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## Finishing in Creative Metalwork: An Appraisal of the Use of Bar Polishing Compounds in Metal Art Studio Practice in Nigeria

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### Abstract



Globally over the years, polishing operation has been an important aspect of finishing in most creative metal works. Investigation revealed that in Nigeria, the first known and used substances for polishing creative metal works have been the traditional use of ashes from animal bones and wood, and lime juice mixed with sand. However, the use of natural lime juice mixed with sand and ash, as metal polishes by traditional metalworkers do not produce the type of high lustre surface finish required by contemporary Nigerian artists. Therefore, Nigeria contemporary metal artists have embraced the use of imported bar polishing compounds in conjunction with polishing wheel in order to achieve desired surface finishing of their products, and to satisfy their clients' needs and demands. Presently, there has been an increase in the demand and use of bar polishing compounds in Nigeria. The increase

in the demand and use of imported bar polishing compounds has created scarcity and high cost in their procurement. Therefore, the article is an appraisal of the emergence of bar polishing compounds. The article discusses the roles, constituents, challenges and prospects of imported bar polishing compounds in the development of the indigenous creative metalwork finishing technology in Nigeria. It also sought to develop potent alternative local bar polishing compounds.

**Keywords:** Abrasive, Finishing, Polishing Compounds, Metalwork, Potent, results

## Introduction

Polishing is an important aspect of finishing for most creative metal works such as goldsmithing, silversmithing, brasssmithing, coppersmithing, metal casting, and fabrication. Polishing in creative metalwork can be regarded as an attempt to bring an art piece surface to smooth and glossy finish by a mechanical process, usually by friction. When the surface finish of a metal piece is natural, it means that the material of the piece itself is brought to finish by employing polishing techniques. It is important to note that metal has natural beauty of colour that can be emphasized or highlighted by smoothening and polishing. A metal piece can be given natural finish treatment by rubbing down manually with smooth emery paper, sandpaper or liquid polishing substances. However, a high-gloss polished finish can be given to a creative metal work by means of power-driven buffing wheels used in conjunction with polishing compound (burnishing). Sometimes, metals natural colours can be altered by patinating to attain contrast, before polishing operation is applied. Moreover, almost all pieces of metal works (particularly jewelries) meant for electroplating may require buffing with polishing compounds before actual electroplating operation can be effectively carried out.

Besides burnishing methods of finishing, there are other types of finishing methods mostly used for mass polishing which include, tumble finishing (barrel finishing), vibrating finishing, sandblasting and chemical polishing. Nevertheless, in Nigerian the most popular, and suitable device for achieving high shine in creative metalwork practice and teaching is buffing (burnishing) with polishing wheels using bar polishing compounds. It is also important to state that Tripoli compound and rouge compound are the most common polishing compounds used by creative metal workers in Nigeria. Polishing compounds are substances usually produced by combining abrasives grains (grits) and binding materials. The binding materials may be fats or liquids. The abrasive

grits may be either processed from a natural or synthetic abrasive material. The abrasive materials are usually pulverized into finely grains before they are blended into cake (bar), pastes, or liquid form. (Figures: 1, 2 and 3).



Figure 1: *Polishing compound in cake (Bar) form.*

Source: Jewelers Rouge Polishing Compound [www.pjtool.com](http://www.pjtool.com)



Figure 2: *Polishing Compound in paste (in tube) form.*

Source: Ningbo Belilun Purui Polishing product Co Ltd 2013



Figure 3: *Polishing Compound in liquid (in tin).*

Source: <http://en.wikipedia.org/wiki/Brasso>.2016

Before the emergence of imported bar polishing compounds the indigenous substances available for polishing creative metal works were the use of natural lime-juice mixed with sand as well as ash from bones and wood. These substances in most cases do not provide the highly smooth lustrous surface finish required in certain creative metal works. The above factor led the contemporary creative metal workers to resort to sourcing for imported metal polishes such as bar polishing compounds which are more potent in achieving desired surface finish of their works and also to satisfy their client's tastes and demands. Therefore, this paper is an appraisal of the employment of bar polishing compounds (particularly, the imported ones) for creative metal works finishing. The paper forayed into the roles, constituents, challenges and prospects of imported bar polishing compounds in the development of the indigenous creative metalwork finishing technology in Nigeria.

### **Traditional Substances and Methods of Polishing before the Emergence of imported Bar Polishing Compounds in Nigeria**

In Nigeria, the traditional bronze caster and other metal workers have been engaged in the use of lime fruit juice-sand compound to polish their metal objects. Johnbull, in personal communication (2015) stated that “we the bronze casters in Benin used lime juice mixed with sand to wash our bronze works to get some shine after filling”. The traditional Bida Brass workers are known to also use the ashes from animal bones and wood to polish their metal objects. However, the contemporary creative metalwork

practitioners have advanced beyond the mere use of lime juice mixed with sand and ashes from animal bones and wood as metal polishes. They now have access to foreign bar polishing compounds made from processed abrasive grits and fatty substances which are giving them better results.



Figure 4: *tamarind tree and fruits.*

Source: <https://world-crops.com/tamarind/>



Figure 5: *Lime fruits (citrus hystrix)*

Source: [https://en.wikipedia.org/wiki/Kaffir\\_lime](https://en.wikipedia.org/wiki/Kaffir_lime)

### **Bar Polishing compound as Abrasive Substance for Finishing in Nigeria**

Abrasives are “materials that are used to smoothen, roughen, polish or clean surface, or simply to remove materials to alter surface shape or dimension. Bar polishing compounds are usually produced by the combination of abrasive grits with fatty binding substances. Joseph and Thomas (2013, p.328) posit that

Abrasives are made from natural or synthetic substances ranging from the relatively soft particles used in household cleanser and jewelers polish to the hardest known materials such as diamond, silicon-carbide etc. Abrasives are substances that are commonly used for surfacing and finishing metals, stone, wood, glass and other materials by abrading action. Abrasive materials may be used as loose grains or grinding wheel or as a coating on cloth or paper.

The properties of abrasive include hardness, toughness, brittleness, grain shape and size, character of structure, and purity, or uniformity, (George and Henry 1991, p.1). The size of abrasive particles that constitute a given polishing compound also determines its functionality. All abrasives, with the exception of the naturally appearing fine powders such as talc, must be crushed to the particle size required for use. Sizes in use vary from 4 grit, which measures about 6 millimeters (1/4 inch) in diameter, to as fine as 900 grit, which measures about six microns (0.00024) as required when used for the polishing of scratch-free surface on high-quality optical lenses, mirrors and metal colour attainment, (John, 2013).

Each hard abrasive particle acts like a single point cutting tool. With hundreds if not thousand available in a small area of a compound, the effect they produce is quite significant. Coarse grades or grits of abrasive are used for compounding when high volume of the material is needed to be removed. Finer grades are generally used after coarser grades to produce a high smooth surface finish that is not possible with coarse grades (Joseph and Thomas, 2013p.329).

There is a variety of polishing compounds. However, Tripoli and rouge are the two standards bar polishing compounds that are generally used in Nigeria. Tripoli compound is a proprietary compound of siliceous earth mineral called Tripoli, and fatty binding materials. The rouge polishing compound composed of highly fired ceramic iron oxide grits and fatty substances is usually used for final polishing finish. Rouge compound produces the final high colour or luster and it does this primarily by burnishing the metal, (Murray 1984p.32).

### **Polishing Operations Using Bar Polishing Compounds**

In polishing operation, using bar polishing compounds requires polishing wheels. Polishing wheels (stitched or unstitched) which are used in most of the art studios in Nigeria are made from fabric (cotton). The process of polishing in the studio using imported bar polishing compounds involves the adoption electric grinding motor (known as bench grinder). It also involve impregnating the polishing wheel with the required bar polishing compound. The object to be polished is usually held against the revolving polishing wheel that is run by the electric motor. The wheel which is fixed on the spindle of the motor is usually charged with the required bar polishing compound at regular intervals because the abrasive grits contained in the polishing compound usually wear down due to the continue friction occurs during polishing operation which brings about the required smoothen and lustrous effects (Figures 6 and 7). During polishing operations in most metal smithing and fabricating studios, Tripoli compound is usually used first before rouge compound is applied because tripoli compound is harder and its abrasive grits can easily remove the fine scratches left by sandpapers or files that are usually used in dressing the art pieces meant for polishing. While the rouge compound which contained grits processed from highly fired iron oxide is used for final polishing.

Before operation is carried out in most creative metalwork studios in Nigeria, the art piece that is required to be polished would have passed through the processes of grinding, filing and sanding (buffing with sand paper). The motor for polishing is usually securely mounted on table or bench. The benches used in jewelry studios are not as high as the ones required in metal design and fabricating studios which are preferably

about one meter (1m) off the ground (Figure 8). The bench containing the motor is usually positioned within the studio (particularly metal design and fabricating studio) in such a way to allow enough space to manipulate large jobs during polishing operation.



Figure 6: *Fabric Polishing Wheel.*

Source: Ningol Beilun Purui Polishing Co Ltd. 2013



Figure 7: *Impregnating the Polishing Wheel with Polishing Compounds.*

Source: Ningol Beilun Purui Polishing Co Ltd. 2013



Figure 8: *Polishing with Motor Secured on a Bench in Metal Design Studio.*

Photo: Philip Olowe 2015.

## **Use of Bar Polishing Compounds in Nigeria**

Finishing in local metalwork in Nigeria has advanced beyond the one practiced by traditional sculptor (metal caster) silversmith and goldsmith in the past which involved chiseling away the unwanted parts, hand filing and polishing by using natural lime fruit juice mixed with sand and the use of ashes. Modern techniques in metal works surface finishing, which include grinding using abrasive wheels (with grinding machines), cutting using abrasive cutting disks (with cutting machines), mopping using sand papers with bench grinder (electric motor), polishing and buffing (using polishing compounds) to achieve required amount of luster, plating using electro plating technology and colouring techniques (using patina), are now at the disposal of Nigerian metal sculptors and other professionals. Nigeria contemporary metal artists have embraced the use of bar polishing compound and polishing wheel techniques in order to achieve desired surface finishing of their products.

## **Early Users of Bar Polishing Compounds in Nigeria**

The origin of the use of bar polishing compounds in Nigeria could be ascribed to the jewelers who started practicing goldsmithing and silversmithing before Nigeria got her independence in 1960. Investigation revealed that they introduced the use of foreign bar polishing compounds, (particularly, rouge and Tripoli compounds) to Nigeria: In fact the entrepreneur jewelers that practice in the metropolitan cities of Lagos and Ibadan were the first to import and use foreign bar polishing compounds in Nigeria. This



is because the foreign polishing compounds enabled them to obtain very smooth and high lustre surface finish required in their jewellerys which lime juice and ashes could not provide. Another early user of bar polishing compounds in Nigeria is a company called Metal Furniture located at Ikeja, Lagos State, Nigeria. This company which started operations in the early 1980s is known for employing the use of imported bar polishing compounds to achieve smooth and lustrous surfaces of some metal creative works before further finishing process such as electroplating is applied.

The use of bar polishing compounds was introduced to the University of Benin when the Department of Fine and Applied Arts gave birth to “jewelry and Silver Smithing Unit” in 1980. This unit which was one of the areas of specialization focused on the teaching and practicing of jewelry and silversmithing. Therefore, the types of art works that are produced in this unit required proper smooth and high lustre surface finish which led to the introduction of bar polishing compounds. The Silver Smithing Unit which was expanded and reconstituted in 1983 to include jewelry, metal smithing, fabrication and foundry practice, and renamed “Metal Design Unit” is even now more involved in the use of bar polishing compounds in the studio practices, (Figures 9, 10, and 11).



Figure 9: *The Surface of a Brass Lampshade-Stand before Polishing Operations is Applied.*

Photo: Philip Olowe, 2015



Figure 10: *Polishing Lampshade-Stand in Metal Design Studio, University of Benin, Nigeria.*

Photo: Philip Olowe 2015



Figure 11: *Lampshade-Stand after it was Polished with Bar Polishing Compound.*

Photo: Philip Olowe, 2015.

Another early user of bar polishing compounds in Nigeria is Rose and Gold Metal Casting and Electroplating Company, located in Gbagada area of Lagos which was established in the twilight of 1980. Some creative metal workers in Benin City and Unibenin Company limited, a subsidiary of University of Benin Consultancy Unit were taking their metal art works to the Rose and Gold Metal Casting and Electroplating Company to be electroplated into nickel, silver or gold colour. There the metal art works were subjected

to polishing operations using metal polishes such as bar rouge and Tripoli compounds to enhance their surface qualities before electroplating processes were carried out. The Unibenin company mentioned above which was located at Ekheuan Campus of the university of Benin, in the late 1980 was also involved in the use of bar polishing compounds.

### **The Proliferation of Bar Polishing Compounds**

The University of Benin trained practicing metal designers encouraged the proliferation of the use of bar polishing compounds in Nigeria. This is because the types of metal works they produce demand polishing to achieve their required surface finishing. It is important to state here that it is only University of Benin that offers metal design as a course and an area of specialization or discipline in visual arts amongst all the Universities in Nigeria. Uyi Aigbontean could be regarded as the first metal designer to go into solo practice after resigning from University of Benin as a lecturer where he taught briefly after his graduation in 1983. Uyi Aigbontean who was also one of the pioneer students of metal design left Benin City for Lagos State to establish a metal design studio in the late 1980s, where he was involved in buffing with bar polishing compounds to satisfy his clients' demands.

Metal designers such as Oghenevwede Kayoma, Chike Omo and Oghenechuko Eru are the early metal design graduates who set up individual metal design studios in Benin City. Oghenevwede Kayoma who started studio practice along New Lagos Road, Benin City, in the beginning of 1980s after resigning from his Unibenin Company employment, pioneered Benin City metal design studio practice. Kayoma who is still practicing till date with his office relocated to Ehakpen in Benin City, focuses mainly on the production of metal design items such as trophies, medals, medallions, maces, traditional insignias and staff of office, corporate gifts, crests, award plaques and shields. Kayoma basically used copper and brass metals to execute most of his works and they required to be subjected to polishing operation to attained required surface finished appearance. Chike Omo who began metal design studio practice shortly after Kayoma had gone into solo practice had his workshop at Zabayo Street, off Ekheuan Road, Benin City. Omo also employed the use bar polishing compounds because he is producing similar creative metal works that Kayoma is involved in. Eru Oghenechuko, a metal designer who is into solo practice since after resigning from Unibenin Company in 1998 stated (in personal communication, 2016) that "I started using bar polishing during my studies at the Metal Design Section in the Department of Fine and Applied Arts, University of Benin, and presently in my studio, I am still using bar polishing compounds because my clients usually demand for highly polished works. Therefore, to be able to meet their demands and tastes, I rely on bar polishing compounds to achieve my goals" (Figure 13). Beside



Kayoma, Omo and Eru, there are others metal designers who are practicing in Benin City and elsewhere in Nigeria who depend on bar polishing compounds to achieve very smooth and high surface lustre in their works.

Moreover, the emergence of the use of polished bronze pieces for the embellishment of wrought iron and steel metal gates, doors and railings in the twilight of 20<sup>th</sup> century by metal sculptors, further increased the demand and use of bar polishing compounds in Nigeria. The bronze pieces meant for the embellishment of such wrought iron and steel gates, doors and railings are usually first modeled in wax and later cast in bronze before they are dressed and polished using bar polishing compounds to obtain very smooth and high lustre before being used for embellishment. According to Odiboh and Ukweku (2015, p.56) Godwin Eriabie, a sculptor trained at Auchi Polytechnic, popularized this type works in Benin. He cast crests, insignia, flora of flowing patterns and traditional motifs in bronze, which are later polished and lacquered, then used for embellishment (figure: 12). Such bronze casts were placed in specific areas of the gates or accompanying railings. The polished bronze piece complements the iron and steel as well as contrasts with and breaks the monotony and coldness of its colour.

Eru Ogheneochuko and Kayoma Oghenevwe, were the first to be engaged by metal gates and railings producing sculptors such as Godwin Eriabie, Gregory Agbonkokon, and Egwasa Omodiawen to dress, polish and fix (lacquer) bronze works meant for embellishing wrought iron and steel creative gates and railings. Presently, some persons who were trained by Kayoma, Omo, and Eru have set up mushroom studios and are now helping sculptors and traditional bronze casters to dress and polish their metal art works using bar polishing compounds. Bello Kuranga who practice in Benin City, and Melus Ojogun in Lagos who are engaged in the production of metal furniture, gates, doors and railings for both interior and exterior architectural decorations and installation, have started combining burnished or polished ferrous with non-ferrous in metal art works. In most cases they produced art works, done in bronze, copper or aluminum in combination with wrought iron or steel to create contrast and to enhance aesthetic attributes of their works using bar polishing compounds (Figures 14). Others sculptors like Njoku Kenneth and Omodamwen Egwasa both in Benin City who now adopt the techniques of combining antiquating, staining, polishing and lacquering for finishing their works, also now use bar polishing compounds (Figure 15).



Figure 12: *Victorian wrought-iron gate embellished with polished bronze crest of St. Mary Dedication British International School, installed at the school premises in Benin City.*

Artist: Godwin Eriabie.

Photo: Ukweku Samson, 2013.



Figure 13: *A high lustre polished mace at the front view of Ekiti State (Nigeria) House of Assembly, produced by Eru Oghenechuko.*

Photo: Dele Ologunleko, 2013.



Figure 14: *Polished Chased/ Repoussé Copper Doors.*

Artist: Melus Ojogun.

Photo: Ukweku Samson, 2013.



Figure 15: *Patinated Polished Bronze Sculpture, Produced by Kenneth Njoku.*

Photo by: Kenneth Njoku, 2013

## **The Production of Indigenous Polishing Compounds**

Presently, there has been an increase in the demand and use of bar polishing compounds in Nigeria. This is because according to Ukweku and Ononeme (2009, p. 142) “over the years, bar polishing compounds have become very important and valuable art materials to the goldsmiths, silversmiths, metal designers and academics involved in studio practice”. Furthermore, there is ongoing increase in the demand for imported bar polishing compounds amongst sculptors, roadside metalworkers, and bronze casters. The reason for the increase could be attributed to the combination of high polished bronze, copper and aluminum patterns (as embellishments) to wrought iron and steel furniture, gates, doors, railings and images. This increase in the demand for the imported bar polishing compounds has created scarcity and has made the sourcing and the procurement of imported bar polishing compounds locally difficult and expensive. Another factor that has led to the scarcity and high cost could be attributed to the existing problems that correlate with importation and weakness of Nigerian currency against other countries’ currencies where bar polishing compounds are imported from. Added with the fact that, the few bar polishing compounds that are imported into the country from abroad are by the efforts of the few corporate jewelers that practice in the metropolitan cities of Lagos and Ibadan.

The above factor which has become a cause for concern to the creative metalwork practitioners appears to have started galvanizing some Nigerians to seek for a means of evolving indigenous technology that could be used to develop alternative local bar polishing compounds that are potent enough to provide high lustre surface quality. This factor spurred the researchers, to adopt the concept of appropriate technology in developing local technique and methodology to produce effective indigenous bar polishing compounds. The study focused on the exploration of local materials that have abrasive qualities such as silica, granite, porcelain shards, broken glass and iron oxide. These abrasive materials were processed into finely grits and blended with locally sourced fatty substances to yield potent and effective bar (cake form) polishing compounds. The entire research efforts were undertaken in five (5) steps to blend various bar polishing compounds in accordance to their respective abrasive materials. The steps are as presented below:

### **Step 1: Sourcing the Abrasive Materials**

Fatty Materials and Pulverizing Implements: Abrasive materials constituted the major ingredients used in the production of various compounds. The abrasive materials sourced and used included: silica, porcelain shards, broken glass, granite and iron oxide. The fatty substances sourced were palm oil, groundnut oil, beeswax and paraffin wax which were used as binders and lubricants. Implements such as mechanical and manual

milling machines and improvised crushing tools (such as steel metal plate, hammers, mortar and piston) were also sourced.

### **Step 2: Pulverizing the Abrasive Materials:**

Pulverization of the abrasive materials collected was undertaken in order to achieve the grits sizes required to carry out the experiments in the study. The pulverizing processes included crushing, grinding and milling (Figures 16).



Figure 16: *Crushing Broken Glass Using Hammer and Cast Steel Metal.*

Photo: Ukweku Samson, 2013.

### **Step 3: Sifting the Abrasive Grits:**

After the pulverization operations had been carried out on all the sourced abrasive materials, it was observed that the grains obtained although, appeared in powder form, were not uniform in size. Factory- graded sieves were therefore employed in sifting all the pulverized abrasive grains (grits) into various sizes. Factory- graded sieves of different grades were used.

### **Step 4: Producing of Polishing Compounds:**

The production of the polishing compounds commenced after the researcher had assembled all the processed abrasive grits, and all the required fatty substances. This was done through the processes of blending the various abrasive grits with fatty substances. For the blending processes to commence, the following tools and equipment were accessed: weighing scale, gas burner, metal pot, metal plate, metal

spoon, plastic container (as mould), etched copper discs (branding plate). The blending procedures were carried out in the following order: 1 trial blends, 2 simple line blend and 3 substantive (actual) blends.



Figure 17: *A Blended Bar Polishing Compound.*

Photo: Philip Olowe, 2013

### **Step 5: The Testing Efficiency of the Polishing Compounds:**

This step involved the production of metal sculptures and subjected them to polish testing operation using the developed polishing compounds to determine their efficacy. From the polishing tests it was established that the resultant compounds adhered sufficient to the polishing wheel. It was also observed that the compounds can effectively and efficiently polish iron, steel, copper, brass and aluminum creative metal works for surface smoothness and luster attainment (Figure 16 and 17). Therefore, the developed polishing compound provided solutions to Nigerian artists, the problem associated with the accessibility, affordability and sole dependency on imported foreign bar polishing compounds.



Figure 18: *Before Polishing Test*  
Photo: Ukweku Samson, 2013.



Figure 19: *Effects after Polishing Test.*  
Photo: Ukweku Samson, 2013.

## Conclusion

In Nigeria, the traditional means of polishing creative metal works has been the use of ashes from animal bones and vegetation, and lime juice mixed with sand by the traditional bronze casters in Benin, brass workers of Bida in Niger State and other aligned traditional metal craftsmen. However, this use of natural lime-juice mixed with sand as well as ash, for metal polishes by traditional metal workers do not produce the type of high lustre surface finish required by goldsmiths, silversmiths, brass-smiths, coppersmiths, metal designers, and sculptors in contemporary Nigerian society. Therefore, the emergence of the technique of burnishing metal artworks using imported bar polishing compounds with polishing wheels has not only helped to raise their surfaces finish to a very high quality, it has also made finishing (polishing) easier, thereby causing creative metalwork teaching and studio practice to be thrilling, robust and lucrative in Nigeria. Nevertheless, the continuous high demands for imported bar polishing compounds by the goldsmiths, silversmiths, metal designers, sculptors and academics involved in studio practice resulted to scarcity and high cost. This has necessitated the need to develop alternative and effective polishing compounds locally. It is therefore, recommended that both the traditional and contemporary metalwork practitioners should be encouraged and exposed to the use of bar polishing compounds in finishing their works in order to achieve desired surface finish effects. This study is also open to further research efforts toward the development of more effective technology for mass production of bar polishing compounds locally to make them more available and affordable.



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