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WOOD CARVING IN THE AKUAPEM HILLS OF GHANA: PROSPECTS, CHALLENGES AND THE WAY FORWARD

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ABSTRACT: *In Ghana, traditional wood carving has been an ancient industry. The wood carving industry in the Akuapim Hill has provided employment for a large number of people in the design and production of different forms of carved objects and articles such as stool regalia, drums, human figures, animal forms and entertainment objects. Like any other industry in Ghana, the wood carving industry in the Akuapim Hill has its own prospects and challenges. Key among the challenges of the Woodcarving industry in the Akuapim Hill include the difficulty in the acquisition of wood due to the ban on tree felling by the Government of Ghana, the high cost of available wood due to the activities of commercial timber loggers and chainsaw operator. The lack of financial support for the woodcarving industry as well as the over reliance on outmoded tools, equipment and techniques in the production of artifacts. The research was a qualitative one with the descriptive research method being the main methodology employed. Data were gathered using interviews and observation. At the end of the study and with the introduction of certain intervention of researchers to the carvers in the Akuapem Hill, it came out that the adoption of improved wood treatment techniques such as the use of the Neem tree leaves for wood processing and the use of the additive technique of carving greatly boost the outcome the works produced by the artisan in the Akuapem Hills.*

KEYWORDS: Carving, Animism, Lamination, Seasoning, Blocking, Assembling.

INTRODUCTION

From pre-historic time to date, man had been and is still experimenting with different tools and materials in his bid to make life easier and more comfortable to function well in his environment.

The story has not changed for the traditional woodcarver who began working in the stone and iron ages. With his main material as green wood, he carved simple objects as handles for simple implements like hoes, cutlasses and ploughs (Hauser, 1982). The ancient wood carver also carved handles for weapons such as spears, axes and tomahawks, bows and arrow shafts (Vansina, 1984). Over the years, the skills were passed on from father to son or nephew through the inheritance and apprenticeship system (Adu-Agyem, 1990, Sarpong, 1974, Segy, Leuzinger, 1972, 1958;;), except in recent years when anyone is allowed to learn the trade both at school and by traditional ways.

In Ghana, traditional wood carving has been an ancient industry. Wood, the main raw material, is available in almost every part of the country, especially in the rainforest areas of the Eastern, Ashanti and Western regions of Ghana . Perhaps this explains why wood carving is prominent in these areas. The Industry in the Akuapem Hills has provided employment for a large number of people in its various specialized areas such as wood supply, itinerant carving, polishing and sales, tools and equipment supply as well as the design and production of different forms of carved objects and articles such as stool regalia, drums, human figures, animal forms and entertainment objects (Prof. Kojo Fosu, personal communication, 2012).

Although these products attract a large number of patrons all over the country and beyond, the quality of work and the technologies used for their production have remained the same. This does not augur well for the industry, particularly at a time when there is deliberate effort by the Ghana government, to promote export of non-traditional products, including woodcarvings.
Every age has had its woodworkers: pattern makers, sculptors, woodcarvers and toymakers, to name a few (Adu-Agyem, 1990). The traditional wood carving industry in the Akuapem hills (which is in the Eastern Region and only 24km north from Accra) had and continues to play a vital role in the socio-economic development of the Akuapem ridge in particular and the country as a whole. However, the traditional wood carving industry in the Akuapem hills in particular and Ghana in general is bedeviled with problems such as unavailability of carving wood due to the depletion of the forest, which has necessitated a ban on the felling of trees by the Government.

High cost of the few available wood makes it difficult for carvers to buy wood in the quantities they need for the smooth running of their businesses. There is also the issue of waste due to lack of education, technical know-how and wood carvers inability to adopt new designs, as well as techniques that make efficient use of wood to promote mass production to meet the growing demand for traditional wood carvings globally.Unfortunately, no attempt has been made to assess the industry on the Akuapem hills to unearth the strengths and weaknesses for interventions to be made for improvement in the general performance of the industry.

The research therefore, is an attempt to delve into the activities of the carvers in the industry, to expose the weaknesses and suggest new designs and techniques of production (interventions) that will, among other things, make efficient use of wood to reduce waste to further develop the industry and put more money in the pockets of the carvers. This will also bridge the gap between

the school and the industry since the findings from this study will enhance teaching and learning in schools and colleges as well as contribute to the socio-economic development of Ghana.

MATERIALS AND METHODS

This research was conducted using the qualitative research approach. Best (1981) explains qualitative studies as those that do not allow the description and observation ordinarily as in the case of quantitative studies. Leedy and Ormrod (2005) opine that qualitative research studies serve the following purposes:

- Description which can reveal the nature of certain situations, settings, relationships, systems and people among others.
- Interpretation which enables a researcher to gain new insights into a particular phenomenon, develop new concepts about the phenomenon, and/or discover the problems that exist within the phenomenon.
- Verification which allows a researcher to test the validity of certain assumptions, claims, etc. and
- Evaluation which provides a means through which a researcher can judge the effectiveness of a particular policy, practice or innovation.

It is for this reason that the qualitative research method was adopted for the purpose of this research which seeks to reveal the nature of the wood carving industry in the Akuapem hills, gain insights into the industry and discover the problems that exist within it, test the validity of certain assumptions or claims and come out with innovations or make an intervention. Descriptive research, also known as non experimental research, is concerned with the collection of data for the purpose of designing and interpreting existing conditions, prevailing practices, beliefs, attitudes and on-goings (Ndagi, 1997). Ndagi explained further that the central purpose of descriptive research is not just the description of 'what is' but the discovery of meaning.

Population for the Study

A population deals with all the people in a particular area or setting. A population consists of all elements in a well defined collection of a set of values (Nkpa, 1997, Fisher, 2007). Leedy and (2005) suggest that, for one to be able to come out with a good research work, there is the need to restrict one's self to or focus on a specific target group, industry, area, community, or an organization. The group to which the researcher intends to generalize his or her findings is referred to as the target population.Population in research does not necessarily refer to a number of people. It is a collective term used to describe the quantity of cases of the type, which is the subject of one's study (Williman, 2001). He further emphasized that the population could be objects, events, people etc. For this research work the target population was the traditional wood carvers in the wood carving industry in the Akuapem Hills. The Akuapem Hills consist of about 300 to 350 carvers.

The total population of traditional wood carvers in the Akuapem Hills could not be established by this research due to the fact that, according to the secretary of the Wood Carvers Association (Aburi Industrial Centre) in the Akuapem Hills (Mr. Addo Biney, personal communication, September, 2010), the registered number of carvers (Association Members) was around 300 but

out of this number, few are very active members who attend meetings. Other members too were displaced by the construction of the Tetteh- Quashie Round-about-Mamfe road which ran directly through the main carving center at Aburi. For this reason many of the affected carvers are still working in their individual homes but he could not tell whether those who do not attend meetings and some of the displaced carvers are still working or not. However, he was quick to add that there were other carvers who were not members of the Association.

However, for the purpose of this research, out of the estimated accessible population of about 200 traditional woodcarvers, 70 master carvers at the main center of production (Aburi) were chosen at random. The researchers resolved only to work with master carvers in the prime of their trade. The research was in two phases. The first comprised the interview and observation of the 70 master craftsmen as well as the observation of their operation to find out in details how they carry out their trade on a day-to-day basis. This first phase was to get the researchers to clearly understand the exact state of affairs of carving in the Akuapem Hills. The second phase also comprised the introduction of concrete intervention to these craftsmen to bring efficiency into the production of their works. These interventions were arrived at as a result of the outcome of the first phase of the research.

Participants Demographics

Table 1. Geder of Respondents

Sex	No. of Respondents	Percentage
Male	70	100
Female	-	-
Total	70	100

Table 1 depicts that all the respondents were males 70 (100%). They were made up of young, middle-aged and old master carvers. The reason was that the nature of the work which required a lot of manpower and hardwork such as the lifting of such heavy material, tools and equipment like logs, axes and chainsaw machines etc. served as a disincentive for women to enter the trade. The old carvers were not seen to be working on a large scale themselves; perhaps this could be due to the demanding nature of the work.

The other explanation was that master carvers of old did not take on female apprentices due to some taboos associated with traditional woodcarving (Rattray, 1927). Females themselves might also have refused to learn the trade based on the mere fact that, they saw it as a male dominated job (Adu-Agyem, et all, 2013).

Table 2. Working Experience

Years	No. of Respondents	Percentage (%)
1 – 4	12	17.1%
5 – 9	20	28.6%
10 +	38	54.3%
Total	70	100%

Table 2 shows that twelve (12) respondents, representing 17.1% of the population have been in the industry for one to four (1-4) years, twenty (20) respondents 28.6% between five to nine (5-9) years and 38 representing 54.3 % have been in the industry for ten (10) years and above. The data in Table 2 indicate that there are more mature and very experienced woodcarvers in the woodcarving industry on the Akuapem Hills than young and not so experienced ones. In spite of the abundance of very experienced master carvers in the industry, the expected impact or contribution of the industry to the economic development of the country has been minimal. The immediate explanation is that the woodcarving industry in Akuapem is bedeviled with problems due to the fact that, appropriate government policies and support from financial institutions to support the growth and development of the industry is lacking. Participant observation by the researchers also revealed that although the carvers have been in the business for a very long time, they still depended mostly on traditional methods of production instead of adopting new techniques and innovations.

Table 3 Educational Background of Respondents

Level	No. of Respondents	Percentage (%)
M. S. L. C.	15	21.4%
O' LEVEL	9	12.9%
A' LEVEL	4	5.7%
B.E.C.E.	5	7.1%
WASSCE	6	8.6%
HND		-
DEGREE	1	1.4%
APPRENTICE SYS.	30	42.9%
TOTAL	70	100

The academic qualifications of the carvers are presented in table 3. The data revealed that out of the 70 being 100 % people interviewed, fifteen (15) respondents (21.4%) were middle school leavers (MSLC), nine(9) 12.9% of them were O'Level Certificate (O'LEVEL) holders and four(4) 5.7% were A'Level Certificate holders (A'LEVEL). The data further revealed that five (5) respondents 7.1% % were junior high school (JHS) graduates, six (6) 8.6% were holders of West Africa Senior Secondary Certificate Examination (WASSCE) certificates while majority of the carvers – thirty (30) representing 42.9% of the population - went through the apprenticeship system. Of the respondents who went through the apprenticeship system, it could be that some never had any formal education. The reason was that their families or they themselves did not find it important at the time to have formal education. Financial difficulty was also a reason for their failure to attain formal education. The data presented here also show that some of the thirty (30) respondents who went through the apprenticeship system were those who had formal education but could not complete and dropped out of school.

Table 3 depicts that a slight majority of the carvers interviewed – forty (40) forming 57.1 % - had received formal education in one form or another (MSLC, BECE, WASSCE, O'LEVEL, A'LEVEL, DEGREE). However, the researchers' interactions with the carvers through participant observation and the conduction of the interviews revealed that only a few of the respondents who claimed to have had formal education could either read or speak fluently in English. This situation cast some doubts on the information provided by some of the respondents as to whether they had actually pursued education up to the levels they claimed but this could not be verified since respondents were not requested to produce their academic certificates. Another explanation was that some of the respondents had gone through some form of formal education but dropped out of school due to financial constraints or simply because they were not academically good. There is yet another reason for this which could be that, some of the respondents lied about their academic qualifications for reasons best known to them.

RESULTS AND DISCUSSION

Types of tools used by the carvers

In order for any operation to go on successfully, every professional makes use of the appropriate tools and equipment and carving is no different. One of the objectives of this research was to ascertain the types of tools used by carvers in the Akuapem Hills in order to assess how the tool help advance the course of their operations. From the study, it came out clearly that the kinds of tools used in carving today by carvers in the Akuapem Hills were different from earlier carving who undertook the trade decades ago (Adu-Agyem, 1990; Sarpong, 1974; McLeod, 1981).

On this issue of tools, majority of the respondents, 61(87.1%) made it clear that their tools were no different from those used by the forebearer; meaning the basic tools they were using were not different from what their forebears used. In fact some master carvers mentioned with pride that they still had in their possession some tools they inherited from their late fathers and uncles who taught them to carve and that they were still using some of the said tools. A few of the respondents, about nine (9) of them representing 12. 9 % of the sampled population was quick to add that they were now also using some modern powered tools such as chainsaw machines, jig saws, electric sanders, planers and drills of which the early carvers never had the opportunity of using. However a closer look by the researchers through visits to the carvers' workshops revealed that only a few of them used these modern tools and equipment and even fewer numbers actually owned some of these modern tools and equipment.

The researchers also found out from the interviewees that majority of the elderly master carvers preferred to stick to the traditional methods of production using the traditional tools than to adopt the use of the modern tools and equipment. Some of the reasons they gave were that the power tools were difficult to handle and not very reliable since they could not be used when lights went out.

Plate 1

Plate 2

Plate 3

Plate 4

Plate 5

Plate 6

Plate 7

Plate 8

Plate 9

Plate 10

Keys
Plate 1: Adze
Plate 2: Gouges
Plate 3: Chisels
Plate 4: Spokeshave
Plate 5: Knives
Plate 6: Machete
Plate 7: Files
Plate 8: Mallets
Plate 9:'weree' (Scrapper)
Plate 10: Design Gouges

Plates 1 – 10 show the basic tools used by a majority of carvers in the Akuapem Hills for their carving operations.

Another reason they gave which seemed to be their main worry was that the electric powered equipment were very expensive to buy and they required further expenditure in terms of extension of electricity to their shops and payment of monthly electricity bills which they could not afford. They maintained that the woodcarving business is not lucrative enough lately to warrant such expenditure. Most of the young carvers however stated that the new tools and equipment enhanced the quality of their work and helped them to complete jobs on time but they also agreed with the other carvers that, the equipment were expensive and they carried with them extra cost or expenditure. All the woodcarvers agreed that the local tools were cheaper and more reliable to use. Perhaps this explained why the tools they were using were not different from what the early carvers used.

Source of the tools used by the carvers

Another concern of the research pertaining to tools was the source from where the woodcarvers got their tools. Sixty-one (61) respondents representing 87.1% stated that they owned local tools forged by local blacksmiths. They claimed these tools were cheaper, sharper and more durable than most of the ones on the market. They could also be forged to the exact specifications of the carvers. This confirmed that woodcarvers used mainly local/simple tools in carving (Sarpong, 1974; Adu-Agyem, 1990; Bohannan 1964; Bridgewater, 2007). The carvers indicated that they had all the tools and equipment needed for woodcarving. A close observation by the researchers revealed that, the carvers often shared tools whiles working. Apprentices in particular borrowed some basic tools like 'V' and 'U'gouges and chisels etc from friends and other apprentices. In some cases, though minimal, some masters sent apprentices to some other masters for some tools to execute certain jobs. This was not encouraging as it slowed down work.

Types of wood used for carving

About the types of wood used by the carvers in the industry, almost all of them – sixty eight (68) respondents representing 97.1% - stated that they worked with a variety of wood. They stressed

that wood for carving was hard to comeby these days, especially with the ban on tree felling lately, most of the wood suppliers have been kicked out of business due to numerous police arrests. Another reason for the lack of wood is the fact that most sawmills are now felling and milling wood they were not using before, forcing carvers to work with any wood that could be carved without many problems. This meant that other types of wood which previously were not considered as very good carving wood are now being carved. Among the woods mentioned as the main raw material used in the industry in the Akuapem Hills were 'Sese' (Holarrhena floribunda), 'Yoyedua', 'Gyenegyene' (Scented guarea), 'Dua Tweneboa'(Cordia Millenii), 'Hyedua' (Danirla ogea), 'Esa' (Celtis milbraedii), 'Onyamedua' (Alstonia boonei), 'Odum' (Chlorophora excelsa) etc. In fact all the woodcarvers interviewed mentioned that the wood types mentioned above were all native to the Akuapem ridge. This confirmed the fact that woodcarvers mainly used wood found in their localities for carving (Leuzinger, 1972; Bohannan, 1964).
They were however quick to add that these days due to the scarcity of wood they are using other types of wood from other regions of the country, such as 'Avudari' (Turraeathus Africanus), 'Mansonia' (Mansonia Altisima), 'Ebony' from the Volta region and 'Asamfena' (Aningeria Altisima), 'Dahoma' (Pitadeniastrum Africanum), and Mahogany (Khaya Ivorensis) from the Ashanti region. It also came out from the interviews conducted that among the local trees used for carving as mentioned earlier, 'Gyenegyene' (Scented Guarea) and 'Onyamedua' (Alstonia Boonei) were previously not carved but they are now carved due to the reasons mentioned above.

Reasons for preference of certain wood types

On the reason why the woodcarvers preferred the wood types mentioned above, sixty five (65) respondents representing 92.9 % of the population gave the following reasons; that the wood types they mentioned especially the local ones such as the 'Sese' (Holarrhena Floribunda), 'Gyenegyene' (Scented Guarea), 'Onyamedua' (Alstonia Boonei), 'Yoyedua', and 'Abare' were readily available. This meant that they are not durable but since they were readily available, carvers made do with them. All the woodcarvers who answered that the wood types they were using especially the local ones, were available and affordable also stressed that they were convenient to carve. A few master carvers explained that most of the local wood were white and white wood is mostly convenient to carve, especially in the green state. Seventy percent of the carvers the researcher interviewed reiterated that though some of the wood types were affordable they could not be used for all kinds of job. Some jobs required very durable and heavy wood such as 'Ebony', and 'Mansonia' (Mansonia Altisima), which were expensive because they had to be brought in from other regions. This also showed that durability and quality is a major reason for selecting wood for carving and not just availability and affordability depending on the job at hand. Five (5) respondents representing 7.1% were not able to give specific reasons why they used the wood types they mentioned. They merely stated in the local language that "eno ara na obiara de ye adwuma" literally meaning "that is what everybody uses ". What this meant was that they were using the wood types just because other carvers were also using them.

Treatment of wood for carving

Table 4: Treatment of wood

Treatment of wood	No. of Respondents	Percentage (%)
Yes	12	17.1%
No	58	82.9%
Total	70	100

With regard to the treatment of wood by carvers before using them for carving, only twelve (12) respondents forming 17.1 % answered in the affirmative. Fifty eight (58) respondents forming 82.9 % answered 'No' to the question as shown in table 4. This piece of information without doubt, shows that majority of the woodcarvers in the industry in the Akuapem Hills did not treat their wood. This confirmed that most traditional woodcarvers from times past carved green wood without treating them. Some of the fifty eight who did not treat their wood explained that, for them the chemicals used in finishing their carvings were treatment enough and therefore did not see the need to treat the wood before carving.

They added that some types of wood especially 'Sese'(Hollarrhena Floribunda) is never attacked by insects, though they could not prove it scientifically. When asked about how they treated their wood the twelve who answered 'Yes' in table 4 above explained that they dipped or sprinkled the wood or logs with 'Dursban' after the bark had been removed or after they had finished blocking the work to be done. When asked whether their method was effective they said 'Yes'. However it is important to mention here that the other carvers who did not treat their wood were quick to condemn the methods used by the twelve to treat their wood. They stressed that it was not only dangerous working with the chemical but they put the entire industry at risk since tourists (who are now their cherished clients), do not approve of the use of toxic chemicals in any form and may shop elsewhere if they found out the activities of the twelve. The information the majority provided clearly indicated the need to find more favorable methods of treating wood in the industry without putting carvers at risk and without driving away tourists.

Sources of ideas for carving

Table 5: Sources of Ideas for Carving

Ideas for carving	No. of Respondents	Percentage (%)
The designs already exist	67	95.8%
I create my own design	3	4.2%
Magazine & other books	-	-
Clients	-	-
Total	70	100

Sixty-seven (67) respondents forming 96.8% told the researchers that the designs for the objects they carved already existed. Only three (3) respondents (Master Offei, Master Quaye and Nana Asabre) representing 4. 2 % of the population for the study mentioned that they created their own designs. What Master Offei, Master Quaye and Nana Asabre said was obvious enough in their

shops for the researchers to see. Among all the shops the researchers visited in their interactions with the carvers in the course of this research, it was only in the shops of these three that one could see origal and highly creative works which were not seen in other shops at the carving centre. Master Offei's works deviated from the traditional objects and other carvings in the whole industry with the unique and intriguing way he depicted form and perspective in his carvings (see plate 11). Nana Asabre also showed class in his way of showing and treating contours and finishing wood in its natural form in the very simple carvings he produced (see plate 13) while Master Quaye also excelled in his unique abstract forms as shown in plate 12.

The researchers' interaction with Master Offei revealed that he is an American trained painter who worked as a painter and a musician for a long time before going into full time carving. He sees himself more of a Sculptor than a traditional carver as he works with other materials like Plaster of Paris (POP). Perhaps this explains his unique style and contemporary way of depicting traditional themes and philosophy. Apart from Master Offei, Master Quaye and Nana Asabere who said they created their own designs through ideas they developed through series of drawings, all other carvers at the centre simply reproduced what they had been doing over the years. This perhaps explained why one could see the same designs in all the shops with very little or no variations at all. The above information could be the reason for the drop in the patronage of their carvings as the carvers complained about because customers, especially tourists almost always found the same products anytime they visited. They might have bought some of them already on previous visits and since the designs had not changed, they might only admire them but would not buy.

Plate 11 Some Works of Master Offei (Bulley K).

Plate 12 Some Works of Master Quaye.

Plate 13 Some Works of Nana Bampo Asabre (King Yellowman)

Types of Artifacts produced

In terms of the types of objects/items produced, all the seventy (70) respondents representing 100 % of the population for the study mentioned more than two items. Items mentioned mostly included Stools, Masks, 'Akuamma' dolls, Human figures, Animal forms, Drums, Walking sticks, and Souvenirs. From the answers given by the respondents, it was obvious that nobody in the industry specialized in the production of only one item since all the respondents said they produced more than two items. In fact, the common answer they gave to question of items produced was, 'yeye biribiara' literally meaning 'we carve everything'. Numerous visits by the researchers revealed a conglomeration of carved items in all shops visited which confirmed what the respondents said. See plate 14.

Plate 14 Carved Items Displayed in Shops.

Challenges facing the woodcarving industry in Akuapem Hills

With respect to some of the challenges associated with the traditional woodcarving industry on Akuapem hills, most of the respondents, fifty one (51) representing 72.9 % of the population attributed them to financial constraints, scarcity of wood and its attendant high cost of wood, which did not allow them to expand their business. This could be the explanation for the poor nature of many of the shops and the over reliance on locally manufactured tools which were

cheaper as compared to the highly quality and expensive imported ones. It could also be the reason why the traditional carvers at the place did not employ the services of other carvers but relied on the services of their apprentices which were free.

However, nine (9) respondents representing 12.8 % mentioned that, coupled with the challenges already mentioned, they also lacked working hands which affected them in many ways since they had to do everything by themselves. To these people, they would have liked to employ more hands but could not due to financial constraints. On the issue of any other constraints the carvers faced, almost all the respondents mentioned working space as one of the biggest problems of the industry. An on- the-spot observation showed that all the carvers worked in temporary structures, under trees and other open spaces (see plate 15). This meant that during the rainy season, work could be uncomfortable especially for those who worked under trees. Ten (10) other carvers forming 14.3 % also mentioned that the national ban on tree felling is another challenge that is making life difficult for the carvers in the industry since they had to pay high prices for the few wood available and also pay huge sums of money as bribes to be able to fell trees for carving which seriously affected their finances. The evidence shows that the industry faces a lot of challenges as carvers have to grapple with and as such they must be assisted to enable them contribute effectively to the growth and development of the Akuapem hills in particular and the country as a whole.

Plate 15: Carvers Working in Temporary Structures, Open Spaces and Under Trees.

PROPOSED INNOVATIONS

Project 1.

Exploring the use of 'Neem' (Azadirachtia Indica) and 'Acheampong' (Chromoelena Odorata) as Alternative Substances for the Safe Treatment of Wood for Carving.

Wood is treated to protect it against the attack of woodborers and other insects (Microsoft Encarta, 2008). It is a good thing to treat wood before it is used to produce any artefact; to protect the artefact from being easily destroyed by insects after much effort and money have been spent on it. However the researcher discovered through an on the spot observation and personal interactions with the carvers that most of them did not treat their wood before using them. The very few who tried, also used chemicals such as Dursban which is very poisonous and hence very dangerous to use. It is in the light of this discovery that the researchers took it upon themselves to look for an alternative way of treating wood which could be user and environmentally friendly as well as cheaper for the carvers in the industry to readily accept. After several trials with other leaves, tree barks and roots, the leaves of the 'Neem' tree (Azadirachtia Indica) and 'Acheampong' plant (Chromoelena Odorata) proved to be very good for the treatment of wood.

Materials for Project 1

i Green 'Neem'(Azadirachtia Indica) leaves
ii Green 'Acheampong' leaves (Chroemolena Odurata)

'Neem' Leaves 'Acheampong' Leaves

Plate 16 Green Leaves from the 'Neem' Tree (Azadirachtia Indica) and 'Acheampong' Plant (Chromoelena Odorata).

Tools for Project I

i. Machette ii. Mortar iii. Pestle iii. Strainer (Nylon Mesh)
iv. Plastic bowls v. Stirring rod (plate 17)

Plate 17 Tools Used for Project I

Processes

Step I

Green leaves were taken from the 'Neem' tree (Azadirachtia Indica) and the 'Acheampong' plant (Chromoelena Odorata).

Plate 18 Leaves from the 'Neem' (Azadirachtia Indica) Tree.

Plate 19 Leaves from 'Acheampong' (Chromoelena Odorata) Plant

Step II
The green 'Neem' and 'Acheampong' leaves were chopped into pieces (see plate 20)

Plate 20 The green leaves were chopped into pieces and mixed together.

Step III

The chopped leaves were put into a mortar and pounded with a pestle. This was done to ground the leaves into a paste – like substance (see plate 21).

Plate 21 Chopped leaves being pounded in a mortar with a pestle

Step IV
The paste – like substance (grounded leaves) were then put into a big plastic bowl and mixed with water while stirring with the stirring rod (plate 22).

Plate 22 Stirring the mixture with a stirring rod.

Step V
The mixture was then left for about thirty to forty (30 – 40) minutes to mature (plate 23).

Plate 23 Mixture left to stand to mature.

Step VI
The chopped leaves and other particles were then removed by straining the mixture into the second bowl with the nylon mesh (strainer). The mixture was then ready for use as treatment for carving wood (see plate 24).

Plate 24 Straining the mixture

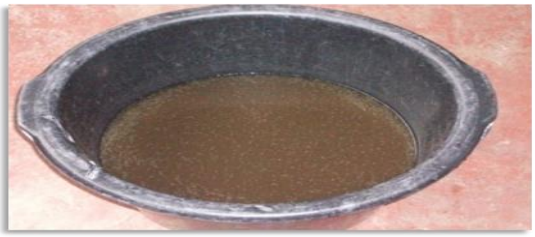

Plate 25 The dark colored liquid ready for the treatment of the carving wood.

Step VII
The freshly carved objects were put into the liquid substance in the plastic bowl and allowed to stay inside for about 30 minutes. This was done to let the liquid penetrate the wood for effective treatment (see plate 26).

Plate 26 Freshly carved objects in liquid substance for treatment.

Step VIII
The carvings were then removed and left to dry out in the shade. This was done to slow down the drying process and prevent the liquid substance used in treating the wood from evaporating (plate 27).

Plate 27 Treated carvings were spread out to dry in the shade after treatment.

Step IX

After the treated carvings were allowed to dry in the shade, the treatment process was thus completed and the works were then finished for sale (plate 28).

Plate 28 Finished treated works on display.

Step X

Testing the Effectiveness of the Treatment.

Some polished carvings from treated wood and other polished carvings from untreated wood were put into a box containing old insect infested carvings and covered for 14 days (two weeks). After the fourteen days the two sets of carvings were retrieved from the box and the results was that;

1.The polished carvings from untreated wood were attacked by insects (woodborers) as depicted in Plate 29.

11.The polished carvings from the treated wood were not attacked by insects (plate 30).

Plate 29 Polished carvings from untreated wood attacked by insects.

Plate 30 Polished carvings from treated wood not attacked by insects.

The tests proved that the 'Neem' and 'Acheampong' preparation were effective and useful for treating wood for carving. Though the treated wood was found to be bitter, it was not toxic meaning it was safe as well as a cheaper way of treating wood for carving.

Project 2

Assembling as an Alternative Technique for Stool Production.

Traditional (subtractive) methods of carving the stool wastes a lot of wood. Traditional carvers have stuck to the subtractive technique of carving the stool regardless of the fact that the large 'Sese' wood (Holarrhena Floribunda) and others needed for the job is almost non – existent, making the few available to be sold at exorbitant prices to carvers. It is a pity then that after going through all the trouble to acquire the scarce and expensive material, most of it is wasted through the subtractive technique.

The traditional carver only picks up a log of 'Sese' and after blocking it to reveal the needed shape, then proceeds to cut away the log piece by piece until the desired stool is obtained (Plate 31).

A. Blocking

B. Detail Carving

C. Sanding

D. Sanding

E. Polishing

F.

G.

H.

F, G, H - Finished stools put out to dry in the sun

Plate 31 Stool Production using Traditional (Subtractive) Methods.

The researchers introduced the use of the assembling technique for stool production to some carvers in the industry on the Akuapem hills. Some of the carvers, especially the elderly ones led by Master Offei (Buley K.) were initially skeptical about the idea because it departed so much from what they were used to. The assembling technique involved cutting the same piece of log that would have been carved into boards. The boards were then used for the individual parts that constituted stool i.e. the seat, the base and the symbol or center. The individual parts were put together (assembled) to form the stool.

The Designing Stages

a. The drawings of the traditional stool to be produced were made.

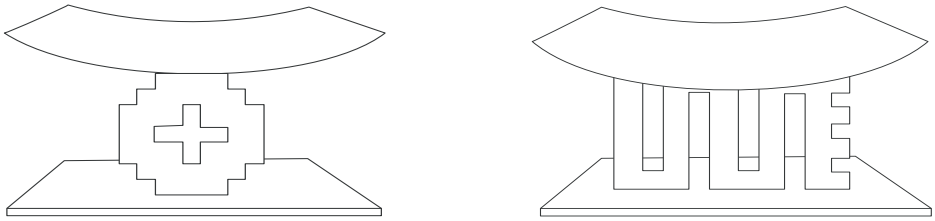

Figure 1 Drawings of Traditional Stools

b. Individual parts that constituted the stool were then drawn separately to scale to make cutting easy.

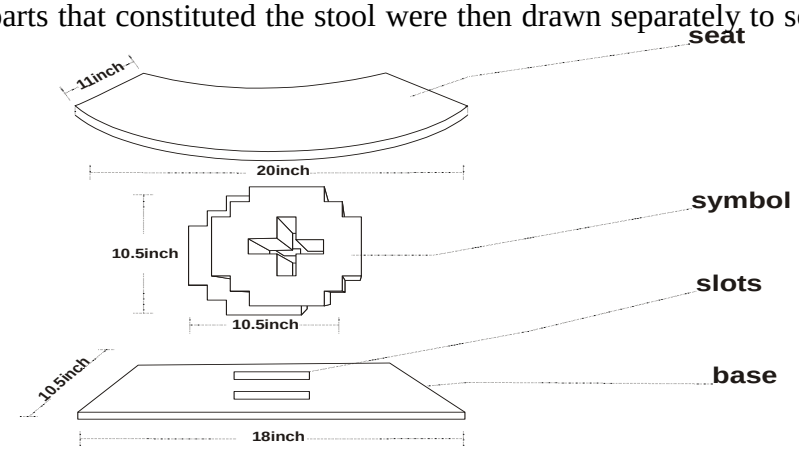

Figure 2 Drawing of Individual Parts of Stool

Construction Process

The following materials, tools and equipment were used in producing the stool.

Materials used for Project IV

i. wood ii. Abrasives (sand paper) iii. Acrylic paint

iv. White glue v. Sanding sealer vi. Screws (Plate 32)



Wood Abrasives Accrylic Paint


White Glue Screws

Plate 32 Materials Used for Project 2

Tools used for Project IV

i. Hammer ii. Pincers iii. Square iv. Plane v. Handsaw vi. Tape measure vii. Chisels viii. Gouges ix. Mallet x. Screw driver (Plate 33).




Hammer

Pincers

Square

Hand Plane




Saw

Measure

Tape

Chisels

Gouges


Screwdriver

Mallets

Plate 32 Tools Used for Project 2

Sets of Equipment used (Plate 33)

i. Sanding machine ii. planing machine iii. Jig saw iv. compound miter saw




Sanding machine planning machine Jig n saw compound miter saw

Plate 33 Equipment used for Project IV

Working Process

Step I
The log to be used was cut into boards and the boards to be used for the stool were carefully prepared by planning and measuring them to give them equal thickness and straight edges (Plates 34 and 35).

Plate 34 Cutting of Log into Boards

Plate 35 Planing of Boards

Step II
The boards were then treated and cut according to the specifications given in the design after the designs for the parts of the stools had been transferred onto the boards. The sharp edges and surfaces of the work were smoothened after the necessary grooves and slots for easy assembling had been done (Plate 36).

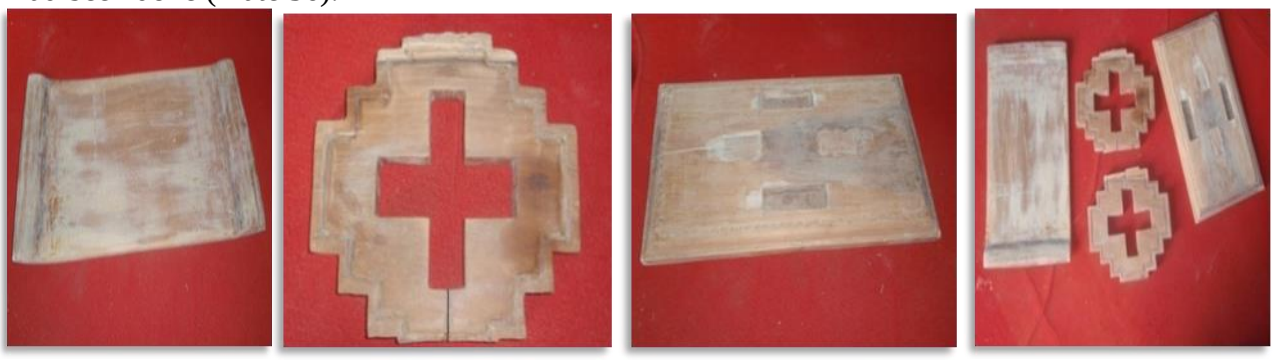

Plate 36 Cut Individual Parts of the Stool

Step III

The various parts were then given a thorough sanding with abrasive sheets of different grades (grades 60, 80, 120, and 1200). This was done prior to assembling the parts to ensure that all parts of the work received the needed attention, as it was easier to sand individual parts than to sand one whole (assembled) piece. The third and final sanding was preceded by the application of sanding sealer. The sanding sealer seals all the pores in the wood for a better finishing. This gave quality finishing to the work. See plate 37.

Plate 37 Sanding of Parts of Stool

Step IV

The work was given a final touch with a combination of paints to beautify and protect the stool. The painted parts of the stool were then put out to dry in the sun. See plate 38.

Plate 38 Application of Paint

Step V

The various parts were carefully marked and assembled. Care was taken to match every pin to its corresponding slot. The assembling of the stool was done in the following way;

- The symbol was first fitted onto the base matching the pins to the slots. It was then held in place with glue.
- The seat was then fitted onto the symbol making sure to match the pins to the slots (Plate 39).

Plate 39 Assembling the Stool

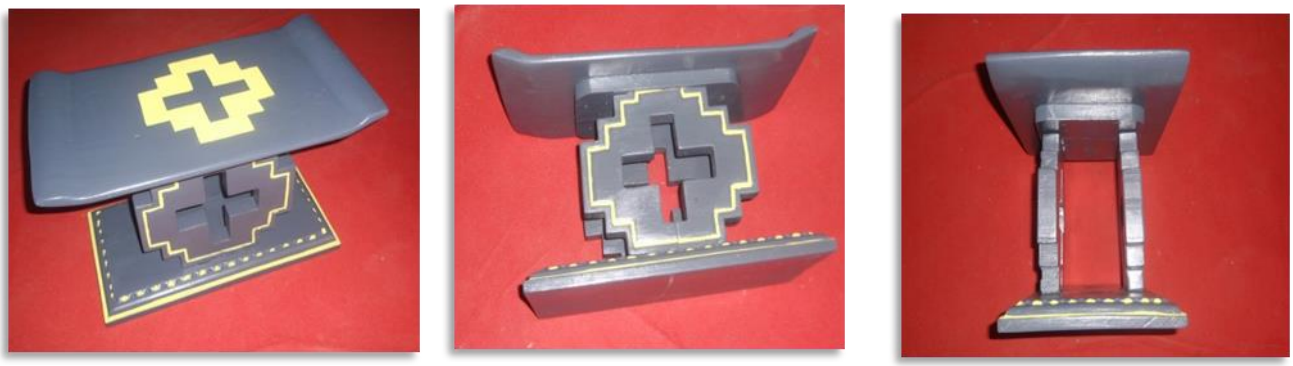

Plate 40 The Finished Stool

Observations Made on Project 2

1. It came out that an average sized log used to carve one medium size stool using traditional (subtractive) methods easily produced two average size stools using the assembling technique (innovation) introduced by the researchers. This showed that there is a lot of waste in the traditional (subtractive) methods of stool production.
2. It was also observed that though the finishing of the assembled stool was easy its quality was higher and aesthetically pleasing compared to that of the traditionally carved stool. The reason was that some parts of the carved Stool were not easy to reach for proper sanding to be done.
However the individual parts were not only easy to handle but all nooks and crannies were also easily accessible for proper sanding and finishing.
3. It was again observed that producing two or more stools of the same design, size, weight and height using the assembling method was far easier than the traditional (subtractive) methods of carving was almost impossible.
4. The assembled stool could also be easily mass produced as carvers could be contracted to produce individual parts of the stool to scale with little or no supervision. This was not possible with traditional carving as the whole stool had to be hewn out of a log with no standard measurements.
5. The assembling technique of stool production is also environmentally friendly as waste wood could be laminated and reused to produce stools which were not possible with traditional methods of carving stools.

The following difficulties were also encountered.

-The techniques for the innovations demanded a lot of accurate measurement and cutting. This initially posed a problem for some of the carvers involved in the projects.

-The technique also required a lot of ingenuity and most of the carvers involved in the projects again found difficulties initially which made the progress of work to be slow.

-Most of the needed equipment for the project had to be provided by the researchers since carvers involved in the projects did not have them in their shops.

The observations made show that the assembling technique is an improvement on the subtractive technique of stool production. However, it is worth mentioning that the assembling technique cannot be employed to produce every carved object.

CONCLUSIONS

In line with the government's policy of poverty alleviation and the drive to put money in the pockets of the citizenry, especially the youth, a critical examination and the introduction of innovations in the traditional woodcarving industry in the Akuapem hills, has become very necessary, due to the role the industry plays in absorbing majority of the youth in the area who would otherwise have been jobless and a burden on the society.

The Traditional Woodcarving Industry in Akuapem has not been given the needed attention by successive governments and other stakeholders. As a result of this, the industry is constrained in a number of ways in terms of quality of the products, costing and pricing of the products due to lack of education and proper orientation. Since wood is the only raw material used for carving in the industry and it is not being replenished, after sometime there will be no trees for carving.
The problems confronting traditional woodcarving, especially in the Akuapem hills, have over the years reduced the popularity and market value of traditional woodcarvings. Carvers in the industry do not know about safety measures and are therefore open to hazards. Works produced are also open to insect attack since wood is not treated before use.

The woodcarvers association (Aburi Industrial Centre) was formed with the aim of getting a body through which carvers in the industry will channel their problems to the government, NGO's and other corporate bodies but their efforts has not fully yielded the expected outcome.

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