



The Architecture Design for Stray dogs

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Abstract

The problems of stray dogs have caused many negative social impacts, including physical such as dirt caused by feces or debris as well as carriers of various diseases caused by the stray dogs. These problems affect the health and environment and cannot be resolved since the number of dogs has increased more and more. The authors believe that these problems can be mitigated by designing the kennel with space because these stray dogs are scattered in different areas, making them difficult to manage and maintain. For this reason, the authors study and observe the behavior of stray dogs. It was found that these stray dogs, despite belonging to the same breeds, have different personalities and needs. For example, some dogs are shy while some are ferocious. The latter can be caused by being caged or chained, making the dogs stressed and anxious. Some dogs are paranoid and hiding as a result of being hurt by humans. In this study, the authors came up with some ideas for designing a kennel, starting with sketching the ideas to developing solutions for different problems. To get the final solution, many concepts were adopted and developed into several versions of mockups. By improving from the problems found in each step, the development of the final prototype succeeded.

Keywords: *Stray dog, Architecture, House design, Dog kennel, Dog cage*

1. Introduction

Pet dogs are different from stray dogs on the streets, from good care, cleanliness, to good sleeping, as most owners give them regular showers and haircuts. Some even have clothes and accessories that mimic human fashion. Moreover, some are given their favorite dishes, good food, or even a dog's bed.

Meanwhile, stray dogs exist in every corner of many areas, whether temples, schools, villages, or even small communities, which they often hear howls every night. Because these dogs do not have caretakers like pet dogs, their torso often looks dirty and unclean. Sometimes it may be wounded from human attacks or bites against each other to compete for limited amounts of food to sustain life and to use local roads or areas as a shelter with hope to just find a shelter from the sun during the day and waterlog when it is raining. These dogs cannot choose their sleeping place at all. They have to endure dirt, mud, and water to survive daily.

A similar problem exists even within a contained environment like the study temple. Aiming to resolve these problems, the authors studied the problems of stray dogs in the temple and concluded that designing a better shelter can alleviate the problems faced by the dogs neighboring in the temple and the people living in the neighborhood communities, to help these dogs to live peacefully with the human (Figure 1). You can also enjoy the interactive pet life (Malhotra, 2020).

The comparison between old and new facilities further enforces how an understanding of companion animals. There are many different systems of dog kennel design currently in use; with subtle variations depending on the individual preferences of the designer, time when the kennel was built, availability of land and building materials, and available finances. Where dog houses are constructed. The following are demonstrations of the main designs of purpose-built dog houses commonly used today. Outdoor dog house, Usually wooden or metal dog houses are used as outdoor dog houses. Apart from the regular dog house shaped like an actual house (Figure 2), several other dog house designs are available in shapes like a cage, a tent; etc. There is also a mobile dog house made of metal that can be easily moved.



Figure 1 Petris Dog Shelter for Stray Dogs (Malhotra, 2020)



Figure 2 Portable Dog Kennel (Countryside Sheds LLC, n.d.)

The ultimate combination of household harmony with this indoor dog house. Seamlessly integrate pet's hideout into daily life in both style and comfort. Featuring a simple but innovative design. Indoor Dog House, Technically, the pet should continue in a position to stand in the dog house, change about and lie down without difficulty (Figure 3). So that doggie would have picking outgoing inside to be warm. It is excellent for the dog since it will keep the dog warm in winter and cool in summer. The dog can get in and out freely to get warm.

Nendo, a well-known Japanese design studio, has taken a minimalist approach to the current trend of pet furniture and lifestyle goods that we cannot get enough of (Morby, 2016). Their line of pet products, appropriately titled Cubic Pet Goods, includes a dog house, soft toy, ceramic bowls, and of course, a ball. Each piece in the collection is carefully selected to coincide with the dog's need and human's desire for aesthetic quality.



Figure 3 Cool Indoor Dog Houses (homemydesign, 2014)



Figure 4 Architecture for Dogs curated by Kenya Hara (2015)

2. Objectives

- 1) To design the kennel to support the behavioral needs and welfare of the stray dogs
- 2) To create a tidy kennel for the stray dogs with a variety of functions



3. Materials and Methods

3.1 Survey data collecting

Data were collected by observing the behavior of the stray dogs at Suankaew foundation and interviewing stray dog caregivers from various foundations that concern the stray dogs on the problems of taking care of the stray dogs. Suggestions to resolve the encountered problems were also discussed with many relevant sectors such as foundations for stray dogs, temples that accept stray dogs for caring, as well as those who give care to the dogs. The guideline of solving approach was analyzed and summarized, and many previous works of the kennel design were studied as guidance.

3.2 Design process

Based on the evidence found in the previous observation and research, space is an important part of stray dogs since stray dogs are often independent inherently. They do not like being captured, which will make them frustrated and appeared ferocious. The design of the kennel should have a sufficient space that is supportive and consistent with their behavior and clean, which will have a positive effect on their health. Also, the dogs should have an access to exercising and running areas. The areas should be large and wide enough for them while running or lying on the back. Because these behaviors are essential for their emotional and physical well-being, by focusing on various functionality and space sharing among the stray dogs, the cage and kennel were designed.

3.3 Model Sketching

The first step of model sketching is to gather as many different innovative ideas to sketch out in different aspects, such as shape and function, present them all clearly to develop solutions, and consider all different aspects to come up with the final solution.

In the next step, the authors brought the ideas to create many versions of mockups using Plastwood material that can be cut easily and is flexible to fabricate many shapes, improve from the problems found, and carefully perform each step to get a complete mockup.

3.4 Create a prototype

A prototype of the kennel was constructed using cement boards for the walls and floor of the kennel due to their weather and scratch resistance. This material is also easily cleaned and durable. For the interior, clear acrylic sheets were used to make the inside clear, which helps the dogs to feel secure.

The cage prototype was fabricated using 8-mm steel bars as a structure to improve airflow and ease the cleaning and a cement board as a floor.

4. Results and Discussion

4.1 Observation and survey result

The results of the observation showed that the stray dogs behave significantly differently from normal dogs, from sleeping to eating. The stray dogs sleep and eat awkwardly and prefer to live in heard. Besides, most dogs lie obstructing a path, know their territory, and know where they can sleep.

The stray dogs spend most of their time sleeping and need a personal space where they feel safe because most stray dogs are isolated dogs. Even though they have to share a territory with other dogs, their places have never been divided by a fence, which makes the dogs uncomfortable and stressed. Thus, the kennel is important for these stray dogs and must correspond to their needs or behavior. Sufficient space between the dog's head and the kennel's ceiling is also essential to allow the dog to stand, lie down, step in and out, and perform other gestures or actions properly.

4.2 Sketch design

The principle of design thinking focused on functional areas that must be flexible and clean so that all dogs can share the space and good environment. An improperly designed kennel can be costly and yet create conditions that are conducive to the dog and human illness or injury as well as are difficult for the



caretakers to manage or function effectively. Most importantly, a poorly ventilated kennel, for instance, can make it difficult to keep ammonia levels low, contributing to upper respiratory problems for the stray dogs as well as people, and can lead to increased disease transmission between the animals.

The authors collected sketch ideas and mockups. All of these represent different ideas to be described in detail below.

4.2.1 The underground kennel

The first idea was an underground kennel (Figure 5). The concept is a kennel that is harmoniously connected with nature. There are two parts of the kennel; the top is designed for the dogs to sleep during the day or in normal weather conditions and the lower part is a basement designed for hiding from the heat of the day, which the dogs can sleep inside. The basement cools the interior, comforting the dogs, and the canopy is adorned with small garden plants, making it in perfect harmony with nature.

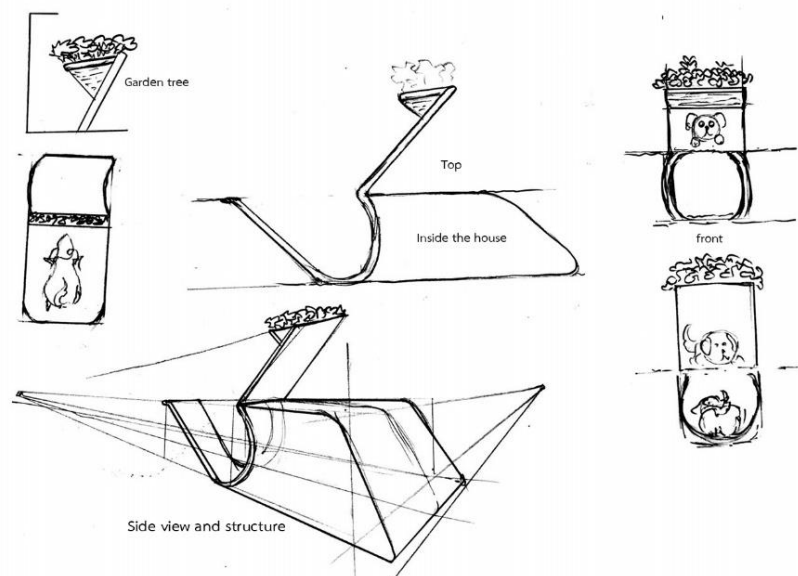


Figure 5 Sketches of the underground kennel

4.2.2 The modular kennel

The second idea was a modular kennel. Figure 6 shows the design that offers multifunctions, which is versatile and can be adapted to many types of stray dogs, for example, isolated dogs, coupled dogs, family dogs, or sick dogs.

At first, the main kennel was designed to accommodate many stray dogs with various functional areas such as a relaxing area and jogging area, each of which can be accessed and used together. To reduce crowdedness, the kennel was scaled down to accommodate only 1 or 2 dogs. It is adjustable to either one or two rooms for a variety of applications. It is a simple yet creative square-shaped design with added fun and challenge spaces for dogs to climb, run, play, and enjoy.

4.2.3 The final design of the kennel

Figure 7 illustrates the final design that was developed from the concept of the modular kennel. In this design, the kennel is divided into two parts. The first is an open kennel for a single dog, which is free to enter and exit at any time. The inside is designed with transparent material to help the dog feel safe and not to feel uncomfortable when staying inside. The second is a cage for small animals such as orphaned cats or



puppies. The concepts of this design are easy to access, easy to take care of, and closed. Cleanliness is also another important aspect of the animal's welfare since it directly affects the animal's health.

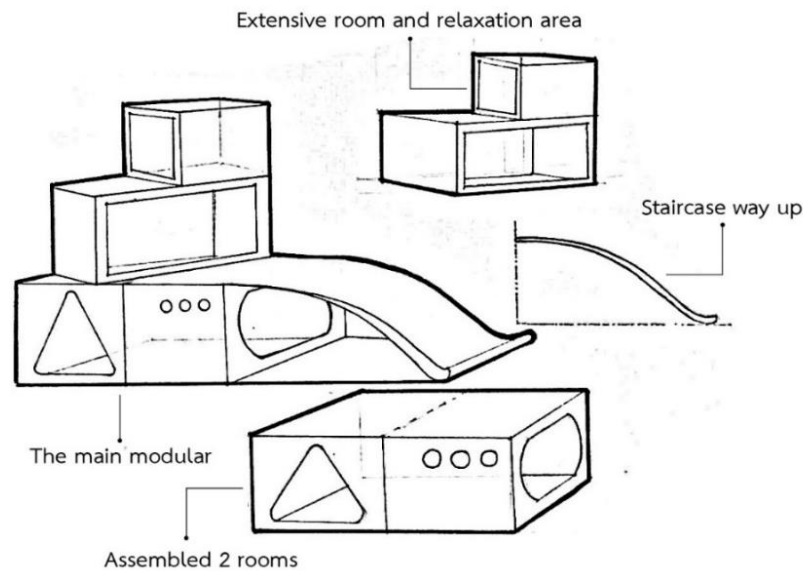


Figure 6 Sketches of the modular kennel

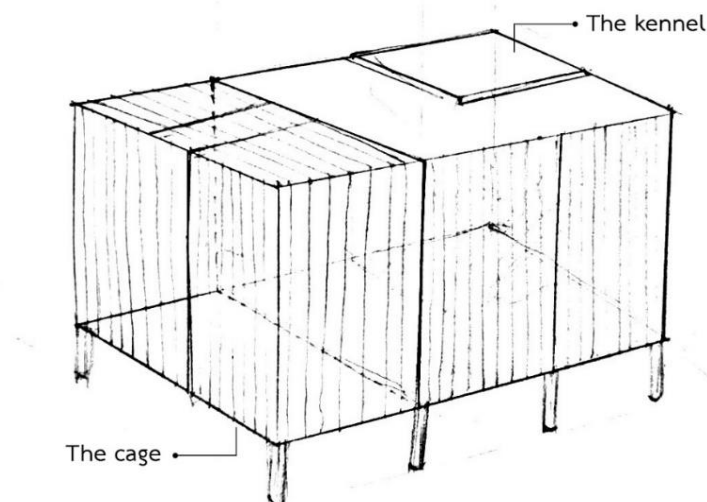


Figure 7 The final sketches of the kennel and cage.

4.2.4 The designed modular model

A small modular model (190 cm width x 130 cm height) was developed focuses on the benefits of particular features through sketching and taken the idea to develop a design that is suitable for many functionalities as shown in Figure 8.

The final design quickly narrowed down redundant features to feasible concepts throughout the development process. Figure 8 left shows the dog kennel that is separated into two parts and Figure 8 right shows additional functions such as bottom drawers for storing food or toys.

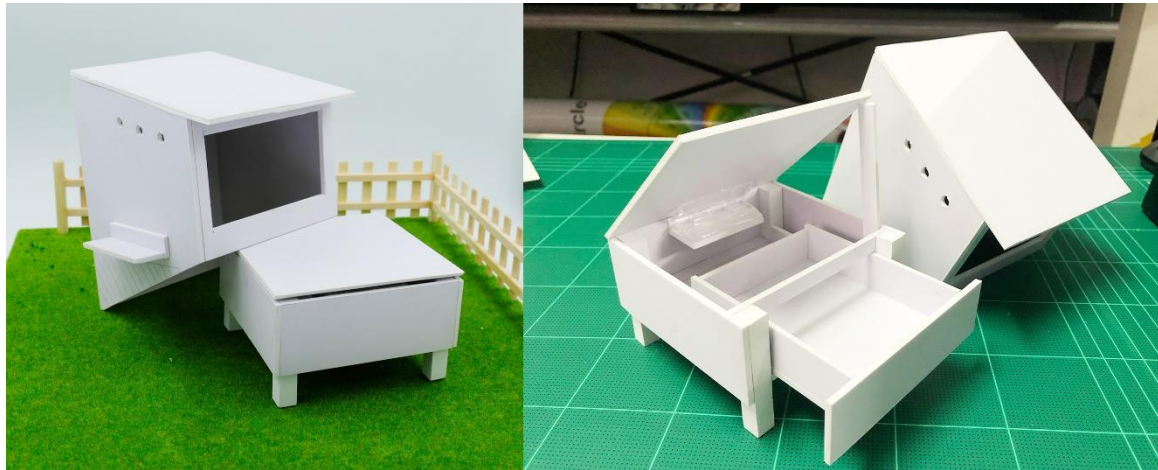


Figure 8 A modular model and its functions

A possibility of a flip-roof was considered (Figure 9) since this design can be cleaned from the top and the fold-away feeding tray can be open and closed, making it easy to eat, clean, and not cluttered.

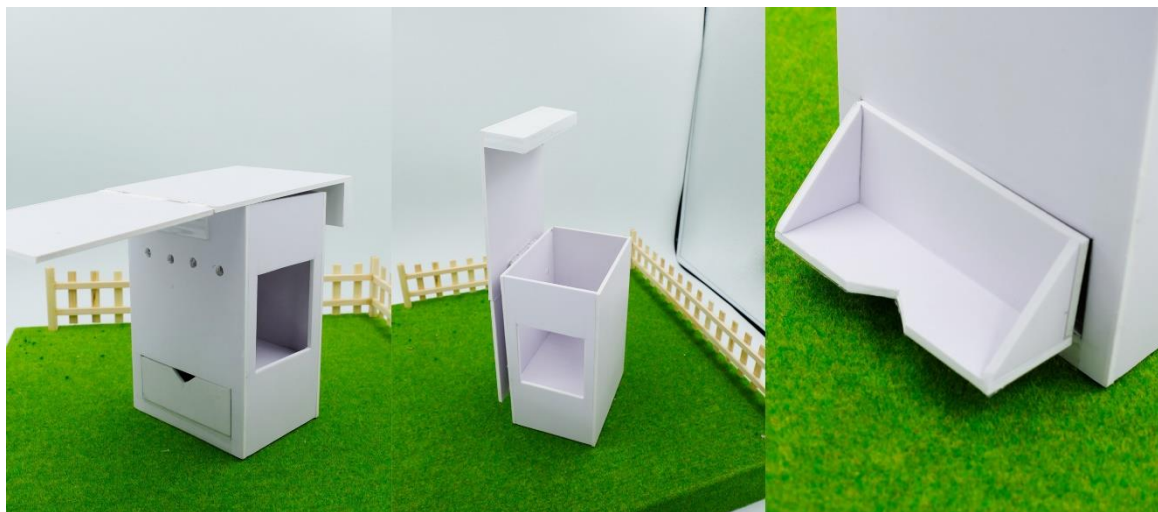


Figure 9 A flip-roof design with a foldable food tray

The development of the modules is shown in Figure 10. This design separates the cage and kennel into 2 modules that can be assembled. To comfort the user in assembling, the cage was designed to have wheels for easy moving. The modules and their functions were developed from the first step, fixing all problems along the process, and finally became the final solution. Figure 10 left shows the assembling of the cage and kennel, which can be easily done by sliding to connect them. Figure 10 right shows the separated cage and kennel when not in use.



4.4 The prototype of the kennel

4.4.1 Designing the prototype

The kennel design provides enough space for one dog to lie, turn, run, and play freely and its clear interior makes the stray dogs feel secure. The kennel will not be closed as the closed environment makes the dog feel more uncomfortable.



Figure 10 The cage and kennel final mockup

Besides, the dogs should have an opportunity to access exercising spaces that are large enough to allow them to extend to the full stride while running and playing. In this regard, the authors generated 3D renderings of the kennel and other parts with an actual dimension of each element as shown in Figures 12, 13, 14, 15, and 16, respectively.

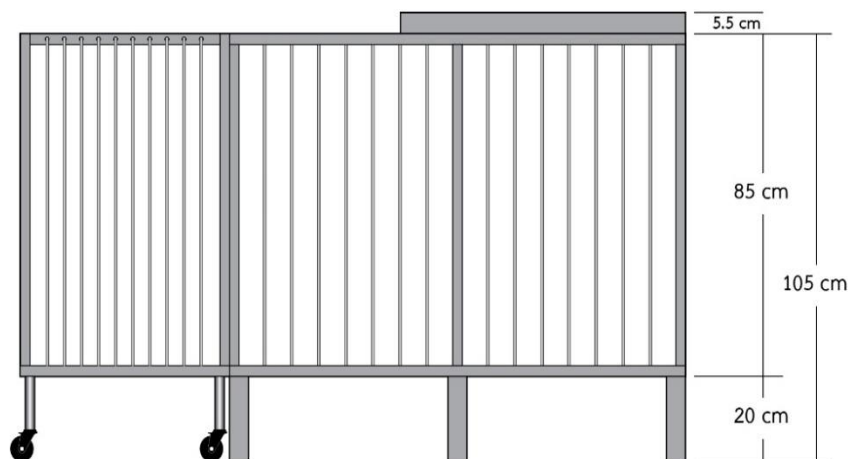


Figure 11 The dimension of the dog kennel (Side view)

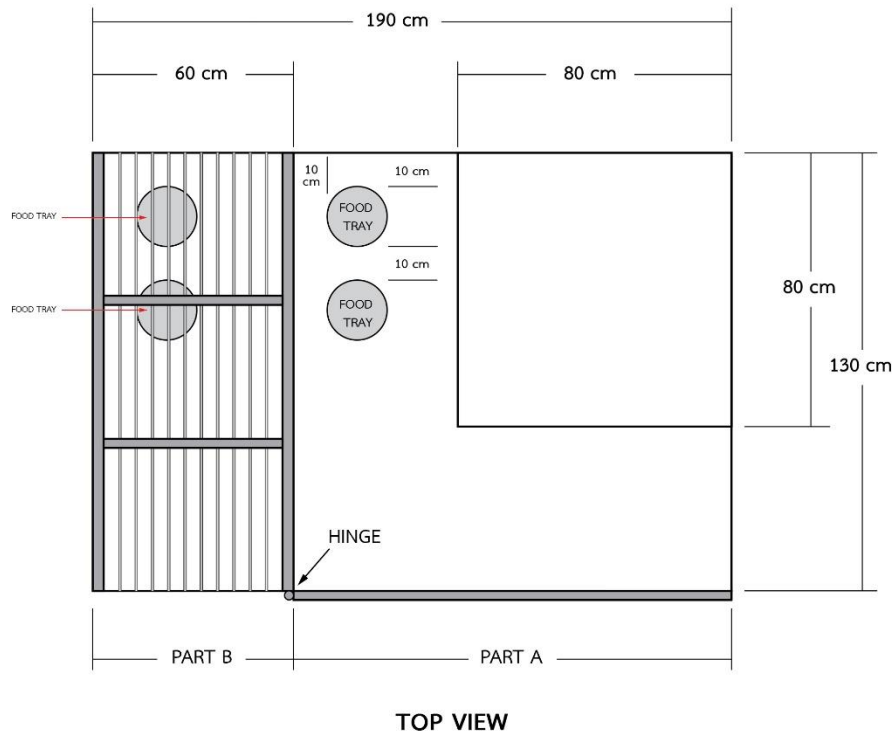


Figure 12 The dimension of the dog kennel (Top view)

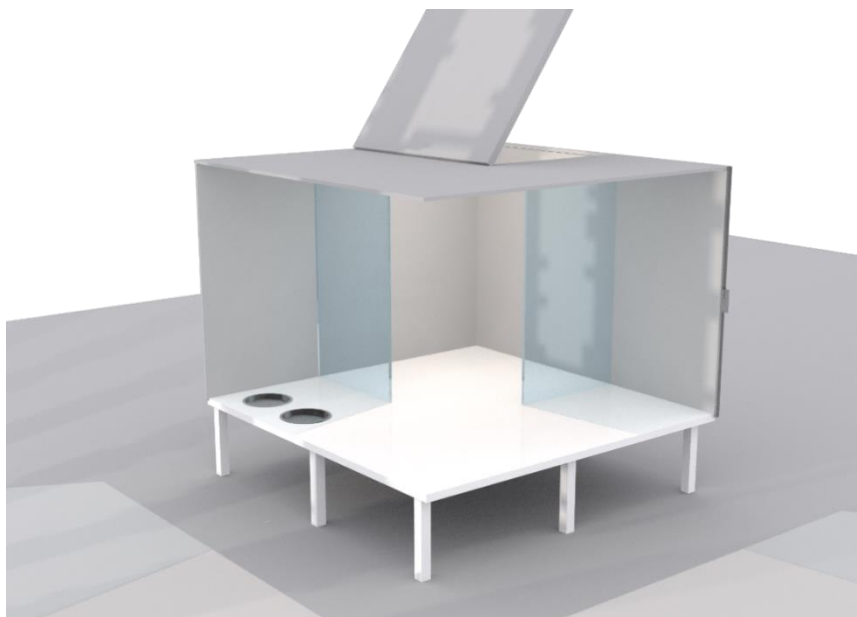


Figure 13 The 3D rendering of the kennel



Figure 14 The 3D rendering of the cage



Figure 15 The 3D rendering of the cage and kennel



4.4.2 The prototype of the cage and kennel

After completing the design process, the authors asked the technician for their opinions to develop the final design and to consider what actions or gestures dogs should be able to do inside and whether the provided space allows those to occur. Based on the estimated space, a dog needs to comfortably sit, stand, and lie in a normal manner and to turn about freely.



Figure 16 The prototype of the kennel

Figure 16 is the kennel for a single stray dog that was designed based on the concept of the open kennel to allow the dog to go in and out freely. The structure of the kennel is made of cement board, which is a weather-resistant material and durable, suitable for outdoor installation.

There is also a roof on the top that can be opened so the interior can be cleaned. The inside partition wall is made of clear acrylic sheets, making the inside clear and not obscure. The closed environment may make the dog feel uncomfortable considering that they have to be inside for a long time. The kennel also has an outer space where the dog can run, play, or do other activities.

For feeding, the food and water tray is made of stainless steel and is attached to the kennel to prevent the dogs from playing with the trays.

Figure 17 shows the cage in which the whole structure is made of steel bar and is equipped with wheels for easy moving and cleaning as it is designed for small animals such as cats or puppies. Cleanliness is, therefore, very essential as it directly affects the animal's health.

Figure 18 shows the assembled cage and kennel that offers multifunctions. For instance, the dog family with newborn puppies requires special needs to take care of. In addition to well-being and good food, the mother dog also needs safety for herself and her children. Therefore, this kennel protects the mother dog and her children from dangers such as big dogs or predators, or inclement weather.

Besides the dog family, sick dogs, including helpless disabled dogs, can also live in this kennel with safety and good hygiene. Cleanliness is imperative as most kennels are sources of spreading germs, which is direct harm to the dogs' health. The researchers have designed the kennel that covers all the basic needs not only for normal stray dogs but also sick or disabled dogs.



Figure 17 The prototype of the cage



Figure 18 The assembled cage and kennel

5. Conclusion

In conclusion, the authors discovered problems concerning stray dogs' welfare at various shelters and analyzed collected data for the solution. Based on the analysis, several ideas of the dog's cage and kennel were drafted and the prototypes were fabricated. Finally, the cage and kennel that can resolve the problems were successfully created. The authors installed the final prototype of the cage and kennel for the stray dogs at a temple and observed. The dogs seemed delighted and excited with every new corner within the kennel. Most importantly, they seemed to feel safe and secure in this excellent sun and rain-resistant home. Besides, the prototype provided the dogs' caregivers the flexibility to easily clean and maintain, which will benefit the dogs' physical and mental health and behavior.



6. Acknowledgements

This research would not have been possible without the great support from Ajarn Sridhar, Ajarn Tnop, Ajarn David for their practical suggestions and great support, and thanks to my classmates M.F.A. Design. They offered me a lot of help when I was conducting my research.

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