

MODIFICATION OF ANCIENT BENIN BRONZE CASTING TECHNIQUE TO ALIGN WITH MODERN TECHNIQUES OF METAL CASTING IN NIGERIAN SCULPTURE PRACTICE

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Abstract

Lost-wax (cire-perdue) process has been the major technique adopted by sculptors/casters in producing their bronze and metal works till date. Technology and culture are dynamic, and the culture of Edo traditional bronze casting which involved direct modelling with wax (bee wax) on a predetermine core, followed by investment of red sand before casting in metal (bronze), has been in practice beyond 1280 AD. Technology and creativity is supposed to have great impact on the improvement and advancement in the process (bronze casting) but because of traditional beliefs or misconception, bronze casting is taken as a project not a process. This paper therefore advocates a readjustment and improvement on the process, technique, materials, forms, and concepts of Edo traditional bronze casting to align with contemporary trends. It further recommends the way forward.

Introduction

The earliest methods of metal casting and use of cast metals by human is lost to the distant past, but it can be linked to the early hunter story as pointed out by Langland (1999), that, as early hunter gathered and were sitting by the fire a lump of copper fell into the coals. In the intense heat, the copper melted and ran out on the ground in glowing stream. Once cool, this shinning, heavy material became very hard and took new shape. Early men saw this repeating episodes and they began to collect lumps of copper so that they could throw them into the fire to watch the glow stream flowing. Someone among them had an idea and formed a shape in the sand, and allowed the metal run into it and it took the shape of the impression on the sand, perhaps a spear sharp

pointed head for hunting. And from that moment came the metal casting of the century and that is what is been practice up till date.

Different people devised various techniques of carrying out operations or get work done in some professions due to constant practicing. When new methods, process or tricks is discovered, it made it two ways of doing it. As the art of casting in metal gained popularity the urge for experimenting in complicated forms started arising and the idea of using wax as temporary model began, that was how lost-wax (cire-perdue) process emanated. The Benin traditional bronze casting culture has been in practice for a very long time.

The Benin traditional bronze casting culture has been in practice for a long time. According to the Benin traditions, the sixth recorded Oba Oguola, must have reigned about 1280 A. D. or slightly before, sent a request to the Oni of Ife, for the service of a master bronze-founder to instruct Benin craftsmen in the making of memorial heads in cast metal (bronze) for the ancestral alters. History had it that bronze pieces had been possessed and cast previously at Ife before being used in Benin. The Oni responded by sending one Iguegha who taught the Benin craftsmen the art of bronze casting process. According to Fagg (1990) Oguola, is still being remembered and was represented with terracotta head by the bronze caster of Iguneromwon quarters in Benin City.

The trade or craft had been taught since about A.D. 1280 and has been in practice till date with little or no modification on the technique, process, materials, concepts and forms. Let us assume that the purpose of producing those bronze pieces then had been altered due to British punitive expedition of 1897 when several works of art in various media were chartered from the palace of the king and taken away to Europe. Since then Benin traditional bronze works can be commonly seen anywhere and can easily been acquired by anybody and can be presented as souvenirs.

Egonwa (2003) stressed that the bronze or arts are made to the glorification of the Oba. From the range of materials that Oba's items were made (ivory, beads, brass, copper, bronze) it is vividly cleared that they are the types that cannot be easily possessed by less privileged. Peju (2002) buttressed the point saying that the processes involved in traditional metal casting are numerous, cumbersome, time consuming and very tedious. Thus, it becomes necessary to settle for less cumbersome procedures that will facilitate production and equally increase the aesthetics and financial value to the product.

Benin Traditional Method of Bronze Casting

Benin traditional technique of metal casting has been in practice for very long time, the processes are too numerous, time consuming and tedious that needs transformation. The traditional method involved direct modelling with wax (bee wax) on a dried and fired latrite predetermine core, followed by investment of latrite before de-waxing, pre heating and casting in metal (bronze). The task should be a continuous one, where ever it is been stopped by an individual or generation, others should pick it up and inject new ideas, techniques, materials and concepts that will be in compliance and measure up with technological age. Because of the earlier traditional conceptions about the art of bronze casting as being court art restricted to only Oba's custody still strife in the mind of the casters. Not only that bronze, copper and brass was not to be used by anybody in the kingdom as a sign of respect for the Oba, because of long life span of the metals (bronze, brass, copper) that is been associated with the Oba. Bronze been a precious metal, it is believed to be associated with some power and mysticism evidenced by what metal object could do, (Egonwa 2003).

The traditional methods of casting does not allow for mass production, alteration of forms and design from identical concept or design compared to modern or moulding technique of bronze casting that allow flexibility. There are few crops of new generation of Benin casters who are academically trained in the field of sculpture that are now injecting contemporary ideas, concepts and materials into the system. But some still continue with the traditional technique with the same concepts, methods, materials, and design.. Perhaps because of fear of distorting or altering the traditional concepts that is preventing the modernization of the pieces. Based on the oral interview conducted with academically trained corps of Benin casters. The whole issue is based on mindset, there are ways the Benin traditional metal casting can modernize in forms, materials, technique and concepts without losing out traditional value and meaning of the concept that will still convey the messages without loosing out its identity.

With strict adherence to the traditional beliefs, concepts, forms, and technique of the traditional bronze casting of their predecessors by embarking on it as a project. Peju (2002) buttressed the point that the "artists continue to work in the old idiom of Benin art" although there little modern changes made in aspect concerning themes and techniques which did not feature in the works of their predecessors. There is no harm in continuity, but there should be positive impact and

advancement in whatever the incumbent artists/casters are contributing and the contributions should enhance the adequate productivities and aesthetics of the products.

Process of Improved Metal Casting Technique

Process is defined by Oxford Concise English Dictionary (1998 edition) as “a natural or involuntary operation or series of changes, progress or course of something” There is no way traditional methods of metal casting can be ignored because that is the genesis of metal casting. Progress is termed as conscious or unconscious changes in operations or stages in whatever is being done in advancement of human endeavours. Whenever the same operation is being repeated without improvement or alteration in technique and materials of production, progress is said not to be recorded. One major obstacle that sets the progress of Benin traditional metal casting back is the secrecy that has dominated the art of metal casting. It is only members of the casters guild or certain families that are allowed to practice the profession. Any artist who wishes or shows interest to learn directly under the knowledgeable master from Iguneronmwon about the art of metal casting is not permitted. It is natural that any field of profession that is being monopolized by some groups that prevent majority full participation to contribute meaningfully to the progress is always difficult to develop or improve. It is a fact that no two people possess the same quality or level of intellect, they can only achieve very little or no achievement without rubbing minds or exchange ideas. What is yours is absolutely yours by right of consciousness and cannot be taken from you until you let it out and it is only you that can destroy it by not impacting on people to improve on it. When two or more people come together with different ideas toward the same goal, that goal will surely yield positive result because there is no way they can pacify the same ideas, there is a saying that “two good heads are better than one.”

Lost wax process (cire-perdue) is the old aged method or technique of metal casting and is still very relevant up till date. But there is new technological improved technique of metal casting that is being practiced in developed countries; they are ceramics shell and centrifugal methods. Moulding technique is an improved method of metal casting by sculptors/casters, it involves different stages;

- * Model (which could be in plastic, clay, wood, metal, etc.)
- * Mould Taking (flexible rubber mould is required in order to achieve register detail impression of the model.)

- * Wax Model Casting.
- * Wax Model Chasing and Iron Pin Tacking
- * Introduction of Sprue, Vent(s) and Runners.
 - Introduction of Investment, Core and Reinforcement.
 - Introduction of Anchor
 - De-waxing and Pre-Heating
 - Pouring Molten Metal
 - De-moulding, Chasing and Presentation.

Model: is a desired finished design from any material which negative impression can be copy from.

Mould Making: Mould is the negative impression of any form. The mould should be taken in piece mould technique, section model into different areas with clay fence (area separator) for undercut to be taken care of. Apply surface separator (engine oil, grease, Vaseline, soap paste, palm oil, etc.) to cover all areas and surface. Mix your chosen mould material with proportional and appropriate aggregates and apply several coats and reinforcement depending on the size of the model. In case of rubber mould, mould jacket is needed to hold the flexible material in place; this can be done in plaster or concrete.

Wax Model Casting: couple piece mould in place after surface separator must have been applied. Melt wax (bee wax) into liquid form and allow it cool for a while, it will be ready to pour into the mould when clot is noticed on the wax. Ensure that the shim lines are being shielded with clay to prevent wax leakage. Liquid wax will be left in the mould for about 3-4 minutes in case of concrete mould; the rate of absorption varies from different materials. After pouring out the excess wax from the mould, cool water would be turned in and filled to the brim to prevent wax from cracking and cool it to facilitate quick remove from the mould. The thickness of the wax model could be checked at tip of the mould. As many copies as possible can be cast out at this stage and it gives room for flexibility.

Wax Model Chasing: this is a very important stage where creativity and craftsmanship are being displayed. From the same mould different concepts can be achieved through alteration of forms. At this stage cleaning of shim line, work up, signature, ornamentations and serial numbers are

been done. Attachment of pouring gate, vent(s) and runners is been done. Iron pins are been tacked on the high point of the wax model to put in place core and investment when wax has been melted out of invested mould.

Introduction of Investment, Core and Reinforcement: Either core or investment can come first, according to Mills (1976). But it is advisable to introduce investment first in order not to distort the form while turning the wax model round and while stuffing in core, but it is just matter of handling and choice. Investment materials are mixed according to the specified ratio and proportion (plaster and grog or silica sand, sand and clay, literite, etc). The mixing ratio of plaster/sand or grog investment and core is 30% plaster and 70% sand or grog while mixing ratio of clay/sand investment and core is 5% clay and 95% of sand. After the first layer of investment to safe guard the fragile wax model form, core materials are mixed proportionally and stuffed in hollow cavity of the wax model. Reinforcement wire gouache and binding wires are introduced on the first layer of investment and covered up with final layer of the same material and proportioned and allowed to get dry before the next stage. The use of plaster and grog instead of red sand saves time and improve registration of forms and it also reduces the amount of clean up after casting.

Introduction of Anchor: construction of anchor with iron rod or wire round the mould is needed to enhance it's lifting from kiln after de-waxing or pre-heating.

De-Waxing and Pre-Heating: this is method of removing or eliminating wax from invested mould in preparation for pouring molten metal into vacuum the wax impression left. The mould is subjected to severe heat that is enough to burn off the wax in the mould. Flaming or smoking at the sprue or vent(s) indicate that there is still trace of wax in the mould and with wax inside molten metal cannot penetrate. The two operations can be done simultaneously, but little or no wax will be retrieved except the operation is done one after the other.

Pouring Molten Metal Into the Heated Mould: the invested heated mould must be securely packed in the sand pit, for it to be able to withstand the pressure and weight of the molten metal when pouring. The ideal sand in the sand pit is foundry sand, but clean-sieved sharp sand can also be used. The whole mould must be buried leaving the pouring gate and vent(s) to prevent leakage. The openings must be taken care of to prevent foreign matter from entering as this may affect the quality of the casting. Then the molten metal is poured through the pouring gate. The operation must not stop until both pouring gate and vent(s) are completely filled to the brim.

After the pouring the mould is de-invested, the positive metal cast is ready for chasing and finishing. The cast piece could be left in natural colour or chemicals patina could be applied

Conclusion

Conclusively, this improved method of bronze casting is very effective, economical, saves time, accommodates mass production, alteration of forms, achieving multiple concepts from one mould, and it also technically supersedes the traditional methods. Laing and Rolfe (1998) buttressed the advancement in metal casting that the fundamental transformation that has taken place in foundry practice is the change from basic crude technique to that of scientific and systematic control, made possible by science and technology. Traditional technique is not being condemned out right, but there must be radical changes both in materials and methods so that we catch up with global trends.

The processes expressed in this paper continue in an endless circle till perfection is achieved and it involves all the stakeholders.

Recommendations

This paper recommends as follows:

- a. The Benin bronze casting culture should be developed to sophisticate and enviable level by improving on materials and methods involved in the production rather than maintaining the old practice or technique.
- b. The academic trained corps of Iguneromwon casters should inject new life into their forms, materials, and technique to reflect or prove the new additional knowledge acquired coupled with the inherited skills that will give better result.
- c. Interest should be reawaken in the area of metal casting in our art schools and the art should be taken beyond figurative concept, furnishing and industrial casting should be incorporated and encouraged in developing the curriculum.
- d. The art of bronze casting should be demystified and the act of monopoly by one set of people or guild should be disallowed, so that any interested individual can learn, practice and make living out of it.
- e. There should be a forum organized by art organization or art school where veteran professionals both traditional and academic trained metal casters/sculptors would cross fertilize ideas and practically demonstrate their skilful experiences.

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