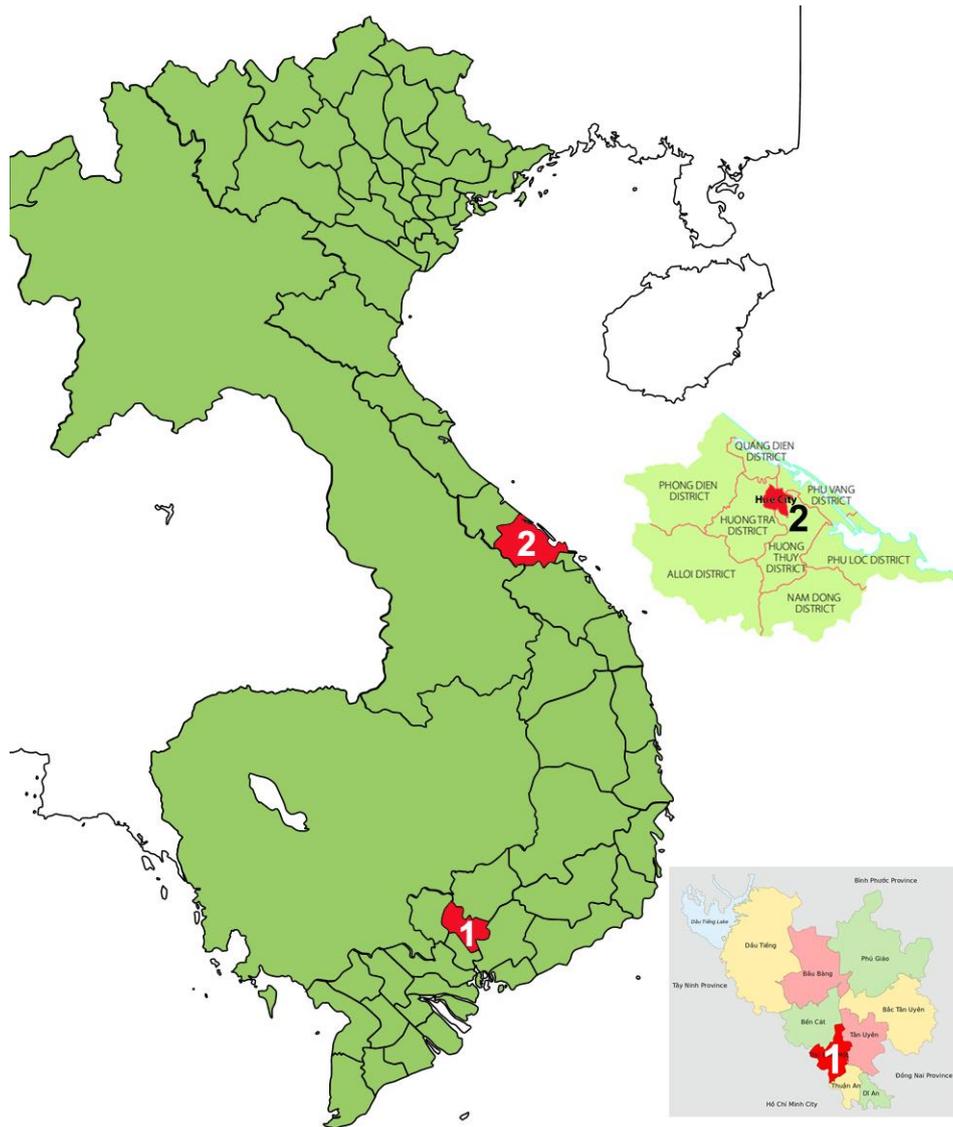


Figure 2: Hue city of ThuaThienHue Province (2) and ThuDauMot city of BinhDuong Province (1) on Vietnam Map (source: author).

The wooden houses and type of carving decoration in ThuDauMot city

ThuDauMot's traditional housing architecture is decorated in a regal style. Architectural space and landscape are combined to create an overall house with its character. The front yard is decorated with a miniature natural scene of flower gardens, ornamental plants, and a shuihan penjing that is fully decorated with the image of daily activities "Fisherman - Woodsman - Flowman - Scholar"; therefore, all these scenes combined with the moss-covered roof creating the tranquility scenery. The almost interior furniture of the house is decorated in a meticulous and elaborate style from the roof, and the altar's door, which is located in front of the altar and has no door, is M-shaped to the crossbar which connects the columns and doors in front of the house with precious wood materials such as Rosewood, Narra Padauk, Doussie, Lauan Meranti, and so on to indicate prosperity. From wooden door railing, contours of rounded squares to alto-relievos are arranged symmetrically in each detail to create magnitude, solemnity, hierarchy, discipline, and royalty style.

Scope and methods of research

Objects and scope of research

Objects of research

The Daukeo vignettes on photographic materials, restoration workshops, and the structure of traditional and renovated wooden houses in reality at several locations in Hue and ThuDauMot cities

Scope of research

- The reality is from traditional garden houses in Hue city (Thuy Bieu, Vy Da, Kim Long ward) and ThuDauMot city (Phu Cuong).
- The Imperial City of Hue area (most cared, due to the concentration of a large number of new and old houses belonging to generations of feudal court officials of the Nguyen Dynasty, and several restaurants, and cafes).
- Restoration images from factories that manufacture and restore ancient housing.
- Pictures from magazines, books, and traditional pattern documents
- There are restaurants, coffee, refreshments, cuisine, Ruong wooden houses in the temple, etc in Hue and ThuDauMot cities.

Methods of research

Interviewing

This method collects information directly from the people who are owners, who are manager and invest wooden house; who build wooden house and the experts study architectural type of this wooden house

- Get opinions from the landlords.

The Opinion for history informations of wooden house in Hue and ThuDauMot cities

The Opinion for restoration period of wooden house in Hue and ThuDauMot cities

- Get opinions from the master craftsmen, and skilled workers.

The Opinion for wooden carving technical

The Opinion for carving type of truss pattern in reality wooden house

- Get opinions from traditional house researchers.
- The Opinion for wooden house structure and history and construction context

- Other sources of relevant opinions.

The Opinion from organization of government for wooden house management

Observation, photography, and technical drawing

This method support to make data by images, drawings is visual in this research

- Take photos of carved details in traditional houses in Hue and ThuDauMot's wards.

Make photos by photography in traditional house and restoration store

- Take photos at the workshops which restore and erect the Ruong wooden houses.
- Measure and draw the details of truss pattern in reality wooden house.

Make Daukeo model of wooden carving by drawing is autocad software.

Compare and contrast

This method supports more data additional by comparing similarities and differences in patterns of wooden houses in each locality.

- Survey and necessary information addition
- Compared with the decoration types of wooden houses in Vietnam.

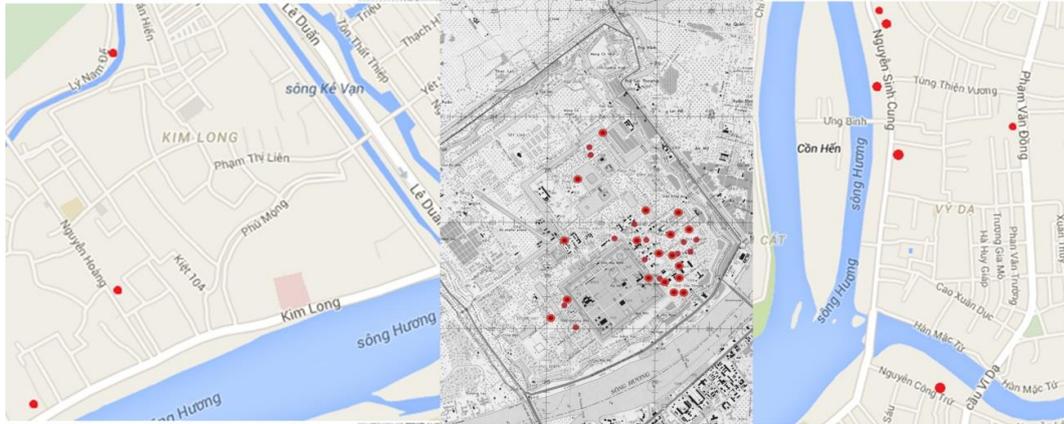
Terminologies

- Ruong is shortened calling of the column. The Ruong house is built according to certain specifications, and is a type of house with a wooden truss system.
- A compartment is the number of a house's rooms delimited by rows of columns. There are only two lean-to (the lean-to is the part on both sides of the house calculated from the top of the roof in a triangular shape to the outermost column) with 3-compartment, 5-compartment or 7-compartment houses.
- Rafter is a structural detail running along the roof and connecting columns.
- Kenh Bong carving is a folk technical term for a form of carving on wood. This technique will carve some components of wooden painting, immersing and almost separating from the wooden background. This carving style creates many high and low layers to describe the depth of space, and highlight the main artistic images of the wooden painting.

Discussion and Results

The system of wooden houses in Hue and ThuDauMot cities in reality

General information about the house in Hue and ThuDauMot cities



Kim Long area

Imperial city of Hue area

Vi Da area

Figure 3: Map showing the locations of surveyed houses (red site) in Hue city (source: author)



Figure 4: Map showing the locations of surveyed houses (red site) in ThuDauMot city (source: author)

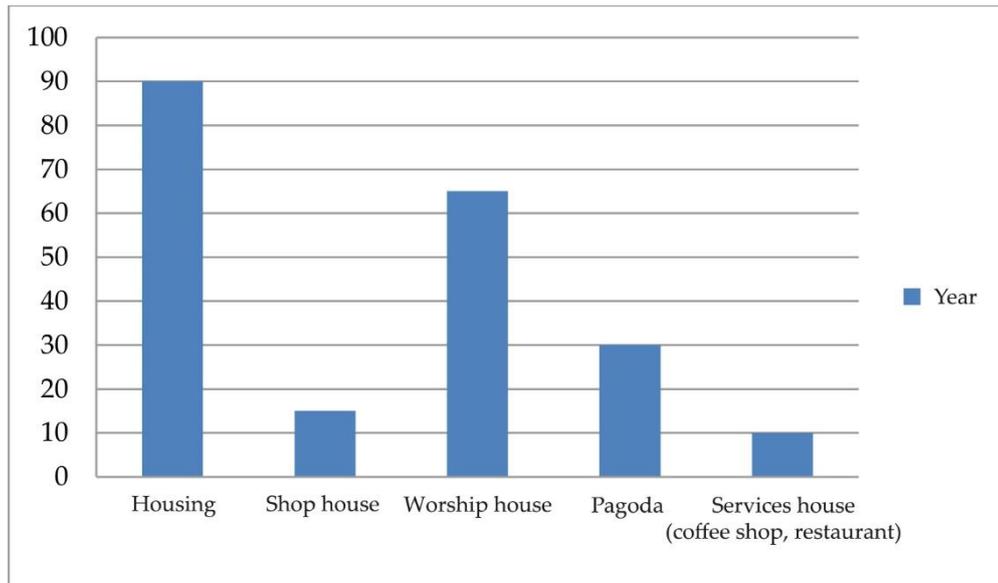
The total number of surveyed places is 82 houses (number of surveyed houses in other localities and Hue is 6% and 94% respectively) which are owned by almost homeowners age range from 80 to 100; moreover, the occupation of homeowners is diverse including teachers, retirees, cadres, officers, directors, and so on.

Consists of the types of houses, namely housing, ancestral temple, housing for businesses such as restaurants, coffee shops, etc.

Construction duration and form of Daukeo decorations in the Ruong houses were surveyed.

- Construction duration of the house

Since there are many different types of house architecture in the scope of the survey, the almost construction period extends from the early years of the nineteenth century to the present; however, the survey concentrates on the type of houses, which has a duration from 70 to 90 years, accounting for over 80% of the total number of surveyed houses.



Bar graph 1: The ratio of average age according to each group of surveyed houses (¹)

The bar graph 1, illustrates that there is a much different difference among house types. Housing exists oldest, with an average time of 90 years. The new house or repaired house groups from the Ruong house appear later to use for business purposes.

- The form of Daukeo decorative patterns

Through field survey, Daukeo vignette is extremely diverse and abundant in the form of carving and decorations in both traditional wooden houses and innovative wooden houses in the two localities, especially in Hue city.

(¹) Housing: for family living (traditional housing and newly remodeled housing); Business houses: the houses are restored to do business; Temples: in village communal houses, family temples; Pagoda: the houses are in the pagoda precincts; Service houses: types of houses serving the needs of restaurants, bars, and refreshments.



Flower-leaf and stylized dragon head vignettes



Mixed vignette



Stylized cloud vignette

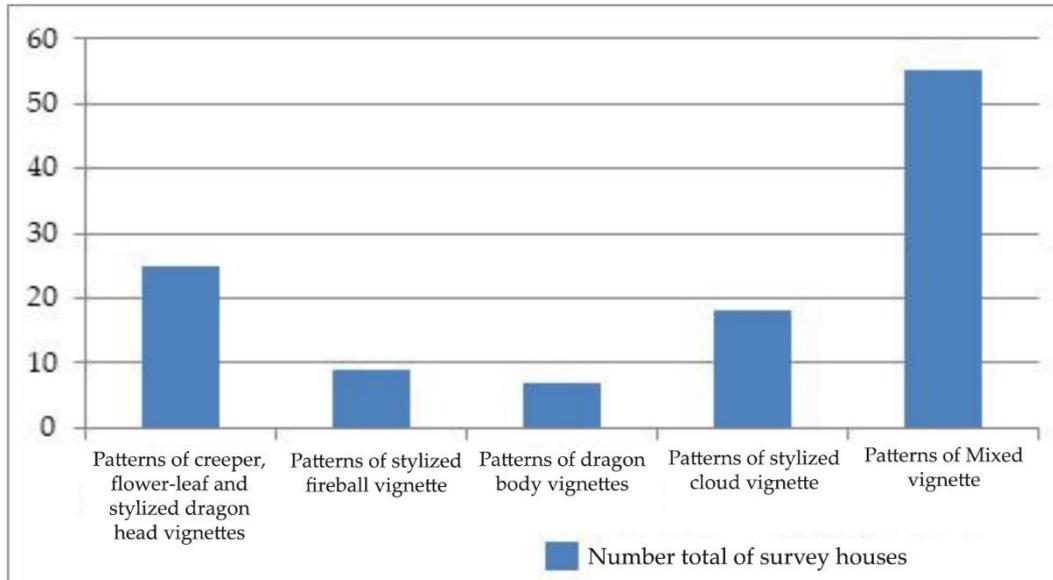


Stylized fireball vignette with creeper-flowers-leaves



Dragon body vignette

Figure 5: The decorative forms of Daukeo in Hue and ThuDauMot cities (source: author)



Bar graph 2: The proportion of decorative patterns on Daukeo in the surveyed wooden houses (source: author)

- Data results

94% of houses are erected in Hue city, and the remaining 6% are transferred from some other regions and re-installed.

- Among all the houses in the surveyed area, there are 60 houses with vignettes.
- Among 60 houses with vignettes (including houses that are intact or have been restored but have not changed the carving details on Daukeo), there are 57 houses with the same vignettes.
- Among the houses restored by restoration facilities in the city, there are 30 repaired or renewed houses with vignettes that follow the traditional style.

- The characteristic of Daukeo

The significant factors of Daukeo. It consists of three main parts (Tamson), usually circular lines running diagonally and meeting at the midpoint of the rafter belly. Including large circular lines mixed with small circular lines.

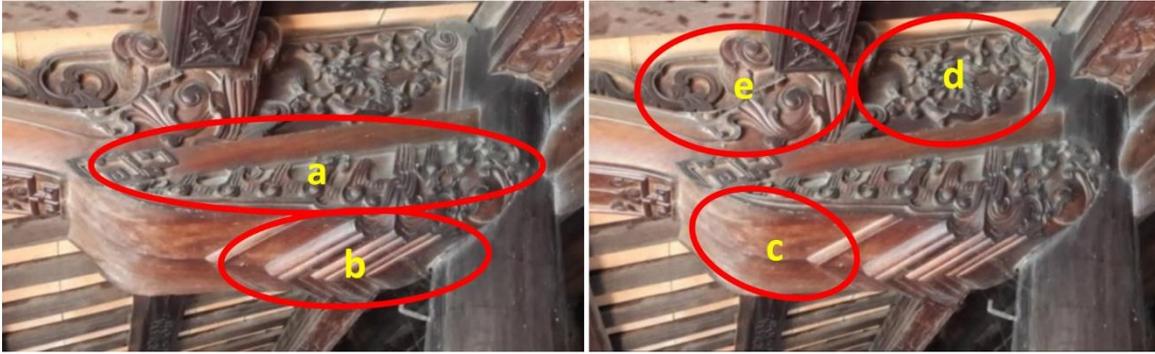


Figure 6: Tamson detail for Daukeol decoration (a. the cheek part, b. Laman part, c. The belly part) and other decorations (d. Vandong, e. Rafter tail) (source: author and [2])

- The cheek part usually has a round shape, carved flame-shaped twisted clouds, or a few other being flowers and leaves turning into dragons creating a soft and elegant feeling.
- The Laman part (can touch or not) is the liner, located in a peg that goes through the column to keep the link. Man leave is usually carved overlapping rhombus like rushing forward to create more vibrancy of Daukeo in feeling.
- The belly part is usually not carved, or a bat holding a coin indicates luck, happiness, and prosperity (Daukeo is not carved).

The most common details on the top of the rafter are the Bat (usually appearing in houses) and vignettes, namely Fire; Spiral; Cloud; Rhombus Edging stacking straight on top of each other; Flowers and Leaves turning into Dragon; Thunder, especially Clouds, Fire, Thunder are most commonly utilized.

Traditional construction techniques are used entirely by hand with the carving method through a chisel called "chang" which is constructed in an inclined direction, not straight like other chisels; therefore, decorative patterns have reached soft and delicate carvings. Furthermore, the technique of removing or separating soil is also very sharp and rarely leaves jagged or chisel marks, but now this method is seldom used.

The correlation of Daukeo's size and ratio

Ratio between parts of Daukeo

With the collected data through the survey process shown the correlation ratio between the details in the house is as follows:

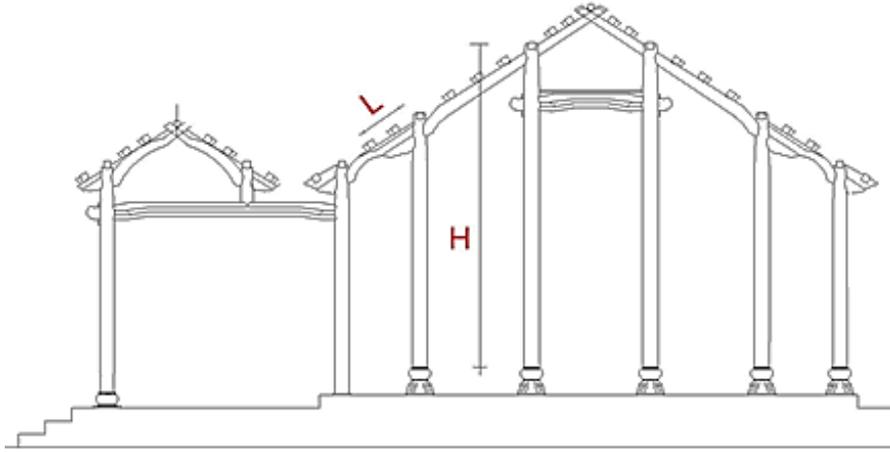


Figure 7: Proportional correlation between Daukeo and the height of the first-row column

(source: author)

The ratio between the first-row column's height and rafter's length: $H = 7,5 L$

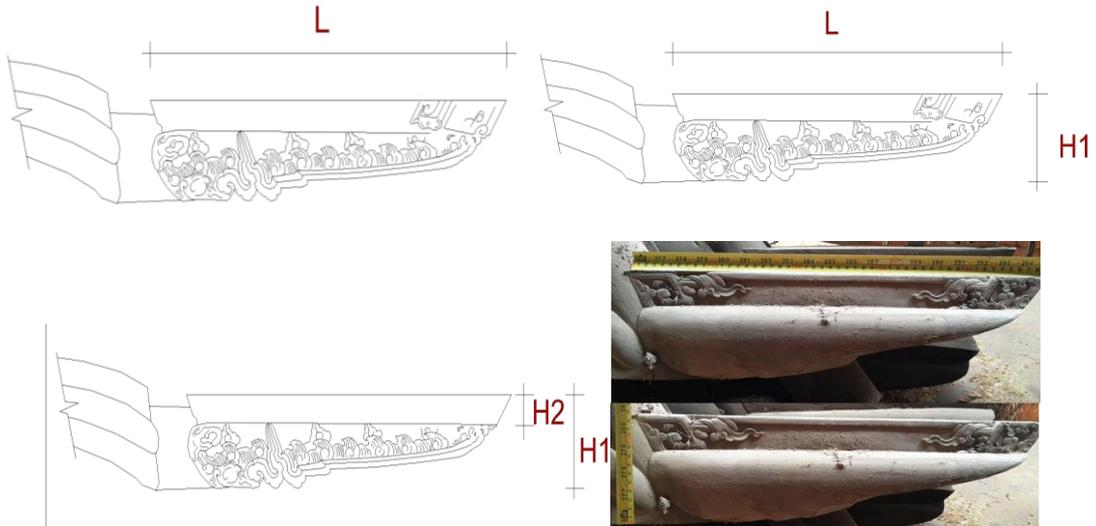


Figure 8: Size and ratio of Daukeo (source: author and [2])

The ratio between Daukeo's length and height: $H1 = 0,3142 L$

The ratio between the belly part and Daukeo's thickness: $H2 = 0,27 H1$

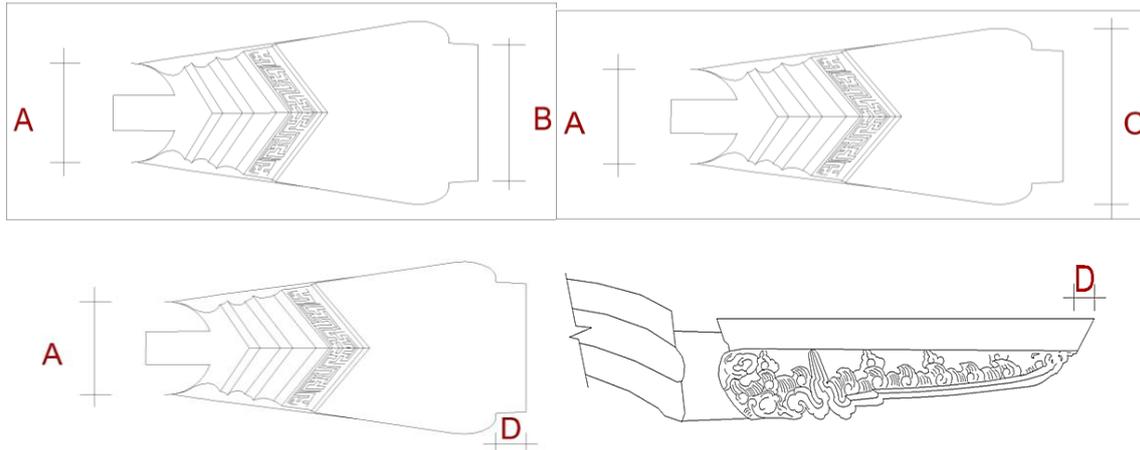


Figure 9: Size and ratio of Daukeo (source: author)

The ratio between the Belly part's head and Daukeo's throat: $B = 1,3 A$

The ratio between the width of Daukeo's cheek part and Daukeo's throat (the widest part of Daukeo): $C = 1,67 A$

The ratio between the length of the belly part and the Daukeo's throat: $D = 0,1523 A$

Data results

Based on the correlation of the Daukeo's size and the ratio of the surveyed houses and the experience of the workers, the size and ratio of Daukeo are as follows:

If the height of the first-row column is considered to be ($h=H$ on the fig.7), the height of the first-row column in traditional ancient houses is 3,5 m.

- The length of Daukeo is 14,3% h (this size is usually around 45 - 50 cm)
- The thickness is 5,2% h (this size is usually approximately 13 - 18 cm)
- The width of Daukeo is 7,1% h (this size is usually around 20 - 25 cm)

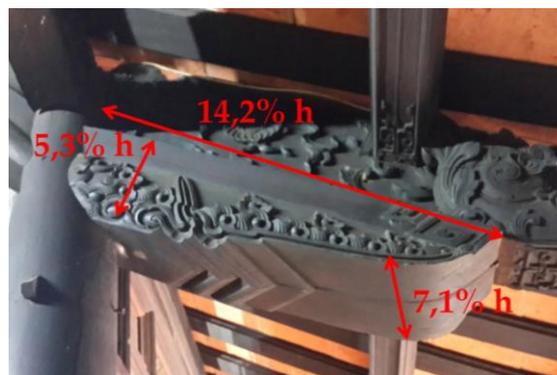
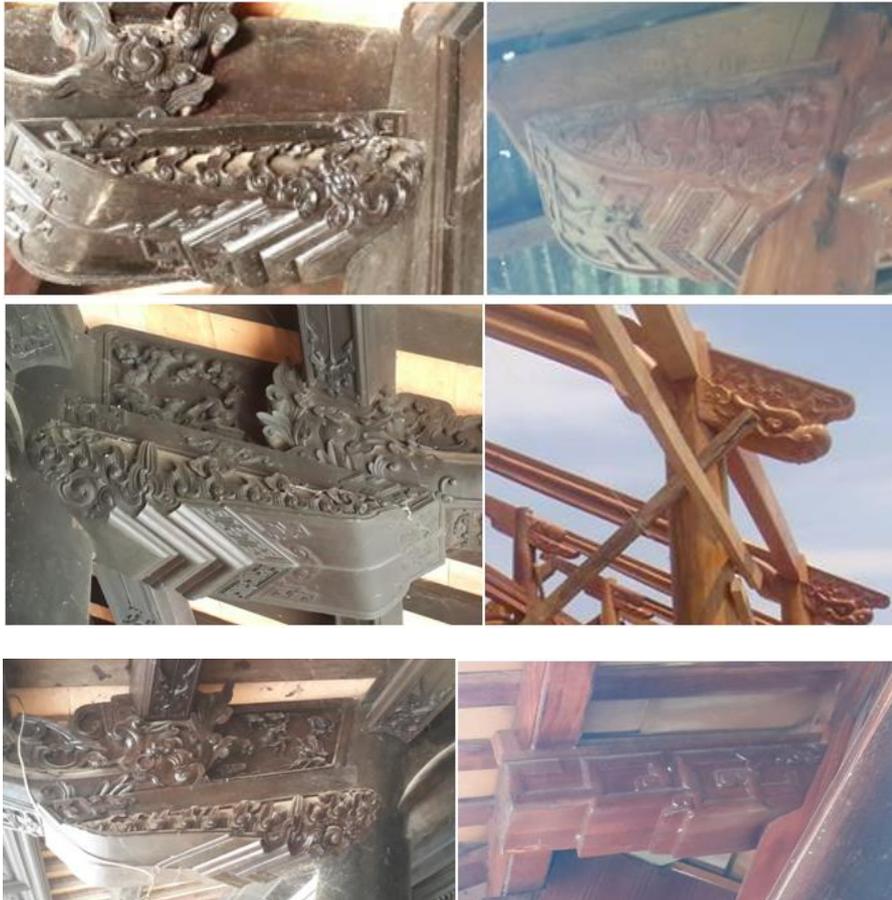


Figure 10: Ratio of rafter head is intact (source: author)

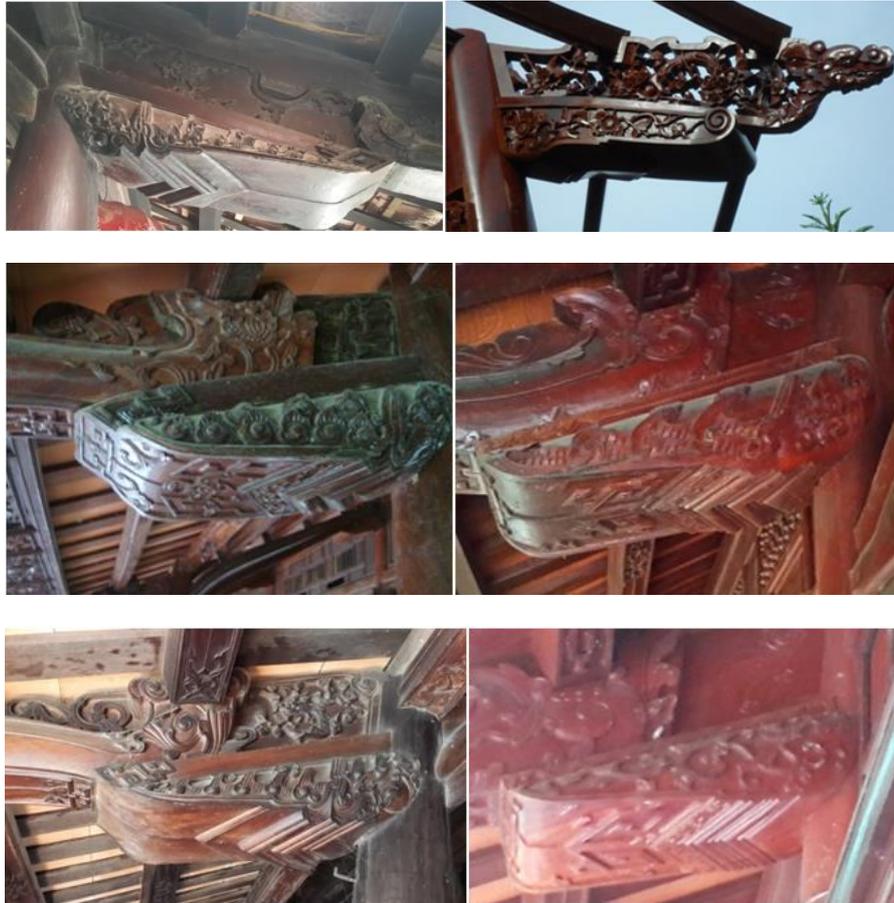
Some changes of the Daukeo pattern in the Ruong current house.

Most homeowners, who have the right to change their house, choose to repair housing based on intact details. This is an important factor to keep increasing the accuracy of details in the house. According to a realistic survey, 89% of repaired houses are still based on the original details, and the rest of the other houses (account for 11%) have vignettes changed a lot. Moreover, some details are carved by Computer Numerical Control machines (CNC), and used in repaired wooden houses.

Comparing the form of traditional and innovative Daukeo



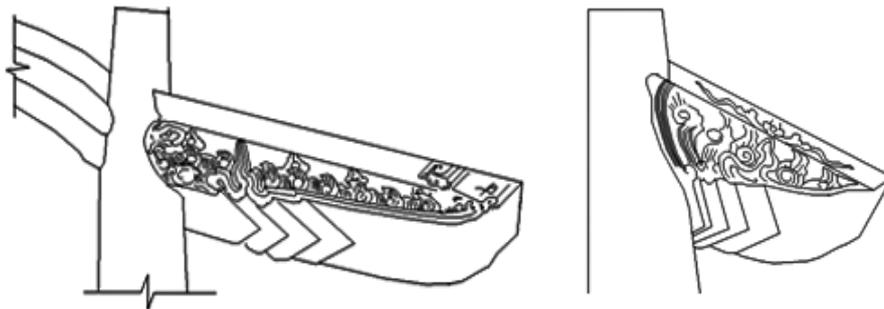
Daukeo at the ancient houses Daukeo at the current factories (CNC)



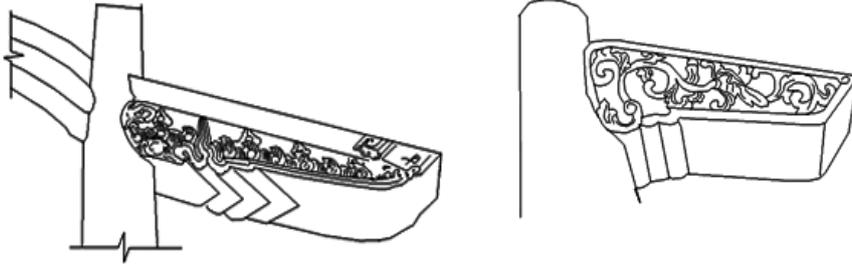
Daukeo at the ancient houses Daukeo at the current factories (CNC)

Figure 11: The difference between the ancient and innovative types of Daukeo (source: author)

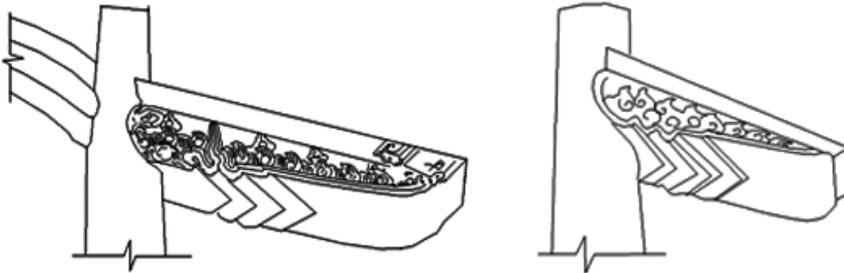
Comparing the proportions and patterns of traditional and innovative truss (Daukeo)



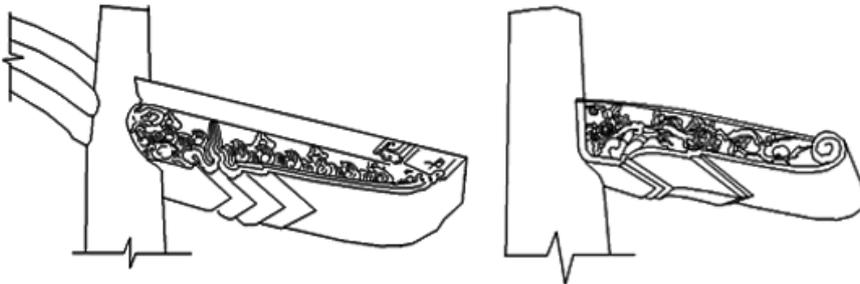
The Daukeo is modified to be shorter and thicker



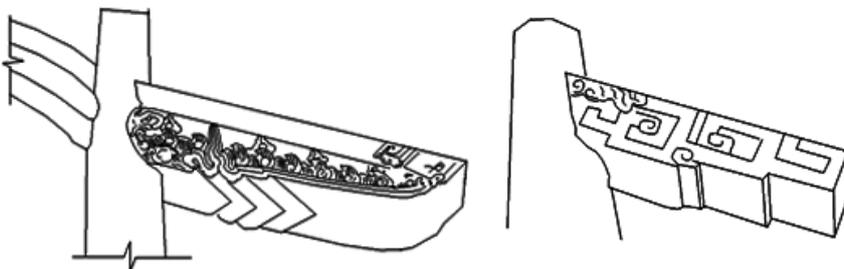
The Daukeo is modified with a shorter Tamson, and the more square tip of Daukeo



The Daukeo is thinned and the belly part is sharper



The Daukeo has been edited with a wider Tamson and the belly part is more rounded



The Daukeo is completely modified into square lines

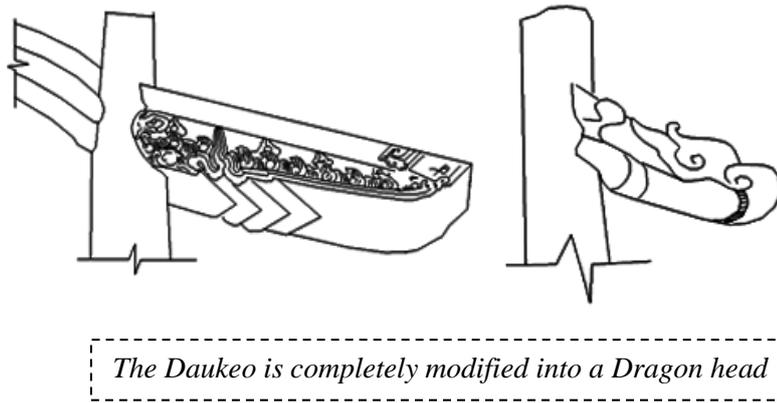


Figure 12: The difference between the ancient and innovative Daukeo (source: author)

General comments on the change of forms of traditional and innovative truss (Daukeo)

Except for traditional wooden houses, some restored wooden houses still tend to be based on traditional patterns. However, the proportion of pattern details, and the ratio of Daukeo still unnoticed, causing a loss of harmony compared to the inherent pattern details of traditional wooden houses.

Moreover, some workshops use machines (CNC) to carve; therefore, the sharp and high-level vignettes are lost and replaced by commercialized vignettes avail on the computer.

The change in Daukeo's vignettes of traditional wooden structures also comes from many different reasons such as the pace of society causing many people to forget the value of traditional wooden house architecture, the market economy leading to some production facilities following the needs and tastes of the current customers, the input cost of traditional wooden carving being expensive, the production facilities do not want to change and depend too much on machines (CNC), and the homeowners do not really understand the value of the art of Daukeo patterns in the structure of the house.

Conclusion

The contents of the article has made statistics, synthesized and analyzed characteristics of some forms for to carve the wooden truss (Daukeo) and to compare the pattern motifs for type change. The modification of the carving method and the lack of selection in the forms of pattern motifs also reduce the value of this carving art.

Types of decorative patterns of Daukeo on the structure frame of wooden houses are very diverse, rich and have a best value in the art of wooden carving in particular and in interior architectural decoration of Vietnam in general and in the two localities mentioned above in particular. This is a feature of culture and unique artistic, that needs to be conservation, preserved and promoted in the form of the pattern motifs are carved previously as well as later pattern motifs on wooden truss (Daukeo) in particular and on all most wooden structure frames in general.

Some suggestions on preserving the truss's pattern

- Should organize training courses on making carved products for young craftsmen who love the job to avoid falling the traditional craft into oblivion.

- There should be more in-depth documents on how to restore or renew wooden houses and data on traditional patterns.
- Disseminate more for people living in the Ruong houses to be aware of the value of the truss's pattern.
- Promulgate a set of criteria in the restoration of the structure of the Ruong houses.
- Organize seminars to get opinions from people interested in determining the direction to develop the Ruong wooden houses. The main purpose of these activities is to preserve the patterns and carving method and ensure the patterns' proportions are not changed.
- Must be supervised by professional agencies on the Ruong wooden houses in restoring traditional wooden houses to ensure the ancient shape and inherent meanings of each house.
- Implement policies to promote and trade tourism to enhance the value of the Ruong houses for the local population and tourists.

Acknowledgments

The authors appreciate the support from ThuDauMot University of BinhDuong Province, Vietnam.

Conflicts of Interest

The authors declare no conflict of interest.

Reference

- Nhandan newspaper. (2012). Ruong houses in Hue culture. Retrieved: from <https://nhandan.vn/van-hoa/nha-ruong-trong-van-hoa-hue-605996>.
- Hieu, TD et al. (2013). Case - study for truss pattern on the structure of Hue wooden house. Student research project: University of Sciences, Hue University.
- Hue Government. (2015). The policies of support, protecting and to promote characteristic value of Hue garden house. Resolution No.25: People's Council of Thua Thien Hue Province.
- Ha, TTQ et al. (2002). The origin and development process of traditional house of Vietnamese. International workshop proceedings, Hanoi National University (VNU), Volume (3), pp.43-61. Retrieved: from http://repository.vnu.edu.vn/handle/VNU_123/20829.
- Vui, TN et al. (2017). The carve art on traditional wooden house architecture. Retrieved: from <http://truongtoc.com.vn/public/index.php/nghe-thuat-cham-khac-tren-kien-truc-nha-go-truyen-thong>.
- Chuong, NPB et al. (2008). The ruong house of new version. Retrieved: from <https://thanhnien.vn/nha-ruong-the-he-moi-post288381.html>.