

Technology and Production Process of Malay Traditional Heritage Pottery in Malaysia

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Abstract

Malaysia is one of the countries known with works of art especially the invaluable handicraft. The earliest creation of works of art crafted by human in this country existed since prehistoric age. Discovery of artifacts such as potsherds, weapons, ornaments and cooking utensils was a proof that human at that time had begun producing pots from clay, involved in handworks, carving and boat making. This discovery was an indication that the earlier human inhabitants were closely related to environment, and they can create utilitarian items using their creative thinking, technology and material from nature. One of Malay heritage crafts produced using technology is pottery. There are 3 types of pottery namely Mambong, Labu Tanah (clay pitcher) and Terenang. The first pottery showing form which stresses the predisposition of clay material and hand forming technique in producing pottery for cooking and mostly produced in Mambong, Kelantan. The second pottery was inspired by a gourd or pumpkin and developed to various forms of clay pitchers produced in Sayong and Pulau Tiga, Perak. The third pottery on the other hand was similar to metal form such as Terenang from Tembeling, Pahang. To ensure the survival of art heritage, various technologies were used in the production. The question is, what technology being used to achieve the objective? To get the answer, the researcher used qualitative descriptive research method which involved written data collection or visual data collection such as interview and observation. The result of the research showed that technology is indeed the root to the survival of those potteries. This can be seen through 4 major manufacturing aspect; Firstly the preparation of clay using human strength and plunger machine. Secondly, pottery forming using hands and moulds. The third aspect is the decoration techniques using various tools. Last but not least is the firing technology using kiln and firing in open trenches. It is hoped that this research will explain that Malay pottery heritage of Malaysia had gone through invaluable process of technology. It is indirectly saying that no matter what technology being used, it is none other than for the everlasting identity of Malay heritage.

Keywords: Technology; pottery; labu tanah; mambong; terenang

Abstrak

Malaysia merupakan salah sebuah negara yang mempunyai hasil seni khususnya kraftangan yang tinggi nilainya. Hasil seni kerja tangan manusia yang terawal dicipta di negara ini adalah sejak zaman prasejarah lagi. Penemuan artifak-artifak seperti serpihan-serpihan tembikar, senjata, perkakas hiasan dan alat masakan merupakan bukti yang boleh menggambarkan manusia pada zaman itu telah mula membuat kerja-kerja membentuk pasu dari tanah liat, menukang, mengukir dan membuat perahu. Artifak-artifak yang dihasilkan dengan menggunakan bahan alam semula jadi ini juga menunjukkan bahawa kehidupan masyarakat dahulu sangat berkait rapat dengan alam sekitar. Ini membuktikan mereka telah mempunyai daya pemikiran yang sangat kreatif, dengan menggunakan teknologi dan bahan daripada alam semula jadi mereka dapat mencipta barangan untuk kegunaan harian. Salah satu daripada kraftangan warisan Melayu yang dihasilkan menggunakan teknologi adalah tembikar. Ada 3 jenis tembikar iaitu labu tanah terenang, dan mambong. Tembikar yang pertama menunjukkan bentuk yang menekankan sifat semula jadi bahan iaitu tanah liat dan teknik menggunakan tangan bagi membentuk tembikar khas untuk masakan dan banyak dihasilkan di Mambong, Kelantan. Tembikar kedua diilhamkan oleh labu asli dan terus berkembang dengan pelbagai bentuk labu tanah yang dihasilkan di Sayong dan Pulau Tiga, Perak. Tembikar ketiga pula menyerupai bentuk bersifat logam seperti Terenang dari Tembeling, Pahang. Bagi memastikan kelangsungan warisan seni ini diteruskan pelbagai teknologi digunakan dalam penghasilannya. Persoalannya apakah teknologi yang digunakan oleh mereka bagi mencapai matlamat tersebut? Untuk menjawab persoalan ini, penyelidik menggunakan metode penelitian diskriptif kualitatif iaitu dengan pengumpulan data-data tertulis maupun visual seperti wawancara dan observasi. Hasil dapatan kajian menunjukkan penggunaan teknologi merupakan tunjang kepada kelangsungan pada tembikar-tembikar tersebut. Ini dapat dilihat dalam 4 aspek pembuatan utama iaitu pertama, penyediaan tanah menggunakan kudrat manusia dan mesin pengisar tanah. Aspek kedua iaitu pembentukan jasad tembikar yang menggunakan jari jemari dan pengacuanan, manakala aspek ketiga pula menghasilkan ragam hias dengan menggunakan pelbagai peralatan. Akhir sekali teknologi pembakaran dengan cara dedah dan tanur. Di harap kertas kerja ini akan memberi penjelasan kepada kita bahawa proses penghasilan tembikar warisan Melayu Malaysia telah melalui satu teknologi yang tinggi nilainya. Tujuannya hanyalah satu iaitu tidak kira bagaimana kemajuan teknologinya, asalkan identiti warisan bangsa Melayu terus dilestari.

Kata kunci: Teknologi; tembikar; labu tanah; mambong; terenang

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1.0 INTRODUCTION

Clay is the basic material used to make pottery and it is the natural resource created by Allah. Human is also the majestic creation of Allah originated from clay and it is proven in Quran (Asmaji Aes Muhtar, 2004):

“He (*Allah*) created man from sounding clay like unto pottery.”
Ar-Rahman, verse 14:1367

Pottery is an object created by human which combines four basic necessities in daily life namely earth, water, air and fire. The combination of those materials resulted in the production of pottery work of art that is creative and masterly. The usage of four materials are as follows; clay as the basic material to form pottery, water is used to soften hardened clay, to moisten hand and to shape various clay forms, and air is needed in drying process before the firing. Last but not least is the fire in firing process to harden the pottery and it came from different sources such as wood, bamboo, husk, twig, charcoal, gas or electric. Pottery is made using clay that is gentle in nature and hardened when dried or burned. The nature of clay that is malleable makes human express the inspiration of art in various unique forms successfully.

The production of pottery is said as the oldest handwork in the world. Before human successfully created pottery, they first started to use clay since Paleolithic prehistoric age between 30,000 BC to 7,000 BC by adding it to the cave wall to produce *bison*¹ image such as the one found at Le Tuc'Audoubert, France about 13,000 BC.

When was pottery being invented in human art history? The oldest pottery was from Japan called *Jomon*² means ‘rope-patterned’ and it was the earliest pottery created in the world. Based on radiocarbon measurement, the oldest *Jomon* pottery was created in 10,750 BC during Paleolithic age. *Jomon* pottery character is easily recognized for its tall shape, small base and fine rope pattern on the surface (Tansey & Kleiner, 1996:530).

In Malaysia, the discovery of Malay primitive potteries in more complete forms are those from Neolithic Age such as in Gua Cha and Gua Musang, Ulu Kelantan, Jenderam Hilir in Selangor and Bukit Tengku Lembu, Perlis. Most prehistoric potteries discovered have shown certain characteristics, forms, sizes and various decorations. From the aspect of decoration, most Neolithic pottery surface were decorated with lines pattern and archaeologists believed that they were made by using scratched wooden bats (Adi Taha, 2001:16-20). The discovery of prehistoric potteries is still progressing by local archeologist such as in the discovery of three legged pottery in Hilir Jenderam, Dengkil by Leong Sau Heng in year 1990 (Leong, 1992:4).

In the early stage, pottery was made for basic use such as for plate and water container spontaneously formed that suited the function at that time such as stated by Norton (1956:83):

“Primitive pottery making is almost universal in association with early man over the whole surface of the earth, and

because communication was practically nonexistent, we are led to the conclusion that it evolved independently in many regions.”

Malay primitive pottery continue to evolve from the aspect of design and pattern. For example, the decoration on the primitive pottery was made by adding layer of clay on the surface of the pot and then it was tapped with wooden bats to produce texture on pottery surface which marked the surface with lines or dots pattern. This shows that the pattern on the surface of the primitive pottery had undergone transformation. The Transformation in pottery has also changed the life values of primitive society’s values of life such as what has been said by a local archeologist Adi Taha (2001:15):

“When talking about prehistoric pottery, archeologist often connect it as a cultural marker in the history of human culture and society development that is from hunting and collecting economy activity as a way of life to economic system that is more domicile or semisedentary. In context of history development and prehistoric social culture, pottery had gone through an innovation that can design a new way of life for a society.”

Eventually, the traditional Malay unglazed pottery which was uniquely created (uniquely in order) to meet the Malay society’s need emerged. The uniqueness of the potteries has been admitted by Leonard Wray - the first person who studied this craft. Wray (1903:24) said:

“The interest attaching to Malayan pottery, as made in the state of Perak, arise from a great antiquity of the art, and from the certainty of its having come down to present time without influence from the more highly civilized nations, who have from time to time, imparted new arts and ideas to the Malayan inhabitants of the peninsula.”

2.0 MALAY POTTERY HERITAGE

Actually, the existence and usage of pottery in Malay world can be traced since Malacca Sultanate era during 15th century. At that time, Malacca get Islamic influence that was fast developing in Southeast Asian region and Malacca itself has become the major trading centre in the region. The evidence of recorded history in writing gives us the knowledge about pottery at that time such as those included in Malay History book whom the author is Tun Sri Lanang³ (1977:275):

“Barang maklumlah Duli yang Dipertuan, inilah banyak bilangan harta hamba sahaya patik itu yang disuratkan tiga hari tiga malam, pertama-tama harta patik itu talam tiada berbibir lagi pasu satu, dan bokor pecah atas terenang Pahang. Sumbing satu, dan pinggan retak China satu, dan mangkuk retak satu, dan piring karang satu, dan periuk tembaga satu putus bibirnya, dan belanga Keling tembaga satu; dan budak tiga orang-seorang si Berkat namanya, berkayuh di buritan, lagi membawa pedang; Selamat seorang

¹ Bison is a type of wild cattle that exist in North America and Europe. Bison is large like gaur, short legged and has thick neck hair. Today bison is near extinct as a result of human hunting.

² *Jomon* is a pottery making culture practiced by *Jomon* society started in year 14,000 BC to 300 BC. This pottery was also known as *Jumon* doki and created before throwing machine being introduced. The pottery was produced by women. Apart from pottery vases, *Jumon* made human clay figurine as well. There are five *Jomon* age namely Incipient *Jomon* (14000 BC - 7500 BC), Initial *Jomon* (7500 BC - 4000 BC), Middle *Jomon* (3000 BC - 2000 BC), Late *Jomon* (2000 BC - 1000 BC), Final *Jomon* (1000 BC - 400 BC)

³ Tun Sri Lanang was a great writer from Johor who was the author of "Sejarah Melayu" book or "Sulalatus Salatin" (1612). He was born in 1565 M at Bukit Seluyut, Kota Tinggi, Johor. His real name was Tun Muhammad. The father was Orang Kaya Paduka Raja Ahmad and the mother Tun Gengang. He was from rich or distinguished family because of his ancestors were from the family of Bendahara Sri Maharaja Melaka, lead to His Majesty Mani Purindan from Bukit Si guntang. Tun Seri Lanang was appointed as the 14th Bendahara with the title Bendahara Sri Maharaja Johor in 1580, by Sultan Ala-Jalla Abdul Jalil Syah. He passed away in 1615 at Aceh.

namanya, duduk memimba ruang, lagi membawa epok, lagi membawa pengudat.”

It portrays Malay pottery in sentence “*talam tiada berbibir lagi pasu satu, dan bokor pecah atas terenang Pahang...*” and a proof that the trading of pottery merchandise from China has occurred as we can see in the sentence “*pinggan retak Cina.*” Nevertheless, the existence of Malay pottery only registered in historiography and today’s generation don’t have the chance to see those hundred years old Malay traditional pottery. It was stated by Mubin Shepard (1972:39):

“No Malay pottery older than 250 years has been found, however. The gap between the pottery of prehistory and that of the Malays of the past 200 years is intriguing and will remain unclear until further research brings light to this obscure phase.”

However, Malay traditional pottery development was finally recorded in writing and photography in year 1903 by Leonard Wray who worked as curator of the Museum of Perak. Through journal documentation entitled ‘The Malayan Pottery of Perak’ published in Journal of The Royal Anthropological Institute, he had successfully explained about Sayong pottery making in Kuala Kangsar district. At the same time, there was also photography on types of Sayong pottery, equipments used and various traditional motifs of pottery in the journal.

3.0 THE DEVELOPMENT OF MALAY TRADITIONAL POTTERY

Pottery making is one of the most common handicraft works in the Malay society although was only focused in several states. States in Peninsular Malaysia like Perak, Pahang and Kelantan have successfully produced pottery, each with its own identity. The diversity of pottery usage produced by women makes it one of the daily essentials. Pottery usage in daily life such as cookware or water container can make life easier. Based on this factor, encouraging demands from locals has made pottery a subsistence industry that can be carried out in individual house.

3.1 Perak-Labu Tanah (Clay Pitcher)

Perak is the fourth biggest state within Malaysia after Sarawak, Sabah and Pahang. This state has nine districts namely Ulu Perak and Kerian, Larut and Matang, Kuala Kangsar, Parit Tengah, Kinta, Manjung, Hilir Perak and Batang Padang. Perak is associated as the earliest state with living human in Peninsular Malaysia by the discovery of human skeleton aged about 11,000 years old that lived during the Old Stone Age (*Paleolithic*)⁴ where the people were practicing ‘Tampanian Culture’. The skeleton was named *Perak Man*⁵ or ‘Tampan Man’. Prehistoric artifacts discovered by H.D Colling in year 1938 at Kota Tampan,

⁴ Old Stone Age (Paleolithic) - This era was estimated happening between 400,000 to 8,000 years before century. The only trace in Malaya was the site found in Kota Tampan, Lenggong. This period legacy also known as ‘Tampanian Culture’ where the imperfect tools from stone were found.

⁵ Perak Man was the oldest & near complete human skeleton from old stone age during Paleolithic era ever found in Malaysia, discovered in 1991 at Gua Gunung Runtuh located in Bukit Kepala Gajah, in Lembah Lenggong, Hulu Perak. Perak Man was buried in “foetal” position, with legs tucked towards the chest and the hand held several types of animal bones. He was buried with several stone tools and thousands of shells. Perak Man was a man aged between 40-45 years old with a height of approximately 157cm.

Lenggong shows humans at that time had used several types of tools made from stone such as ‘hammer stone’ and ‘hand axe’ (A. Halim, 1977:25-28).

The discovery of ancient pottery fragments found at Gua Badak, Lenggong and Tanjung Rawa, Kuala Selising; pottery surface produced was patterned and this shows that potters at the time were amazingly creative. They were able to create various pattern combination such as zig-zag pattern, striped lines, messy lines, round lines and points. Those patterns was arranged on a pottery surface and the result was almost similar to the pattern on current Malay traditional pottery (A. Halim, 1977:39-40).

Undeniably, Perak is certainly more popular with pottery. Perak pottery is different from pottery of Pahang and Kelantan due to its form adaptation from gourd or pumpkin. The pottery is called ‘labu tanah’ or *labu ayor*⁶. In 1903, there were four districts famous with clay pitcher industry namely Sayong, Pulau Tiga, Bukit Gantang and Lenggong (Wray, 1903:25) but now only Sayong, Kuala Kangsar and Pulau Tiga, Parit carried out this industry actively.

Clay pitcher from Sayong and Pulau Tiga were produced from the same material and functioned the same, but the features of the clay pitcher from these two districts were differentiated through the colour. Clay pitcher from Sayong is black, smooth and large in size while clay pitcher from Pulau Tiga is a little smaller with rough surface and yellowish in colour. Nevertheless, clay pitcher from Sayong or better known as Labu Sayong is more popular than Labu Pulau Tiga. Labu Sayong is more unique for its blackened surface resulting from oxidation reaction of the paddy husks during firing process or reduction. Apart from clay pitcher, there are also other products like flower vase, clay urns, pitcher and ashtray produced.

3.2 Pahang-Terenang

Pahang is the largest state in Peninsular Malaysia and divided into nine districts namely Lipis, Bentong, Temerloh, Cameron Highlands, Jerantut, Kuantan, Rompin, Kuala Pahang and Raub. Pahang state capital was Kuantan while Pekan is the Royal town of Pahang. Pottery in Pahang existed since the end of Mesolithic age and produced by a community that practised ‘Hoabinhian’ culture. This based on the discovery of prehistoric pottery during the excavation at several archaeological sites such as in Gua Kecil, Bukit Chinatamani, Kota Tongkat and others (Mohd Kamaruzaman, 1997:46-48). Today, among nine districts in Pahang, the only district that produce pottery is Jerantut. Clay forms known as Terenang, clay pot (belanga Tembeling), censer (bekas perasap) and large jar (tempayan) are the main production of Kampung Pasir Durian located at Kuala Tembeling, Jerantut.

Kuala Tembeling is situated amidst the junction of three rivers, to the northwards is Sungai Tembeling, southwards is Sungai Pahang and to the west is Sungai Jelai. Based on the geographical setting, it is undeniably that once Lembah Tembeling was an important human settlement during Neolithic age. Based on archeological study conducted by I.H.N Evans in 1930, along Sungai Tembeling from Kuala Nyong to Hulu Sepia was once a major trade route (Evans, 1931:53-56). Among the artifacts found by Evan was the earthenware produced by the people who lived in Lembah Tembeling. The techniques and decoration like stamping and incising on prehistoric pottery found in Lembah Tembeling had similar characteristics with pottery produced by traditional pottery makers in Kampung Pasir Durian (Evans, 1922:259-260).

⁶ *Labu ayor* is Perakian’s dialect referring to the clay pitcher.

3.3 Kelantan-Mambong

Kelantan state has ten districts namely Tumpat, Kota Bharu, Pasir Mas, Gua Musang, Pasir Putih, Bachok, Machang, Jeli, Tanah Merah and Kuala Krai that covers a wide area of 14,943 sq km (Ibrahim & Sahaimi, 2005:33). Among various popular art crafts from this state are batik, songket, wood carving, copper and pottery. Even though Kelantan pottery is not as great and popular as pottery from Perak, it still has special features. Pottery had existed in Kelantan since Neolithic Age about 3000 years ago proven with the discovery of near complete primitive pottery in Gua Cha. Various pottery forms found together with different artifacts such as stone bracelet and 'T' shaped stone ring proved that Neolithic society in Kelantan were more advanced. The discovery of near complete pottery form shows that they were able to produce durable pottery not easily broken.

Pottery handicraft in Kelantan is known as Mambong pottery. It was pioneered and introduced by the late Mohammad Ghazali Yusoff who was the headman of Mukim Mambong, Batu Mengkebang, Kuala Krai district, Kelantan around 1980's. Undecorated earthenware covered jars and pots are among the popular productions apart from clay urns and censers.



Figure 1 The Malay traditional pottery

4.0 THE TECHNOLOGY OF MALAY TRADITIONAL POTTERY MAKING

The word technology is derived from a Greek word 'technologia'. 'Technologia' is derived from two parts of words; first 'techne' which means "art skills" and 'logos' which means "learned." Therefore, technology technically can be understood as a management system that uses the techniques and skills to produce a product. Technology is also associated with knowledge and practical work using particular devices or specific machineries (Drengson, 1995:30).

To produce Malay traditional pottery, potters use a technology process management system which incorporates handworks skill and techniques. Apart from knowledge, practical works using materials, specific equipments or machines both in old or modern way are used to ensure a perfect pottery production. In other words, technology in Malay traditional pottery making is actually a level of technical knowledge used, intermingling certain sources for manufacturing a particular product. There are four processes in Malay traditional pottery making:

4.1 Preparing the Clay

Clay preparation for Labu Tanah (clay pitcher), Terenang and Mambong is almost the same. The clay from river bed is dried out and two people were needed to grind the clay using traditional

wooden mortar and pestle. One will use the pestle to pound the clay and one will flip the clay inside the mortar.

For producing a clay pitcher, the grinded clay is sieved into a big pot. The sieving process is a must to separate impurities such as sand, stone or small twigs from the clay. Sieved clay is fine like clay powder and excessive coarse clay is pounded again until fine. The clay powder is then mixed with water and soaked for a day until it became slurry.

For Terenang production, the process started with 'melepa' where clay slip is poured onto a porous bat called 'lepa'. Lepa can absorb the water from the clay for easier kneading process. Different from Mambong, fine sand from the river is added to the grinded clay before being pounded again to make it even finer.

Nowadays, the clay preparation is done manually and also using modern equipments. The process became easier thus saving a lot of time and energy. Liquid clay called slip grinded using a plunger machine is used instead of the clay lumps. The process can produce a large amount of clay in one day. The ratio for producing slip is 60% clay and 40% water to enable the rotor of the plunger moves and the clay to be grinded perfectly. To add plasticity, sodium silicate is added to the mixture little by little until the level of plasticity needed is achieved. Sodium silicate acts as an agent to dilute the clay and float fine clay particles in the mixture so the clay is not sinking at the bottom of the plunger. The mixing and blending process is carried out for 3 to 4 hours before the slip is sieved and soaked in a large container for a day. This processed liquid clay is called slip (Norton, 1956:166). Slip is sieved again before being used to cast Malay traditional pottery.



Clay is pounded using traditional wooden mortar and pestle



Pounding the clay using wooden hand pestle



'Melepa' process



Blending the slip using a plunger

Figure 2 The preparation of clay process

4.2 The Forming Process of Malay Traditional Pottery

Coiling and pinching technique (picit-cubit) are the best ways to produce Labu Tanah (clay pitcher), Terenang and Mambong. Among basic tools needed during this process are plate (*pinggan*

ayan⁷) or turntable (*meja putar*⁸), bamboo ladle (*sudip buluh*⁹) and wooden spatula (*kayu penepek*¹⁰). The first part to be made for all three types of pottery is the body. The basic process is rolling out the perfectly kneaded clay by hand until it became thick coil and length approximately 12cm. Then, both ends of the coil is scratched and slip that acts as glue is added. Both ends are joined to produce a rounded coil like a thick ring. The forming process of the body starts with the thick rounded coil being placed on a centre of a plate that acts as a turntable (*meja putar*¹¹).

Pinching technique is applied to form the clay wall; Left hand is rotating the plate while right hand will pinch the clay upwards until a cylindrical clay wall is formed. The initial thick and short clay coil will transformed to a thin and tall clay form. The outer surface of the cylinder is smoothed using forefinger or bamboo ladle by smoothing the clay in upwards movement and therefore the height of the cylinder will increase at the same time. If the needed height is not achieved, another layer of coil is added to the top part of the cylinder and pinched again. After smoothing process, the outer part of the cylinder is gently patted using wooden spatula to straighten up the cylinder and to firm up the outer layer of the cylinder.

The cylindrical clay pitcher body is then shaped to become a convex form by pushing out the wall slowly from inside using finger while rotating the plate at the same time. After the needed belly is formed, a clay coil is added to the top part to make the base of the pitcher. The uneven part is leveled using knife. A round clay slab is attached to the open part therefore the base and the body of the clay pitcher is now completed. It is left to hardened for a while so this part can support the added clay that will form the neck, head, mouth and the cover afterwards. The body of the clay pitcher is turned upside down before the process of making the neck to the top part is carried out.

The process in producing clay pitcher using coiling and pinching techniques is the same process to produce the body of Terenang and Mambong. The completed body part of Terenang will shaped to become pot or urn by pushing out the internal part slowly from inside using a small pebble shaped like a pestle so the base of Terenang will become curved at the bottom. The inside part is then scraped using a type of metal tool like grater called 'kukur' and this process is called 'menguka'. The same process is done to form Mambong only the tool used to flatten the internal part is called 'besi kokok'. A cover with knob/handle for the pot is produced using a clay slab with the size that fit the pot mouth.

After completing the forming process of the body, it was left to harden and semi-dried before the next process that is burnishing using a river pebble to smoothen the outer surface of the clay body. The objective is to close the pores of the clay so the clay body is semi-permeable porous and in Perak this process is known as 'meluru'. This process will give smooth and shiny look for the clay pitcher after firing.



Thick clay coil placed inside a plate for pinching process



The outer surface made firmer using wooden spatula



The internal part is stretched out to form a convex belly for the clay pitcher



The head of the clay pitcher is formed and it was smoothed using wooden spatula



Burnishing using river pebble



Smoothing the internal part of Mambong using metal tool

Figure 3 The clay forming process

Traditional pottery can also be made in modern way by using mould that can produce a large quantity in one day. A few processes needed to carry out before the pottery body is shaped:

4.2.1 Pottery Model Making

To understand the process of traditional pottery making, we refer to clay pitcher production using mould. Pottery model is the main item for producing traditional pottery using mould. The model is the actual clay pitcher form made from a block of *plaster of Paris*¹². The block is placed on a jolly jigger machine for model making process. The shape of clay pitcher is produced using *trimming*¹³ method. From a cylinder, it finally transformed into a clay pitcher form. Several types of blade were used during this process. The model is left to dry for a while before mould making process started. Firstly, the model is lathered with special soap so it won't stick to the mould piece. Usually one model can be used to make around 15 to 20 pieces of mould. The mould is also made from the same material that is plaster of Paris.

⁷ *Pinggian ayan* is a plate used during the process of forming the clay pitcher.

⁸ *Meja putar* is a piece of round wood used during the process of forming Terenang and Mambong.

⁹ *Sudip buluh* is a tool made from bamboo used for cutting and smoothing the outer wall of the pitcher.

¹⁰ *Kayu penepek* is a wooden tool like a boat paddle only smaller. It is used to pat the wall of clay pitcher and make it firmer.

¹² *plaster of Paris* is a gypsum stone processed into powder and also known as *gypsum plaster*

¹³ *Trimming* is a model making technique using special tools to carve out the model slowly when the jolly jigger machine is in full speed.

4.2.2 Mould Block

Mould block is produced from clay pitcher model. One block of clay pitcher mould consists of three separate pieces for left, right and bottom part. Material and tools needed to make a mould is plaster of Paris, four square pieces of wooden/glass board, a piece of *template*¹⁴, sponge, *special soap*,¹⁵ bicycle tubes, a bucket and a *grater*¹⁶. The clay pitcher model is segmented into two parts by making a straight line as a guide. Then, gently lather the model with special soap that acts as model release agent using a sponge. The purpose is to avoid the model from sticking to the mould piece. Lay the model on a piece of clay slab to stabilize it. The second step is making the first mould piece. The soap lathered model is surrounded with a template and the four pieces of board. Tie the boards with rope to stabilize it when plaster of Paris mixture is poured into the block.

Plaster of paris is introduced to a bucket of water little by little until it leveled up with the water. Stir the mixture slowly in one direction to avoid air bubbles from forming. Stir it for two minutes using hand until there is no sign of plaster lumps. After the water and the plaster is well mixed, pour it slowly into the wooden/glass block until it covers the model.

The plaster mixture will set gradually and it will become warm to the touch. A cold plaster surface means the mixture is fully harden and the wood block can be opened. The uneven surface of the mould is scraped then turned upside down; We can see half of the model is protruding while another half is still embedded in the first mould piece. Template is taken out slowly from the mould piece. The second step is making a pinhole on the first mould piece; Three pinholes are needed for the left, right and bottom part of the large size clay pitcher mould. The third step is making the second and third mould pieces. The process is the same with the first mould only without the usage of template or making a pinhole.

The next process is separating each mould piece and taking out the clay pitcher model from the mould. After the model is taken out, the soap residue on the internal part of the mould is wiped off using hot water. This process is important to enable the water absorption from clay slip works. The completed mould block is secured using bicycle tubes that has been cut into long strips. The rubbery tubes can strengthen and tighten the mould pieces during slip casting process to ensure no leakage.

4.2.3 Slip Casting Process

Slip casting process is a clay pitcher making using mould and slip. Slip is poured until it fills the mold up to the brink and left for few minutes. The slip will sink because the plaster wall is sucking up the liquid to form the thickness of the clay pitcher body. Slip should be added until the desired thickness which is around 1cm is achieved. The slip excess is then poured out. This process is taking around 15 to 20 minutes depending on the dampness of the mould piece. The clay body is left to dry for a while inside the mould so it can be extracted easily. At the same time, the drying process of the clay pitcher is shortened because plaster of Paris used for the mould is absorbing water from the clay pitcher body. After the body is taken out from the mould, it is cleaned and

smoothed using fine sponge. It is left to dry again for the burnishing process.

Obviously slip casting pottery is more productive. By using only one mould block, slip casting process can be done up to 3 times a day. For more productive mould with low water absorption, slip casting can be done up to 2 times a day. If one has 10 mould blocks, he can produce up to 30 pieces clay pitcher per day. The maximum use of a mould is up to 3 months or approximately 200 times usage. Hence, the slip casting technology can produce traditional pottery in large quantity to fulfil the market demand.



Model on jolly jigger machine



Model separated from mould pieces



Slip poured inside the plaster of Paris mould



Semi-dried clay body inside the mould

Figure 4 The moulding process

4.2.4 Decoration

Decoration is a process to decorate the pottery surface with motifs which creates pattern. There are three chosen techniques to decorate the clay pitcher, Terenang and Mambong that are the stamping technique, incising and carving technique. Decorating process is carried out after pottery surface is burnished and half dried.

Stamping technique is the most popular choice to create pattern on all three types of traditional pottery. A small wooden block is used to stamp the leather-hard clay surface. If the clay surface is too soft, the pressure from the stamp will give an indentation marks on the body and the clay will stuck to the wood stamp. If the body is too dry, decorating process will cause cracks to the body. Motif carved on wooden stamp is simple to create clear and defined pattern on the clay surface.

The second decoration technique is incising. Among the lines produced are straight lines, horizontal, 'tulang ikan', 'pucuk rebung', 'potong wajik', triangle and oval. This motifs were produced by incising the clay surface using sharp tool. The horizontal line acts as a divider between a row of motif to the other. While repetition of vertical lines can produce opposite

¹⁴ *Template* is a thin piece of *plaster of Paris* used during the first mould piece making only. It functions as a wall to separate the left and right model. After the completion of the first mould piece, the template is not used anymore.

¹⁵ *Special soap* is a type of *palm oil grease*. It has a consistency of a gel or sometimes thinner. Boiled water is used on the model surface to get rid of the soap.

¹⁶ *Grater* is a tool to carve out the surface of the *plaster of Paris* to make it even and clean.

effect to the horizontal lines thus giving a variety in the decoration.

Carving technique is also used for the clay pitcher even though it is not as popular as stamping and incising technique. Carving is done during the leather-hard stage and free-hand drawing technique is used to produce flora motifs. Carved motif is done repetitively and sometimes overlapping so it looks a bit complicated. The clay pitcher with carving technique is somewhat similar with carving on wood sculpture and it is exclusive. Exclusive clay pitcher usually owned by aristocracy and royals because the design pattern produced portrays the great skill and wisdom of the craftsmen.

Cut out decoration technique is much applied in today's traditional pottery after slip casting technology was introduced. Research shows that the even thickness and solidity of the clay body makes the decoration technique suitable to be applied on the pottery. It is important to ensure the even thickness of the wall so it looks nice after the cut out process.

Meanwhile, there is another new decoration technique applied to create flora motifs on clay pitcher, and it is called slip trailing. Slip trailing is a technique to produce an embossed floral motif using engobe. Engobe is coloured slip and can be applied on pottery surface in two ways. First, using a rubber syringe or slip trailing bag. Secondly by using brush to draw on the pottery surface. Engobe is best used on semi-dried clay body because it won't absorb the engobe too fast.

Different color engobe such as green, blue, brown, black and others can be brushed on clay pitcher as background colour that can highlight the slip trailing pattern. The method is, clay pitcher body is centered on throwing machine and while the machine is rotating slowly, the colored engobe is brushed on the clay surface. White engobe is used to draw flora motifs. By using rubber syringe, the stem, leaf and flower motif is drawn spontaneously and fast. Then, a wooden stamp carved with flower and leaf part is stamped on the surface. A deft hand while trailing the slip and drawing the motifs spontaneously is very important to produce fine, organic and beautiful motifs.

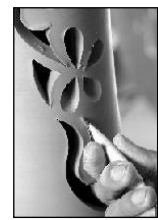
Gold or silver marker pen is becoming more popular to design or coloring the pattern on blackened clay pitcher or on the surface of the natural color Terenang and Mambong. This is mainly because gold and silver color will look more contrasting on the dark/natural coloured pottery surface. Various points of pen are used to produce a diversity of lines and motifs. Usually a pencil sketch on the surface was done beforehand to avoid defects and material wastage. To ensure the color doesn't fade off, a glossy transparent paint will be sprayed on the applied motifs.

Spraying technique on the other hand is using a spray gun with brown oil paint for the main layer of the clay body. The oil paint is blended with a small amount of turpentine or kerosene to thin it and to avoid the paint from clogging the spray nozzle. Firstly, the bisque pottery is cleaned using wet sponge to remove dust. This will ensure a good absorption of the paint. Next, it is left to dry. This technique is carried out in an open area outside the workshop. Therefore, spraying is not done if it is windy to avoid wastage. It is best to spray when the sun is out so the paint will dry faster.

Spraying technique can be done in two ways; one or two layers colour spray techniques. The bisque is placed on a turn table, it is sprayed slowly while the turntable is rotating. This is important to ensure an even coating of spray paint on the bisque surface. If two layers spray technique is used, the clay pitcher is left to dry for a while after the first colour was sprayed. For a greenish look, green color paint is sprayed on particular area. The slightly damp first color will mixed with the second colour to produce an even two tones on the pottery surface.



Pattern produced using wood stamp



Cut out technique.



Engobe brushed on pottery surface



Slip trailing.



Stamped on slip trailed engobe.



Silver colored pattern on clay pitcher



Drawing using gold marker pen



Spray gun used in spraying technique

Figure 5 The decorating techniques process

4.2.5 Firing

Firing is a process to harden the pottery body. There are two types of firing for Malay traditional pottery that are firing in open trenches and firing using kiln. The clay pitcher was placed on a rack built with wood or bamboo for 3 hours for smoking process. Firing process in open trenches for clay pitcher, terenang and mambong is the same; A hole is made on the ground and lined with coconut tree leaves, twigs or small bamboos alternately. The potteries were arranged neatly with those natural fuel/materials. Lastly, they were covered with small and large strips of wood and bamboo before the firing process begin.

The firing process will take 4 to 5 hours and fuel was continuously added until the potteries are cooked. The well-cooked body is dark brown in colour when taken out from the cinder. The clay pitchers were immediately placed on a pile of paddy husks to obtain the blackened surface. Next, the base of the pot is brushed with liquid resin or wax to render it waterproof. Mambong goes through a slightly different process; the cooked body was left to cool before being lathered with sap from banana heart that is believed can extend the lifespan of the pot.

Firing can be done using gas kiln which is safer, cleaner and time saving. By using kiln, the risk of uncontrolled heat level and broken body can be avoided therefore the wastage of time and raw material can be prevented effectively. This is because in firing process where heat is increased drastically, the water inside the body will quickly vapourized and caused the pottery to crack. By using a kiln, one doesn't have to constantly monitor the firing temperature. Nevertheless, the smoking process using kiln takes longer time which is 6 hours and usually is carried out from midnight until dawn with low temperature. After 6 hours, the heat

is increased and the actual firing process started for about 4½ hours. Only 15 kg gas barrel is needed for one time firing.



Smoking process with clay pitchers on the rack



Arranging the wood & bamboo strips before firing process for Mambong



Firing in open trenches



The fiery hot body is placed in a pile of paddy husks to obtain the blackened effect



Brushing the liquid resin to render it waterproof



Lathering the sap of banana heart on Mambong pot



Gas kiln

Figure 6 The firing techniques process

5.0 CONCLUSION

It is clear that technology is the root for pottery production. No matter what equipment being used, each has its own function that can benefit the pottery makers. Through technology, the process of pottery making is running smooth thus making their life easier. The research has shown that various kind of technologies done manually or by using machine had been carried out successfully in pottery making of Malay traditional heritage of Malaysia. This shows that besides maintaining the old ways in technology, modernization has also contributes in the aspect of scientific and equipments used. Technology used is also indirectly contributes towards more efficient manufacturing process and design technique that will increase productivity of the traditional pottery. The knowledge of pioneers in this industry is also increased especially in the aspect of technical expertise and this contributes to the innovation of decoration technique. Traditional pottery making has proven that talent and skill among the entrepreneurs in associating various process using technology had also contributes to the strength of pottery making industry in Malaysia on the whole.

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