



Development of Furniture as Equipment Storage for Rowing Athletes

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Abstract

The development of furniture as equipment storage for rowing athletes examined according to the storage needs and athlete behaviour. In order to propose guidelines for oar cabinet design data was collected according to their spatial characteristics and oar use. The study suggested that 2 types of oar was used by the rowing club, including rectangular and Bodhi leaf shaped oars, both types have an adjustable length handle according to the rower's arm span. The test with storing oars found that the oars should be placed upright to allow for easy handling and should also be fastened to prevent the oar blade from twisting. The design process starts with a co-planning of work among teachers, students and the Rowing Club to design the feature and function of furniture as equipment storage for rowing athletes. The process and steps for design thinking was employed as a guide for furniture equipment storage for rowing athletes by 1) Empathising and defining, 2) Collecting ideas, and 3) Prototyping and testing development. This study shows a local identity of oars and storage should be created in line with users' space, behaviour, and ergonomics. Additionally, durability of the material used is crucial to support the athletes' rowing skills and performance.

Keywords: Furniture, Rowing Oars Cabinet, Rowing Club of Trontrisin School

Introduction

Boats have been part of Thai society for a long time (The Rowing & Canoeing Association Of Thailand, 2018, On-line) because, in the past, boats were the main form of water transport in daily life and in times of war. This had led to finding ways of making the boat reach its destination safely and as fast as possible. In addition, boats have long been used in important ceremonies and rowing boats that are currently in use include those in competitions, ceremonies, water travel, and traditional rituals in certain areas. With the rapid changes in technology today, boats as transport have become less popular.

Currently in the rowing competition, training practices are performed for physical preparation before proceeding actual competition to make the muscles become habituated. Some of the clubs may practice throughout the year since there are now competitions all year round and many competition fields to compete in. There are 2 types of oar blades: one made of wood and the other made of plastic. The length of the oar depends on the arm span of each rower. Where the athlete's oar is made of wood, it will tighten its grip while pulling it, which is more practical and cheaper compared to oars made from other materials. However, a property of wood is that it absorbs water and enlarges. After training, the athletes kept the oars at home. During the day because of the hot weather, water in the wood evaporates. As the oar blade absorbs water which later evaporates, the oar blade warps, and as a result the



oar blade is unable to counter the current, the speed of the boat decreases and more rowing force is needed, and the oar blade eventually cracks. Mostly, rowing athletes check their oars every time prior to training. In the case of marked and damaged blades, maintenance is done by using solder paste mixed with fine sawdust to fill in cracked gaps. The problem of warped blades may be solved by placing a clamp in the middle of the blade to prevent it from bending or twisting. The application of a final coat of paint or varnish for waterproof. Athlete training follows the training procedures of the club coaches. Training will be over twice the distance of the competition events. For each training session, athletes bring their oars from home, and if they do not have one, they can borrow one from the club for training. Young rowers, they often travel from home to the training location on a bicycle or motorbike with one hand controlling vehicle and the other holding their oars, hence they might cause an accident on the way. Because of this, it is necessary to design furniture to store oars and other equipment for rowing athletes at the club.

Objectives

The current study aims to develop furniture as equipment storage for rowing athletes.

Methods and Materials

In the development of furniture to store equipment for rowing athletes, the target group includes 125 rowing athletes of the Trontrisin School Rowing Club located in Baan Kaeng Subdistrict in Uttaradit Province. This sport of rowing adds to the uniqueness of the school. This school was granted the 2011 Thailand Championship Award for racing 12 dragon boats for males under 18 years of age, and has also won various competition awards for boat racing. In this study, the principles of furniture design were applied in terms of function and also to prevent theft. Safety considerations have been taken into account to ensure that the cabinets are safe for users. Durability and functionality are both important as the cabinets need to carry the weight of many oars for a long time. Carbon steel was used as the main material for both the weight-bearing structure and other parts. Design convenience relates to the accommodation of the oar dimensions user height, and pickup distance to provide for ease of use.

Results

To develop furniture as equipment storage for rowing athletes, the guide to proceed according to the set objectives started with an investigation of rowing athletes' behavior during their travel, training breaks, boarding and rowing, and keeping of oar blades; a preliminary analysis to further design oar cabinet features according to its function and an examination of the dimensions of oar blades. The details are as follows:

1. Empathize and Define It involves making an in-depth understanding about the target group by adjusting the mindset of both the designer and the rowing athletes so as to see the overall picture of the project, and administering unstructured interviews with the target group as unidentified interviewees, so that conclusions can be drawn to guide the development of furniture corresponding to its function.



Figure 1-2 Field investigation on the context of rowing athletes

Based on the field investigation, 2 types of oars are used by the athletes, i.e. wooden oars and plastic oars in both training and competition. Most athletes brought their oars from home and took them back home after training for they are expensive and could get lost. They rode motorbikes to school and when attending training sessions. During rest or while waiting to board for rowing, they placed their oars by the riverside or on the stairs. On non-participatory observation, if the athletes ride alone on a motorbike, they used the right hand to control the motorbike and the left hand to hold their oar blades, which puts them at risk of having an accident. They kept personal items under the motorbike seat and during attending a rowing competition, they placed them close together and must have someone keep an eye on them to prevent theft.



Figure 3-4 Rowing athletes
(Source: Phairat Sookkharot, 2024, On-line)

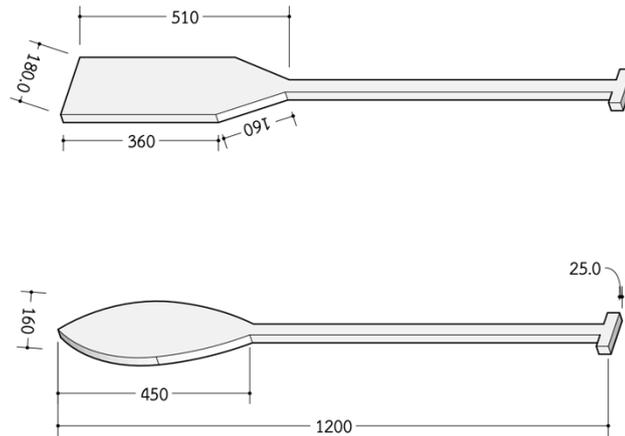


Figure 5 Feature of oar blades

Figure 5 illustrates 2 types and sizes of the oar blades: the first one is rectangular in shape, 180 mm wide x 510 mm long x 25 mm thick and adjustable in length with adjustable length according to the athlete's arm span; and the second one in leaf-shape of 160 mm wide x 450 mm long x 25 mm thick. Its length is also adjustable according to the athlete's arm span. Figure 6 illustrates the test of placing the oar vertically and horizontally, reducing the contact of oar blades with other equipment. As the blades have a tool to prevent twisting and they differed in size, the handle was thus used to provide the size to determine the spacing between each slot, which was 40 mm wider than the handle size with a spacing of 500 mm wide. The oars were provided with 4 slots of 540 mm wide altogether and each slot can contain 12 oars, thus making it available for a total of 48 oars.

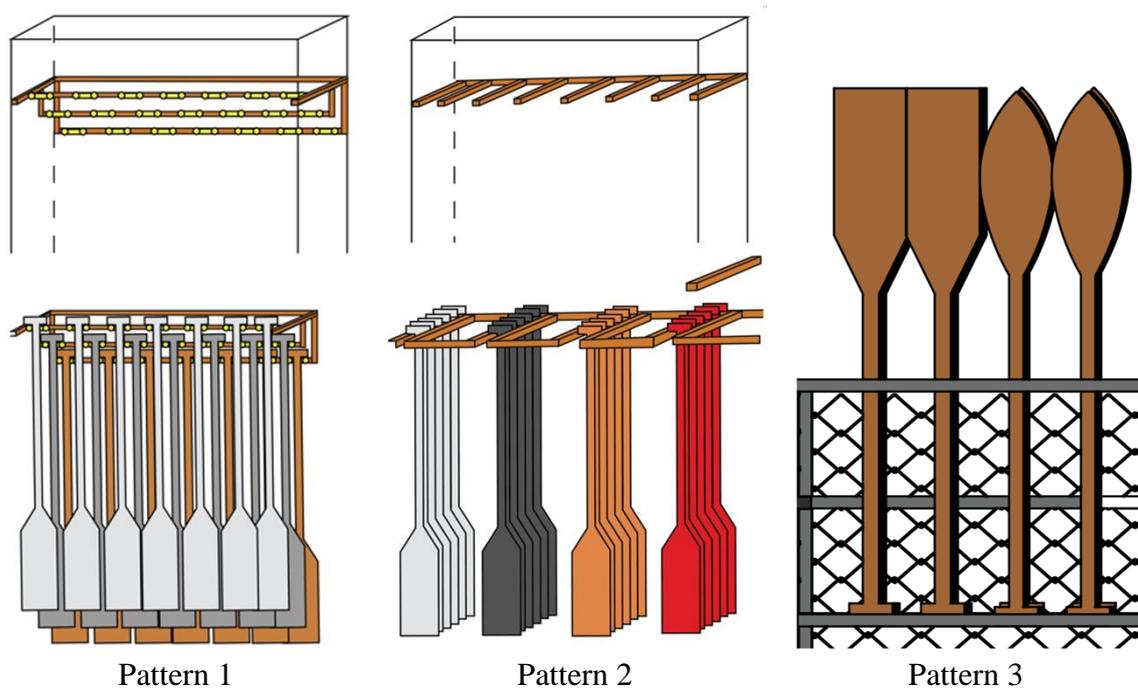


Figure 6 Modeling patterns of oar blades storage
(Source: Tanawat Seanprasert, 2022, p. Appendix)



2. Ideas involved in the construction after framing (Define) the problems in developing furniture to store the equipment of rowing athletes, that arose out of the need for keeping athlete's personal items and the oars, and also allowing easy transport to other competition locations. The sketch of the ideas for furniture development was presented to the rowing athletes followed by brainstorming sessions based on the needs expressed by the athletes to facilitate the storage of their equipment, first aid kit, chart batteries and hanging space for life jackets.

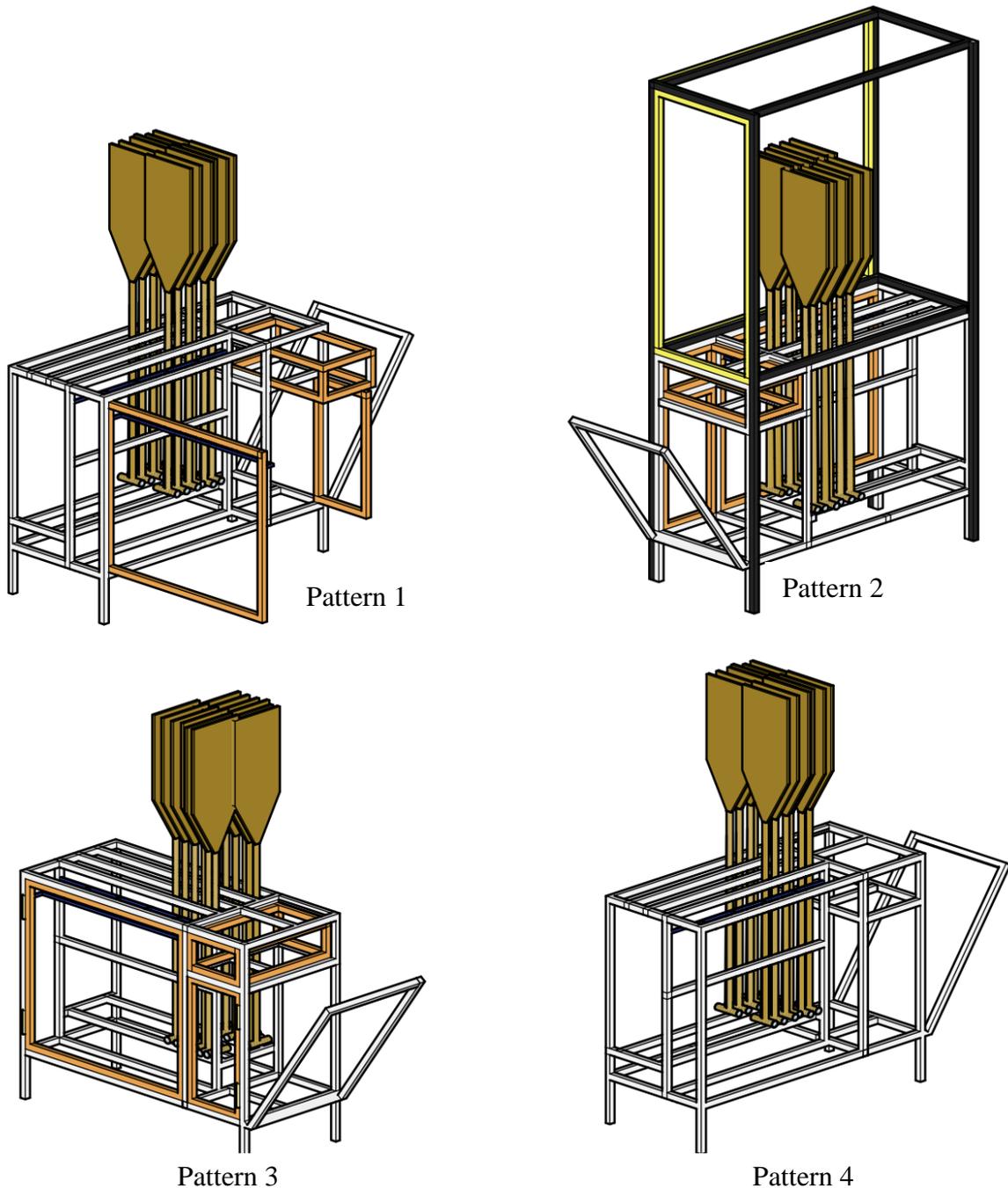


Figure 7 Guidelines for furniture design
(Source: Tanawat Seanprasert, 2022, p. Appendix)

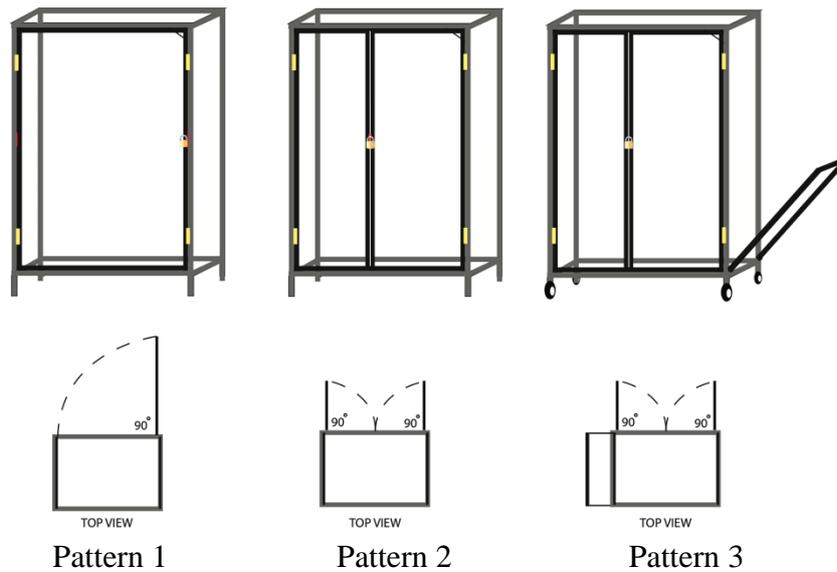


Figure 8 Design concept of furniture frame
(Source: Tanawat Seanprasert, 2022, p. Appendix)

The frame design takes into consideration the principles of furniture design including function, safety, durability, materials, structure, convenient to use and the beauty of the oar cabinet. In Figure 8, the design of frame in part of the oar storage included the insertion of steel grids in 3 slightly different patterns. Pattern 1 with a hinge to open on the right side. Pattern 2 is divided into 2 compartments that open in the middle. Pattern 3 with added wheels and a push bar for ease of moving as it has to be transported to the athletes using oar blades in rowing boat. The dimensions were determined by the space of oar blades, life jackets and equipment compartments. The sketch furniture frame was presented to the research sample group and it was suggested to adjust to Pattern 3 in the opening and closing that the opening should not be there however, the oar blades should be pulled up from the top, and also adding an equipment compartment. The material used is waterproof.



Figure 9-10 Field visit for the conclusion of the design concept
(Source: Tanawat Seanprasert, 2022, p. Appendix)

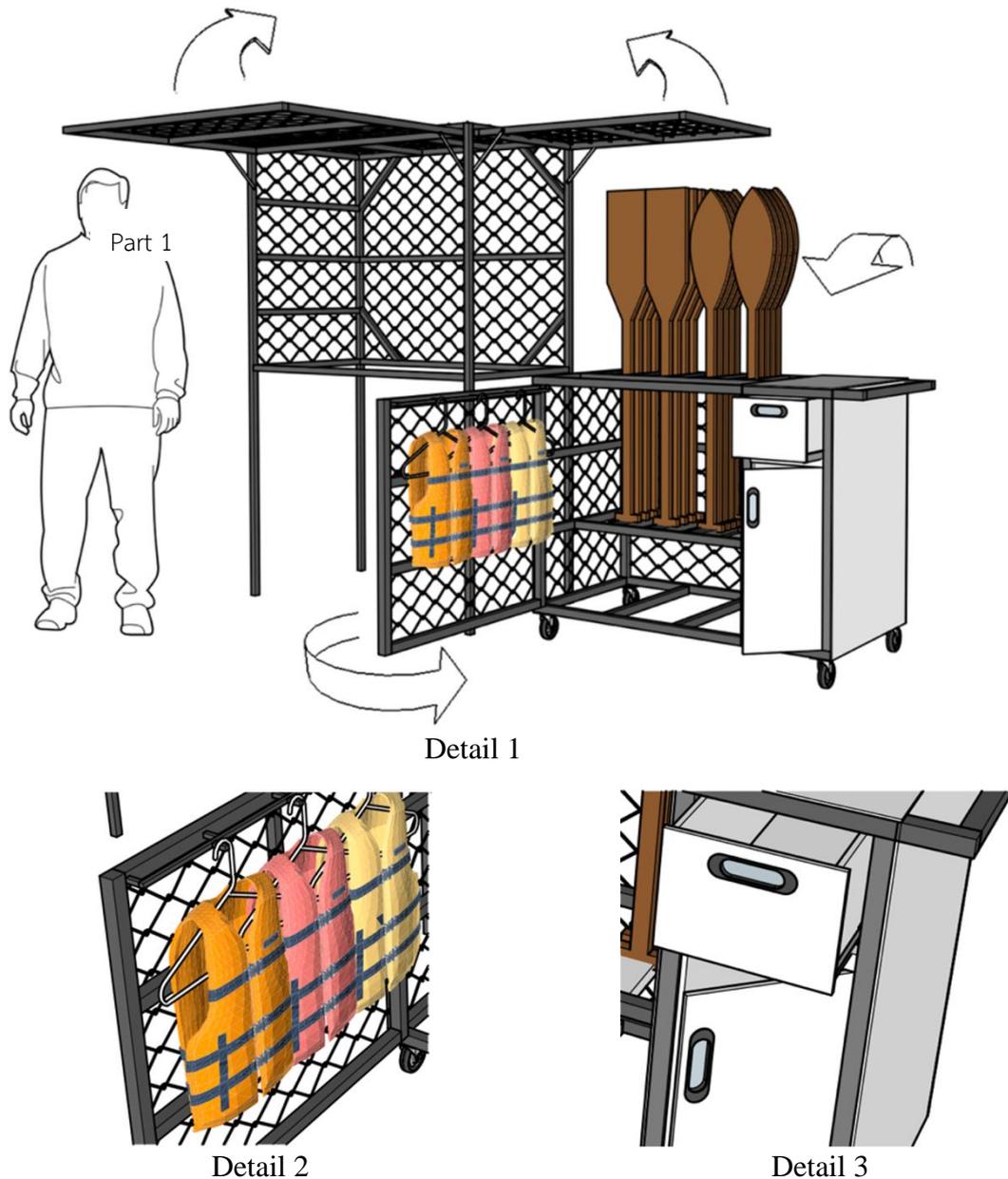


Figure 11 Details of the furniture frame

Detail 1 in Part 1 shows how to open and close the furniture as a cabinet for storing the equipment of rowing athletes. Carbon steel square tubes were used as the structure to provide strength, with steel grids fixed at 2 sides to prevent theft, hinges to help open and close, and steel hooks to bear the weight. Part 2 is the compartment for storing rowers' equipment, using carbon steel square tubes as the main structure, with grids fixed, handles and wheels for easy moving. This compartment consists of slots to store the oars. Detail 2 shows how to hang a life jacket, and Detail 3 shows how to open and close the compartment for storing the rower's personal items.

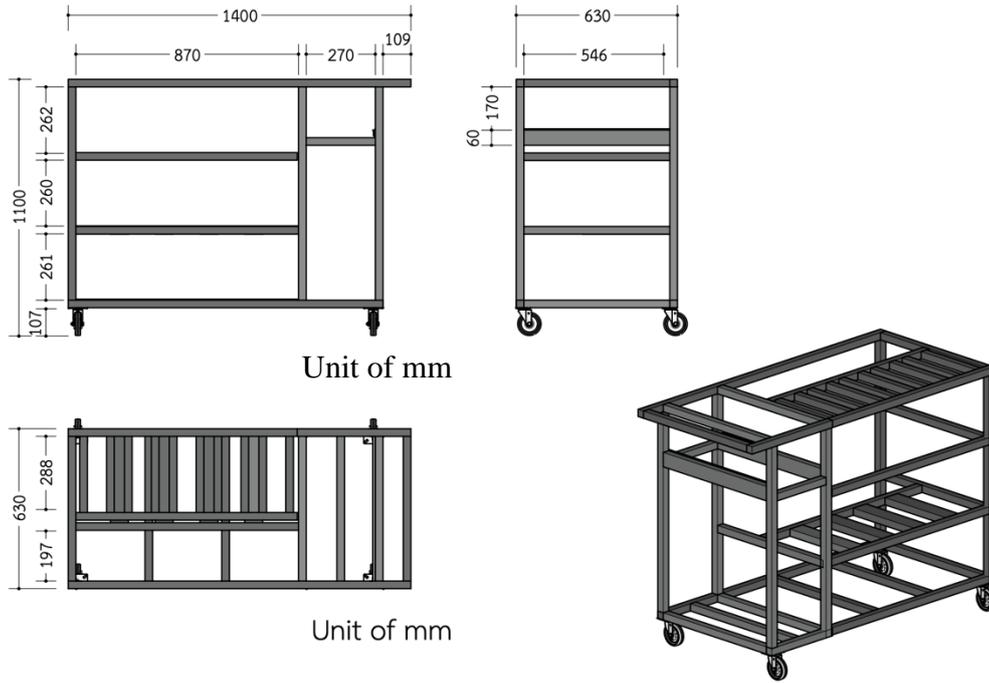


Figure 12 Patterns of furniture frame in Part 2

Figure 12 illustrates the patterns of furniture frame 630 x 1,400 x 1,100 mm, using carbon steel square tubes welded together. The height of each compartment is approximately 260 mm. Figure 13 illustrates the overall dimension of combined Part 1 and Part 2 in a size of 690 x 1,370 x 2,000 mm.

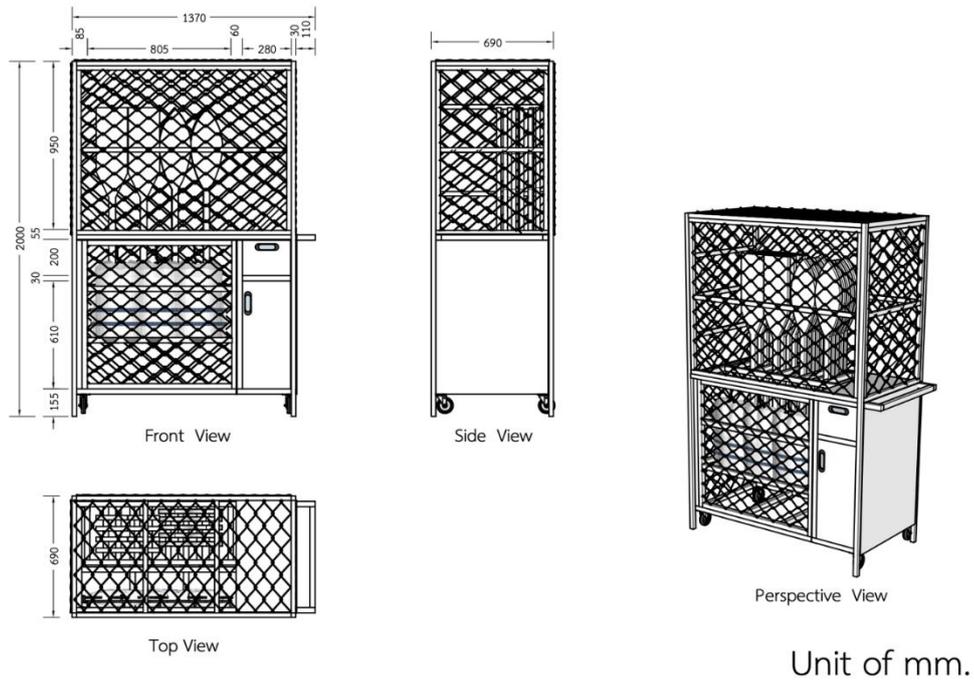


Figure 13 Dimension of furniture



3. Prototype and Testing - The testing was done by the athletes of Trontrisin School Rowing Club. It was found that the function of the furniture corresponded to the function as a storage for oars and equipment, hanging the club's life jackets and allowing for ventilation, prevention of theft, ease of movement with wheels according to the needs identified and discussed at a group meeting. This piece of furniture can be moved and taken to various competition locations to store equipment and oars. The cabinet may be used outdoors as well.



Figure 14 Furniture as equipment storage for rowing athletes

Conclusion and Suggestions

The development of furniture as storage for the equipment of rowing athletes is in line with the design and thinking processes consisting of 3 steps namely: making an in-depth assessment of the target group (Empathize) regarding the rowing athletes' behaviour and use of oars and also spatial limitations, and determining the scope of problems (Define) on where to place oars, life jackets, and to keep important items, including ease of moving; constructing the ideas (Ideate) comprising draft ideas, draft design, and participatory conclusion of concepts with the club; accordingly constructing a prototype (Prototype) to be the best, that is, ready for use; and in every step testing with the target group (Test) to make it suitable for use. The design of limited space and the design considering the functioning nature of the oar-cabinet corresponded to the activities of rowing athletes. This conforms to the article on the design contributing to identity creation for a small hotel: a case study of Ban-Sri Family Hotel, Kabinburi district, Prachin Buri province (Patsara Srirungruangchai. Miyoung Seo. Kriangsak Khiaomang, 2022, p. 56) Firstly, a local identity was examined before interior design that may be applicable to local identity to create work pieces and combined theory to create usable space for users. Similarly, the design of the oar cabinet considered the athletes' body and behaviours, as well as the function that is different from other athletes from other clubs. It also aligns with the Modular system for outdoor furniture in Larn Hin Korn Wat Panyanant Ram Larn Hin Korn Wat Panyanant Ram Area (Thirarat Srihongchan, 2022, p. 85) suggesting that the design of outdoor furniture for maximum usability and responding to the space that should take into account the ergonomics of space, the durability of the material used and the ability to produce by the skill of general technicians.



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