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Coffee Table Inspired by Haidilao Hotpot

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Abstract: Heavy rainfall is common in Malaysia during the rainy season (October to March), resulting in flooding and, in some areas, flash flooding. Following the flood, various consequences occurred, including furniture destruction and the weight of maintaining or replacing new furniture. Therefore, the primary goal of this research is to determine the design criteria for a coffee table inspired by Haidilao hotpot, as well as to design and build a prototype of a coffee table inspired by Haidilao hotpot. The design criteria were derived from the questionnaire that disseminated online via Google form, with 50 people responding. The survey's primary subjects were Taman Angkasa Nuri residents. According to the findings, 100% of respondents favor water resilience coffee tables because their coffee table was destroyed during the flood incident. Furthermore, most respondents favor a contemporary coffee table with a light color, a square form with closed storage, and a mix of more than one material. Because of its water-resistance property, the prototype of coffee table in this study is made of stainless steel (frame) and tempered glass (top table). In conclusion, the suggested coffee table is critical for flood victims because it reduces the cost of purchasing or repairing the damage coffee table.

Keywords: Coffee table, Flood, Haidilao hotpot, Modern design

1. Introduction

Floods are widely regarded as the most common and devastating natural disaster in many parts of the globe, particularly in tropical countries such as Malaysia (Romali & Yusop, 2021). Floods are already becoming more prevalent throughout the globe because of the extreme rainfall that is expected to occur more frequently because of the climate change occurrence. Malaysia has an abundance of water resources due to heavy rains. In 2017, the greatest and lowest annual rainfall quantities were reported at Kuala Kangsar ($1,955.4 \text{ mm}^3$) and Labuan ($4,938.9 \text{ mm}^3$), respectively (Department of Statistic, 2018).

According to the statistics, the December 2021 floods in Malaysia cost an estimated RM6.1 billion in financial damages and forced the evacuation of approximately 400,000 people (Rahman, 2022). Unprecedented rains submerged parts of Peninsular Malaysia's west coast to nearly four meters, turning

roads into rivers. The flood that hit this nation in late 2021 and early 2022 damaged residential areas, cars, business properties, the industrial and agricultural sectors, public assets, and infrastructure as well as the furniture (Mahadin, 2022).

Following the flood, various consequences occurred, including furniture destruction and the weight of maintaining or replacing new furniture. Upholstered sofas, easy chairs, some wood-based furniture, and recliners were discarded if they have been drenched or immersed in floodwater, particularly if it is muddy. The soft padding and fabric are now a potential breeding ground for mold and mildew, and cleaning these materials is difficult. The structural harm includes furnishings restoration costs such as cleaning, re-painting, and material replacement (Romali & Yusop, 2021).

Furthermore, the formaldehyde in these wood-based furnishings contributed to environmental pollution. After inadvertently ingesting polluted water, formaldehyde creates a local corrosive impact in the upper gastrointestinal system because formaldehyde is detrimental and even toxic to many tissues and systems in the body (Isabirye *et al.*, 2012). People in a frequently flooded area may organize their major tools and valuable furnishings on higher levels to prevent severe harm to the furniture (Kang *et al.*, 2005). However, for those who live in a downhill area or in single-story homes, the flood may completely submerge the house, causing total loss to furnishings and other items. Therefore, the objective of this study is to develop a coffee table made of flood-resistant materials (i.e., stainless steel and glass) as remedy to the issue.

2. Literature Review

2.1 Flood in Malaysia

One natural calamity that significantly damages human life, severely disrupts socioeconomic operations, and significantly damages properties is flooding (Chang, 2008). Flooding can also result in fatalities and a decline in human health. A flood hazard is an inundation risk that puts people's lives, health, property, and the resources and services of the natural floodplain at risk. Floods often occur in Malaysia, causing an average of 915 million in physical damage year and affecting around 29,800 km2 and 4.82 million people (Romali & Yusop, 2021).

According to the statistics from Malaysia, the floods in December 2021 caused an estimated RM6.1 billion in financial losses, forced the evacuation of approximately 400,000 people, and resulted in almost 50 fatalities. Unprecedented amounts of rain caused sections on Peninsular Malaysia's west coast to be nearly four meters under water, turning highways into rivers. Many routes in the center of Peninsular Malaysia were submerged, making travel impossible. In Taman Sri Muda, many single-story homes were submerged up to their rooftops. 95 percent of the region was submerged by floodwaters that in some areas rose to a height of four meters (Rahman, 2022).

Additionally, Peninsular Malaysia experienced floods because of heavy rain starting on February 25, 2022. In the 48 hours leading up to February 27, 2022, Kuala Terengganu saw more than 400 mm of rain. According to the National Disaster Management Agency (NADMA), 20,000 people or about 6,000 families had to leave their homes and move into 224 evacuation centers spread out over 15 districts in the states of Terengganu and Kelantan.

2.2 Coffee Table

The materials used to make furniture and other household items typically include wood, metal, plastic, marble, glass, textiles, or materials like those listed above. Moving things used to support a variety of human activities are referred to as furniture. Examples include mattresses and hammocks for sleeping and seating like stools, chairs, and sofas for dining.

Coffee tables are long, low tables that are intended to be positioned in front of (or adjacent to) sofas or upholstered chairs to hold beverages, periodicals, books, ornamental items, and other small items to be used while sitting, such as beverage coasters (Samygina, 2017). In Britain during the late Victorian era, the first wooden tables manufactured primarily for use as coffee tables were produced, especially in 1868 when a table created by EW Godwin was classified as a "coffee table." The table was categorized as a coffee table, making it the earliest instance of the popular modern centerpiece in Europe. The traditional table's funny feature is that it was rather high, measuring around 27 inches high, although other sources only list it as a table, leaving it unclear. The legs of the table had to be shortened when coffee tables grew more and more popular in the 20th century because this was not uncommon.

There several types of coffee tables including their design styles, table legs, and ideas on how to choose and match a coffee table with your sofa, includes traditional coffee table, contemporary coffee table, vintage coffee table, rustic coffee table, stackable coffee table, coastal coffee table and modern coffee table. There are several types of coffee table in the market, which is traditional coffee table are made of carved wood and have a rectangular or oval tabletop surface. Furthermore, contemporary coffee table feature a revolutionary design, modern coffee table feature simplicity, rustic coffee table sculpted in more subtle patterns, vintage coffee table usually odd style concepts from the past and stackable coffee table features provided space saving. Besides that, the shape of table surface also varies according to the types of coffee table.

The dimension of a standard coffee table based on the industry standard is height is 15-19″ (381 mm-482.6 mm), length 36-48″ (914.4 mm-1219.2 mm) and width is 18-24″ (457.2 mm-609.6 mm). Whereas the average sized for coffee tables have a width of 18″ (457.2 mm) to 24″ (609.6 mm) inches and a length between 36″ (914.4 mm) and 48″ (1219.2 mm). Ideally, coffee table should have about 16″ (406.4 mm) of space around it. This open area allows people to move comfortably around the table. Meanwhile, the standard height of a coffee table typically ranges from 16″ (406.4 mm) to 18″ (457.2 mm). The average sofa seat height measures 17″ (431.8 mm) to 18″ (457.2 mm) from the floor to the top of the cushion. The ideal length to choose a coffee table that is two-thirds the length of your sofa. For example, a sofa whose length is 84″ (2133.6 mm) would need a coffee table around 56″ (1422.4 mm) long. This will make it, so the table is easily within reach when sitting on either end of the sofa but still allow for plenty of room to walk around it (Randall, 2022).

2.3 Haidilao Hotpot

Haidilao was founded in Jian yang, Sichuan province, in 1994. Zhang Yong, the company's founder, and president was born in Sichuan province. Haidilao is a hot pot restaurant chain with over 450 locations in Asia, including mainland China, Hong Kong, Taiwan, Singapore, South Korea, and Japan, as well as Canada, Australia, and the United States. In comparison to other hot pot restaurants, Haidilao provides exceptional customer service. Haidilao is more of an experience than a restaurant. The first item on the menu to order is the soup base. You can divide your pot into four sections and have four different soup bases at Haidilao (Jinyu, 2020).

The design concept of the coffee table is come from problems of flood disasters. The wooden coffee table or the other materials that does not have water resistance will damage after flooded. The ideation is come from Haidilao hotpot because the shape of the Haidilao hotpot is like square shape coffee table. Besides, this hotpot is made by stainless steel and divided the pot into four sections to place four different soup bases. Therefore, the idea of designing the coffee using waterproof materials to avoid coffee table from corrosion and damage when soaked or immersed during flood disasters. On top of that, the coffee table is also design for storage which enables the users to maximize the working space with drawers that can be divided into four sections to serve as storage.

2.3 Water-Resistance Materials

Water resistance is a form of protection against humidity and water penetration. A water-resistant material can endure raindrops or water splashes, or even an occasional drop in the sink (Versus, 2020). A water-resistant material, such as pressure-treated lumber, will combat the effects of water, but it will not prevent water from passing through. Once the water soaks the lumber, it will seep through to the other side (Scalisi, 2021). Water-resistant materials used to make a coffee table include stainless steel, tempered glass, polymer, and water-resistant timber. These materials are not only water resistant, but they can also endure heavy loads as a coffee table should work and have aesthetic value.

3. Research Methodology

The combination of methodology reported by Ramli *et al.* (2018) and Selimin *et al.* (2019) was implemented in this study. To acquire the design criteria of coffee table inspired by Haidilao hotpot, the primary data was collected by using quantitative method which is the questionnaire. Researcher utilized Google Form to distribute the questionnaire to 50 individuals aged 18 and above in Taman Angkasa Nuri, Melaka, Malaysia. Taman Angkasa Nuri, Melaka was chosen because this area frequently flooded when heavy rainfall happens. In this study, the questionnaire was divided into two sections which is Section A (demographic information) and Section B (design criteria), with total of 17 multiple-choices questions. The obtained data was analyzed to assists the researcher in gaining a better understanding of the market's needs and consumers' preferences regarding the coffee table features. The questionnaire results were incorporated into the design of a coffee table inspired by Haidilao hotpot during design process as design criteria and help in deciding which material should be used as main materials during prototype fabrication process.

Next is visual research. In this research, the resource of visual research was obtained from Google Images. The selection for the visual research involves the way to apply the hotpot element to the coffee table design and the element to prevent coffee table corrosion when flooded and some other design elements of coffee table. In this study, five visual research were generated that focus on the coffee tables with the modern design concept, hotpot concept (rectangular table surface), and coffee tables with storage. Besides that, the visual research also focused on coffee tables with flood-friendly materials. The set of visual research elements will provide some fundamental and guideline for a brainstorming about the coffee table design and help to further identify the design criteria and the direction for this research.

Subsequently, thumbnails were drawn to visualize the coffee table basic design concept and ideas. The concept for a coffee table was sketched in 2D and 3D sketches on A3 paper using a pen or pencil only. In this study, 30 thumbnails were generated based on the design criteria obtained from the questionnaire and visual research.

Eventually, the ideation is the process of generating ideas and solutions through sketching or graphic sessions. The selection was made based on the appearance and possible to the serve the as coffee table function. In this study, six ideations were further extended based on the chosen thumbnails. The selection of thumbnails was made based on the most appealing and attractive thumbnails that appropriate with the Haidilao hotpot design. The ideation was sketched in 3D views on A3 paper mainly to improve the original thumbnail design. Only selected ideations will be further developed in idea development stage.

Afterwards, the design details such as the arrangement of the coffee table storage structure was improved to meet as many required design criteria as possible in idea development stage. Moreover, in this stage, the elements of Haidilao hotpot were instilled into the design through enhancement of the coffee table sketches with some explanation on important features. Total of three ideations were selected

to further develop in this stage. From these chosen ideations, three idea developments were generated and improved by considering the functions, appearance, and proposed materials in detailing the important part of each sketch.

Following that, simple final design survey was conducted to determine the final design. Three idea development sketches were selected from previous stages as candidates of final design. The survey was conducted in the form of questionnaire and again distributed to 50 respondents in Taman Angkasa Nuri, Melaka by using Google Form. The sketch of final design was prepared in color with some detailed information and full dimension of the coffee table.

In this study, a mockup of coffee table was developed with a 1:5 ratio based on the exact dimension of the final design by using a ruler, pencil, scissor, utility knife, spray paint, cardboard, chopstick, bamboo stick, hot-glue gun, mini saw, and acrylic sheet. The steps to develop is using a pen and ruler to draw the structure of the coffee table on the chopstick. Then, using a mini saw to cut the chopstick and bamboo stick according to the size had set. After that, use scissors to cut the cardboard (for Chinese pattern) and the acrylic sheet (use for mockup tabletop) to the desired size or shape. Next, warm up the hot glue gun and joint the part according to the final design sketch. After that, spray the mockup and let it dry. Then researcher identified the feasibility and any improvement with the mockup.

Next, the technical drawing of final design was generated using AutoCAD software. There are both 2D and 3D drawings. In orthographic view (2D), it comprises three views known as top view, front view, and side view. Moreover, the isometric and perspective views were developed in 3D view. The drawing's measurement is in millimeters (mm).

Finally, a prototype was manufactured in accordance with the technical drawings. Wood, stainless steel, polymer, or a combination of these materials are all acceptable choices. The water-resistance production and finishing processes for different materials differ. As a result, the appropriate method for constructing and finishing was selected based on the parts being used. After every necessary part had been made, it was time for assembly and packaging.

4. Results and Discussion

4.1 Questionnaire Analysis

50 respondents living in Taman Angkasa Nuri, Melaka were selected to answer the questionnaire. After collecting data, the researcher analyzed the data by using Google Form. This questionnaire consists of two sections which are section A (demographic information), section B (design criteria). Table 1 shows a summary of the questionnaire results. This study found that the design criteria preferred by the Taman Angkasa Nuri residents are modern coffee table as a design concept than traditional, contemporary, rustic, coastal and stackable coffee table. Almost of respondents preferred light color, square shape with closed storage and combination more than one material for their coffee table design.

4.2 Visual Research

In this study, there have total of five pieces of visual research produced (Figure 1). Based on the design criteria has collect by questionnaires above, the visual research was focus more on the elements of coffee table with square shape coffee table, coffee table with closed storage, modern coffee table design, coffee table with light color, coffee table with combination more than one material.

Table 1: Summary of the questionnaire data

Section	Percentage (%)	Description
Demographic	52	Female respondent
	28	41-50 years old
	60	Chinese
	34	Housewife
	50	M40 (RM 4,850 to RM 10,959)
	62	2-storey terrace house
Design criteria	98	Have coffee table in house
	88	Coffee table had been damaged by the flood
	46	Less than RM100 to replace or repair the coffee table that was destroyed by a flood
	32	RM251- RM500 spend on a coffee table
	74	Know Haidilao hotpot
	52	Prefer modern coffee table
	54	Prefer square shape
	52	Prefer closed storage
	52	Prefer light colour coffee table
	100	Like a water-resistance coffee table
	68	Prefer combination more than one material

Figure 1: Visual research of coffee table

4.3 Thumbnail and Ideation Sketches

Several ideas were sketches as thumbnail as presented in Figure 2. All thumbnails were sketched in 2D front view with difference design criteria based on the data collected from the questionnaire and visual research. Thumbnails marked with red box as in Figure 2 were selected for further development in the next process known as ideation. The decision to proceed was made based on sketches that could meet all the design criteria that were previously gathered from respondents.

Next, six ideations were generated from the selected thumbnails as illustrated in Figure 3. The ideation was sketched in 3D view. For ideation 1, this sketch was made based on Chinese pattern of the Haidilao hotpot. The coffee table base for ideation 1 is made from stainless steel, square shape, glass tabletop and provide open storage. Next, for ideation 2, this sketch was made based on modern types of coffee table. The coffee table base for ideation 2 is made from stainless steel, square shape, glass tabletop and provide two triangle open storage. Meanwhile, the ideation 3 made based on combination

of modern coffee table types and the soup bases of Haidilao hotpot design. The coffee table base for ideation 3 is made from stainless steel, square shape, glass tabletop and the open storage is divided to four sections.

Furthermore, the ideation 4 was made based on modern coffee table simply design. The coffee table base for ideation 4 is made from stainless steel, provide two-cylinder table legs and two L shape leg, square shape, glass tabletop and the open storage. In addition, ideation 5 was made based on four soup bases Haidilao hotpot design and its base are made from stainless steel with square shape, glass tabletop and the open storage that has four sections. Lastly, ideation 6 was made based on four soup bases Haidilao hotpot design on top view and side view. The coffee table base for ideation 6 is made from stainless steel, square shape, glass tabletop, and the open storage is divided into eight sections which are up-down four sections.
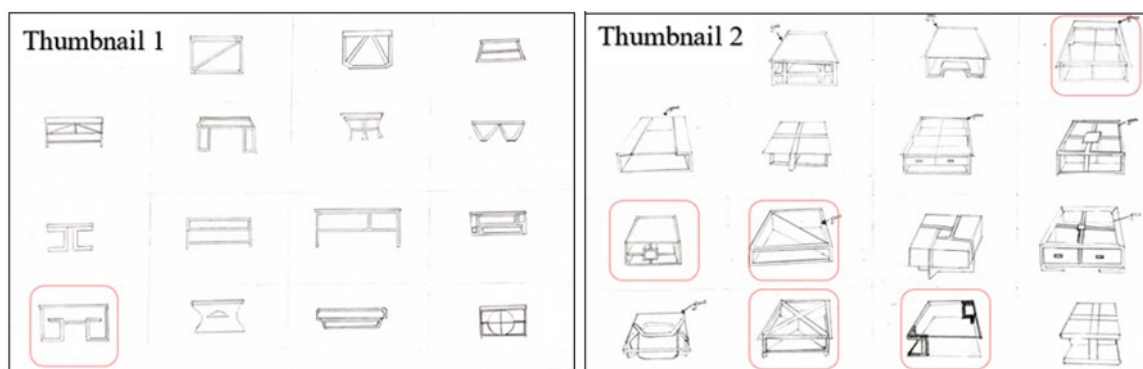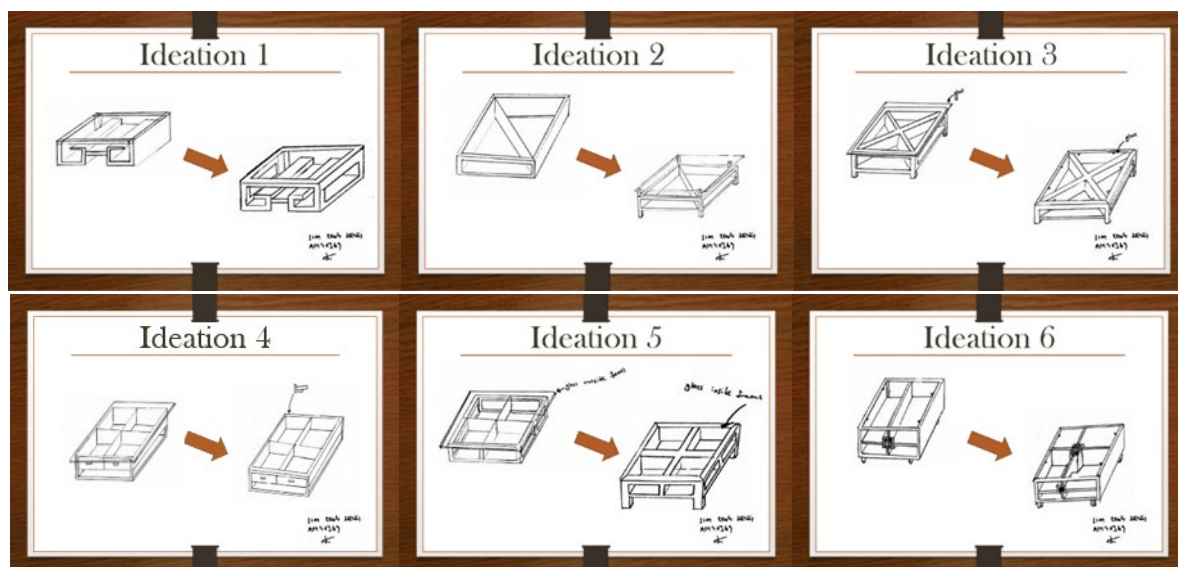

Figure 2: Thumbnail of coffee table

Figure 3: Ideation of coffee table

4.4 Idea Development

In this stage, ideations 1, 4 and 6 were chosen for further development because they possessed a better potential design that can embrace the Haidilao hotpot concept. In the idea development, the sketches were drawn in difference view with some detailing to give better information about the design. Additional information regarding each idea development is tabulated on the drawing. Figure 4 shows the idea development sketches of this study. In this study, all idea developments were used as a final design candidate in the final design survey. This is done mainly to ensure that the final design for this

study serves the preference of potential users although all designs fulfilled the main design criteria obtained earlier.
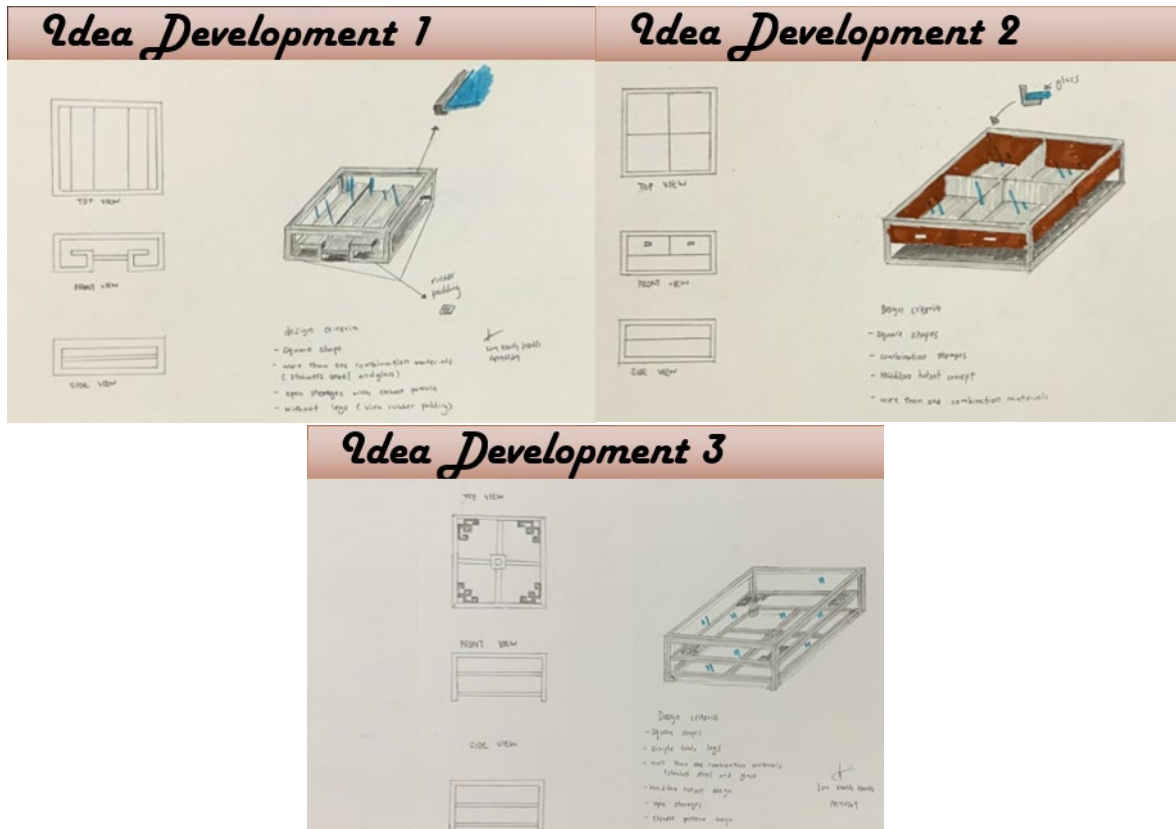

Figure 4: Idea development of coffee table inspired by Haidilao hotpot

4.5 Final Design

In this study, 50 respondents living in Taman Angkasa Nuri, Melaka were selected to answer a simple final design survey. Table 2 shows the summary of the final design results. This study found that the preferred design is Design 3, where majority of the respondents considerate or choosing furniture that meet to their satisfaction in the term of intention of the design, function, storage, and design appearance.

Table 2: Summary of final design selection

Section	Percentage (%)	Description
Demographic	62	Female respondent
	36	41-50 years old
Design selection	56	Design 3
	48	Satisfied with its design
	48	Satisfied with its storage

Design 3 was selected as a final design as it met the respondent's preference. Based on the final design of the coffee table, its height is 40 cm whereas the coffee table width and length are 80 cm in square shapes, which fulfil the suggestions of standard dimension of coffee table. The open storage design is done mainly because of flood-friendly design, which the pull-out drawer difficult to managed or clean after flood. Furthermore, stainless steel (frame) and tempered glass (tabletop) were used as the materials for fabrication. In addition, the jointing of the stainless-steel frame will be done using welding. The final design for coffee table inspired by Haidilao hotpot as shown in Figure 5.
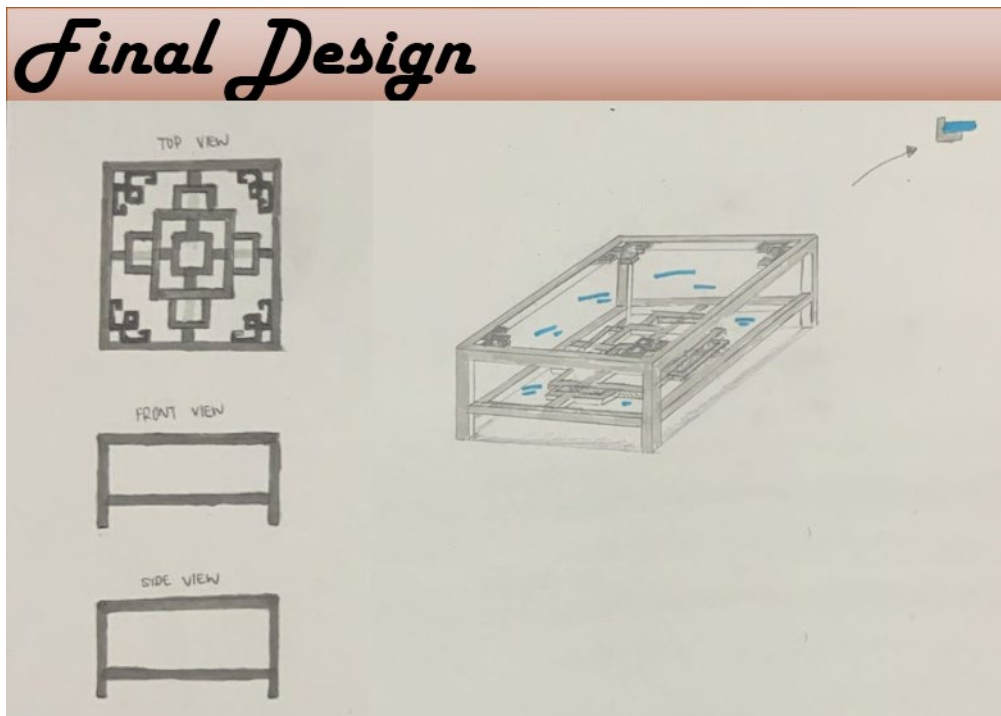
Figure 5: Final design of coffee table inspired by Haidilao hotpot

4.6 Mockup Development and Technical Drawing

The mock-up of coffee table was made at the scale of 1:5 on the exact dimension of the proposed final design. The mockup of coffee table inspired by Haidilao hotpot is presented in Figure 6. The structure was constructed of wooden chopsticks and bamboo sticks that were sprayed to look like stainless steel. Meanwhile, an acrylic sheet was used to replicate the tempered glass tabletop.

Figure 6: Mockup of coffee table inspired by Haidilao hotpot

The technical drawing is defined as an overview for illustrating how the coffee table is constructed in suitable techniques. The technical drawings are presented in an orthographic and isometric views as illustrated in Figure 7 and Figure 8, respectively. The exact dimension of the coffee table is presented in Figure 7.
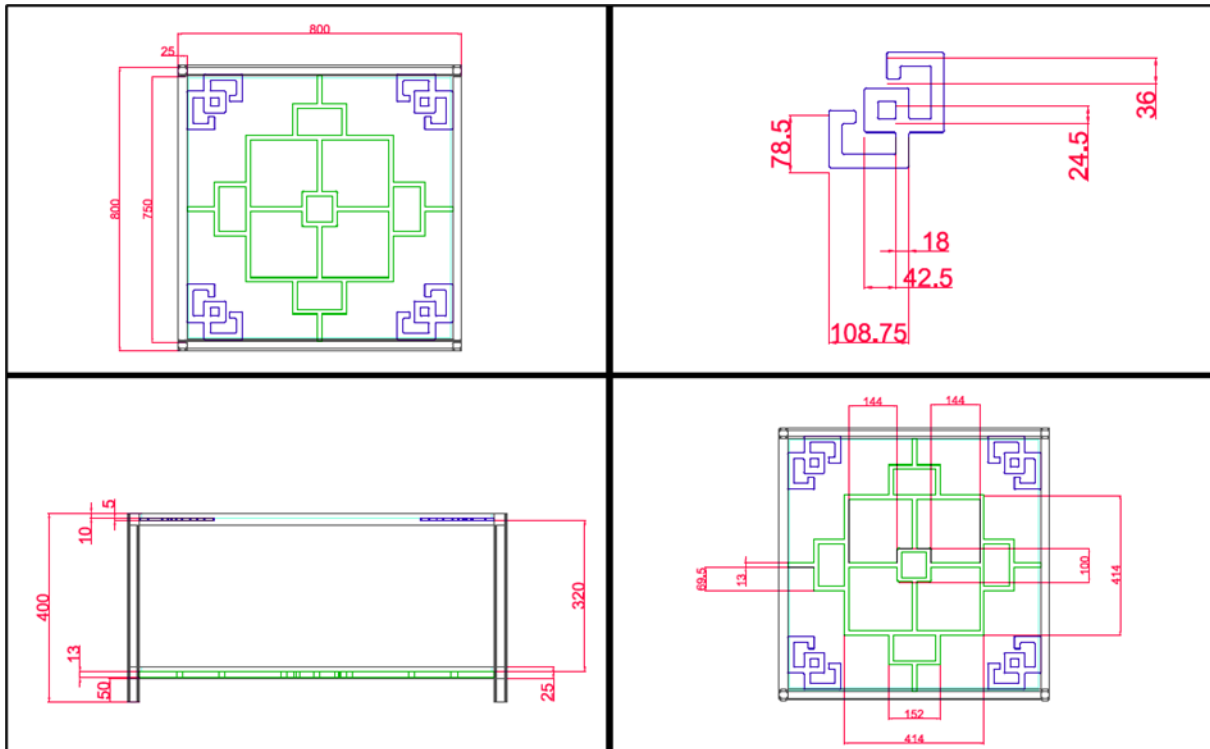
Figure 7: Orthographic view of coffee table inspired by Haidilao hotpot (dimension)
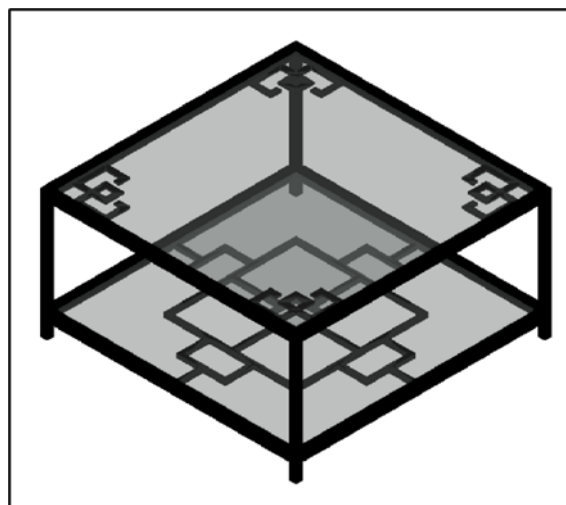

Figure 8: Isometric view of coffee table inspired by Haidilao hotpot (rendered)

4.7 Prototype Fabrication

In the prototype fabrication process, the prototype was made of stainless for it frame and glass for the tabletop. In this study, the prototype has an open storage, and the design on the top is using the Chinese pattern. In addition, the bottom part was designated to replicate the Hotpot design (Figure 9). The dimension of the coffee table inspired by Haidilao hotpot is 80 cm x 80 cm x 40 cm. The researchers put the rubber pad on the table leg mainly to escalate the aesthetic appearance, to avoid scratch on floor, and better stability. The coffee table are water-resistance and has a modern design because of the materials selection and the simple design. In case of flood event, this proposed coffee table design able to sustain and can be easily clean without bring any damage.

Figure 13: Prototype of coffee table inspired by Haidilao hotpot

5. Conclusion

Finally, this study accomplished the research goals. In the present study, a coffee table inspired by Haidilao hotpot was created by identifying design criteria through questionnaires distributed to respondents residing in Taman Angkasa Nuri, Melaka. The major criteria when designing a coffee table are the modern coffee table, square form, combination of more than one material, light color, and water resistance. The study also produced 30 thumbnails, 6 ideations, and 3 idea development sketches. Because of its appealing design and ability to meet all design criteria acquired prior to the prototype manufacturing process, idea development 3 was selected as the final design for this study. This design adds value and has economic prospects for commercialization. This design could help users who have experienced flooding, particularly during the rainy season, which occurs every year in tropical nations like Malaysia.

Acknowledgement

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