

Chapter 6

Between Batik and Fiberglass: The Hybrid-Technology of Boat Construction



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6.1 Introduction

Batik is one of the popular handicraft arts for the Malay community in Malaysia (Fauziah 1983). This handicraft art is a technique in designing fabrics using certain dyes to be used as clothing for both men and women. The batik weaving technique has gone through a process of development from conventional to modern practice. In Malaysia, batik is not only worn by Malays but also by non-Malays because of its pattern attractive and suitable to wear when attending formal or informal functions. Therefore, the demand for batik is increasing from time to time and this situation gives a good picture in improving the economic sector in the country.

The batik industry in Malaysia is also experiencing good development in the country (Chee 1990). For example, previously the batik industry was often associated with states on the East Coast such as Kelantan and Terengganu, but now there are also other states, such as Kedah, have begun to develop the batik industry to compete in healthy in producing batik products of different motifs and patterns (Azimi 2018). The batik industry is currently getting good demand not from local community only,

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A. Ismail et al. (eds.), *Materials and Technologies for Future Advancement*,

Advanced Structured Materials 193,

https://doi.org/10.1007/978-3-031-38993-1_6

but also the international community also wears it due to the quality and finesse of its art of making (Yusoff and Abdullah 2018).

To promote batik, the government strives to hold various initiatives through its agencies. For example, the Ministry of Tourism and Culture takes the initiative by organizing the National Craft Day every year to promote and commercialize local handicraft products on the international level. National Craft Day also aims to make the local handicraft industry, including the production of batik, which is seen to be able to contribute to the improvement of the country's economic sector. In addition, the program is the best platform to give recognition and appreciation to local handicraft entrepreneurs and entrepreneurs who work hard in developing the handicraft industry, including the batik industry.

The art of batik handicrafts continues to be promoted to the international level based on two main purposes, namely, to highlight the culture and image of the country and attract foreign tourists to visit Malaysia to witness the production of batik traditionally and modernly. The initiative was undertaken by a group of students from the Faculty of Fashion and Creative Lifestyle, Limkokwing University who have brought their fabric design collection to London Fashion Week, United Kingdom (Muzdalifah 2018). Their design fabrics of batik managed to attract many visitors.

The Malaysian batik is traditionally produced through hand painting. The art of batik handicrafts is synonymous with the activity of weaving fabrics made from materials such as cotton to be used as fabric and then clothing for men and women. Batik-based clothing patterns and motifs are one of the efforts in maintaining the culture and identity in Malaysia, especially for the Malay community. Although the Malay community is rich in the treasures of handicrafts, but the art of batik handicrafts is one of the superior arts and is a symbol of the Malay identity that needs to be preserved and dignified.

Malaysian batik has its own identity in terms of manufacturing techniques, patterns and motifs. Such features also symbolize the Malay identity and culture which has its own uniqueness. In Malaysia, the batik industry continues to be preserved and fought for by the Malays in order to maintain the identity and culture of Malay -based handicrafts so as not to be swallowed up by the currents of modernity. In addition, the existence of the batik industry in Malaysia is indirectly able to contribute specially to improving the small and medium industrial sector for the rural community. Typically, the batik industry in Malaysia focuses on productivity based on the manufacture of textiles and clothing as well as other products such as souvenirs, appliances, and home decorations.

However, the batik-based products are seen as limited to textile-related enterprises only. The retention efforts of Malay cultural identity through batik must be expanded in various sectors or fields to be able to survive in the face of progress in today's globalized world (Rafeah 2012). In addition, batik-based art needs to undergo transformation and be flexible to further highlight the specialties and uniqueness found in batik (Akhir et al. 2016). Based on the argument, the batik industry is not only limited to the textile industry and has the potential to be developed in other sectors.

This initiative needs to be done not only to maintain the Malay identity and culture through batik, but also to be able to contribute to the economic resources

in the country. Therefore, a group of lecturers and students from Universiti Kuala Lumpur Malaysian Institute of Marine Engineering Technology (UniKL MIMET) sought to explore the potential application of batik in the construction of fiber boats as an initiative and alternative to maintain Malay cultural identity based on batik.

6.2 Methodology

The research method used is experimental and involves two main stages, namely prototype construction and analysis. The design of the study is based on design and development. Design and development refer to the activity of designing, developing and evaluating certain processes systematically against a product or material created (Richey and Klein 2007). In addition, the design and development methods involving hands-on or practical teaching and learning activities starting from project planning, material preparation, prototype construction and evaluation of the process and product.

Hence, this study involves an experimentation of the construction of a fiberglass boat prototype done by combining fabrics containing batik patterns through certain processes. Next, the fiberglass batik boat prototype was tested in terms of its strength to determine whether the prototype is safe to use or otherwise.

6.3 Results and Discussion

This section discusses about the techniques in boat making from wood to fiberglass as well as the process of making batik-based fiberglass boats. The process are divided into three stages which are planning, boat construction and analysis of batik-based fiberglass boats in order verify the quality and durability of the boats.

6.3.1 *The Evolution of Boat Making Techniques: From Wood to Fiberglass*

Boat construction using fiberglass material is a continuation of wood-based boat manufacturing technology. The history of boat making for the Malays began when the Malay settlement territories began to undergo a process of separation because of the melting of the ice that increased the sea level thousands of years ago (Ali 2009). Therefore, boats and ships are needed to help the Malays to travel and trade and visit relatives separated by the sea, especially in the Malay archipelago (Ingram 2007).

At that time, the Malays had used wood as the main material in the construction of boats and ships. The wood from *cengal* trees and wood from *resak* trees were

chosen by the Malays to be used to build boats and ships due to their durability and strength (Ingram 2007). The technique of making boats and ships based on wood is traditional based on the way of working that uses almost entirely human energy and this manufacturing knowledge is usually inherited from one generation to the next (Salam and Osozawa 2008).

Today, wood is still used in the manufacture of boats and ships for the Malays, but the rate is declining (Maidin 2003). As a result of the advancement of science and technology, this situation has affected the technology of making boats and ships and their building materials. Shipbuilding is now more focused on the use of iron-based materials, especially involving large-scale projects so that the ship is durable and strong for long-distance travel with heavy loads. Boat making is more focused on the use of fiberglass than the use of wood (Koto Munirah and Arief 2014).

Manufacture of fiberglass-based boats is more popular today because this material is easier to maintain and more durable than wood. Fiberglass material is lighter, can move fast on water is stable and can prevent the entry of water into the boat. Furthermore, the difficulty in obtaining a supply of *cengal* timber and its rising prices have prompted boat operators to switch to using fiberglass as an alternative material in the boat building process as the cost of the material is cheaper than wood (Shamsuddin 2003).

6.3.2 Batik Application in the Process of Making Fiberglass Boat in UniKL MIMET

To create a good learning environment and meet the standards of the study program, UniKL MIMET has provided laboratories and workshops for instructors and students so that they are able to carry out practical academic assignments. Thus, the fiberglass workshop is used as a location in the process of making batik-based fiberglass boats. The process is divided into three stages, namely planning, construction process and prototype analysis.

6.3.3 First Stage (Planning)

Referring to the planning activities, the first thing to do is to find a suitable existing boat mold. UniKL MIMET fiberglass workshop already has several types of boat molds available, and this situation provides convenience to lecturers and students in the process of building a boat without having to make a mold first. Then, the process of measuring the boat mold that has been selected needs to be done because the process will determine the amount and number of materials used during the boat construction process. Among the materials used are batik fabric, fiberglass fabric, resin, gel coat, flow coat and catalyst material known as MEKP catalyst.

6.3.4 Second Stage (Boat Construction)

When implementing the boat making process, the preparation of batik fabric must be done first. The batik fabric purchased must have the same color so that the final product looks beautiful and even. Batik cloth needs to be soaked in hot water to remove the remnants of batik wax and new cloth wax. After that, the fabric is washed using soap and then dried. Then, the batik fabric is rubbed to produce a neat surface. The cloth is cut to a small size measuring one foot square so that it is parallel to the curved shape of the boat. The second process in construction leads to the preparation of boat molds. At the initial stage, the existing boat molds that have been selected will be cleaned using soap and water and dried.

The next step is that the dried boat mold will be smeared with a polishing material known as mold release wax. The third process involves the manufacture of the boat hull or known as the hull. This process started by applying a gel coat mixed with a catalyst that is the catalyst MEKP which is translucent on the surface layer of the mold. After that, the layer is left to dry for about half an hour. Once dried, glue or polyester resin is applied to the gel coat layer. Then, a piece of batik cloth that has been cut is applied on the glue that is wet. Another layer of glue is applied on the batik fabric.

This process needs to be repeated by replacing the batik cloth with fiberglass material known as chopped strand mat (CSM 300), woven roving (WR 400) and CSM 300 again. Once four layers are ready, this boat mold is left overnight for the drying process. The fourth process deals with the work of detail work. The dried hull of the boat is removed from the mold using tools such as hammers and wedges. Once the hull is removed, the process of tidying and detailing is done using an electric saw and an electric grinder. Floors, banana transom wood and seating are then attached to the boat. The surface in the boat is coated again using batik cloth and coated with a material known as clear flow coat. After that, the detailing and tidying work is done again using sandpaper. Imperfect parts of the boat will be repaired and smeared with a flow coat.

6.3.5 Third Stage (Analysis of Batik-Based Fiberglass Boat)

The first analysis of a batik-based fiberglass boat is to do a driving test on water or known as a sea trial. This test is important to determine the stability of a boat built while on the surface of the water. In addition, this is also important to ensure the safety of drivers and passengers when using the boat. At UniKL MIMET, the batik boats produced are lowered into the sea via a ship platform (slip way). After that, the boat is driven to test for stability, comfort, and leakage. The second analysis is from the use of batik cloth in the production of fiberglass boats.

To produce a beautiful and neat batik exterior surface, more time is required compared to the usual fiberglass boat making process. The process of soaking hot

water, washing and batik fabric fixtures in the boat mold takes quite a long time. In addition, the batik fabric should be placed on the mold in a small size (one square foot) to reduce the risk of trapped air. The attached batik cloth should be pressed using a cotton roller to remove the trapped wind residue.

This action is important because wind trapped in the batik fabric will damage the durability and surface of the boat. The second analysis is in terms of costs and expenses. Estimated cost for batik fabric in terms of size, it is priced at RM9.00 for a size of 2 m, compared to fiberglass fabric, which is priced at RM10.00 for a size of 3.3 m. Therefore, the price differences are seen not far from each other and not very significant. Thus, the final product of batik boat can be sold at a higher price compared to without batik if this product can be commercialized.

The third analysis is more scientific through testing of the materials used including a combination of materials such as batik coating, CSM 300, WR 350, CSM 300 and batik fabric. The results of scientific test analysis found that batik boats meet the requirements of the standards that have been set in the manufacture of fiberglass boats in terms of tension test, water absorption test and fire-retardant test.

6.4 Conclusion

In summary, the batik-based fiberglass boat construction process is a new method in boat building technology. This process is an experiment to find out whether the quality and durability of batik-based fiberglass boats can compete with ordinary fiberglass boats. Based on the analysis done, batik fiberglass boats have the same durability and quality as fiberglass boats, but batik fiberglass boats have their own advantages. This is because the batik fiberglass boat has been covered with batik cloth and makes it more attractive and beautiful. Batik fiberglass boats can be used as an attraction in the water-based tourism industry such as cruise boats and fishing boats to attract tourists to try the boat.

Although batik fiberglass boats have their own uniqueness, there are some disadvantages in terms of time and cost. This is because if a regular fiberglass boat can be completed in four days, a batik fiberglass boat will need to take six days to complete, and this situation will involve increased costs in terms of material expenses and workers' wages. However, such challenges can be addressed if the construction of batik fiberglass boats is done commercially and involves the use of technology as an additional approach to boost the construction of batik fiberglass.

The construction of batik fiberglass boats is a new thing and has the potential to be developed in the future based on continuous efforts, research, and development. In addition, this activity is also an alternative effort to highlight the Malay identity and culture in the application of batik to survive as one of the Malay heritages for the next generation.

Acknowledgements This study sponsored by UniKL research grant UniKL/CoRI/str19056. We would like to express our special thanks of gratitude to Universiti Kuala Lumpur Malaysian Institute

of Marine Engineering Technology (UniKL MIMET) which provides us the golden opportunity to do this wonderful research project and publication.

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