

**FACTORS INFLUENCING CRITERIA AND INDICATORS OF QUALITY  
CONTROL OF TIMBER AND TIMBER PRODUCTS IN GHANA**

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## **1.0 INTRODUCTION**

### **1.1 Background**

The timber industry of Ghana is facing many challenges which are leading to low productivity, low profits, inefficiency and subsequent collapse of some timber firms, while those operating are barely breaking even. Reasons cited for this trend in Ghana include, lack of raw materials, lack of skilled labour in specialised areas, unavailability of standards and modern technological challenges. Thus the performance of the industry in the past few years is registering decline in both volume and value.

To others, the decline is attributed to lots of problems such as the continuous use of obsolete equipment, high operational cost, inconsistent policies and intense competition from the Far East Asian countries and development of substitutes apart from decline in resource base. Thus showrooms of many large and famous furniture companies are stocked with imported and inferior furniture and little of locally produced furniture. Resource management policies suggest that a sustainable way of salvaging the timber industry is by producing value added products capable of matching international competition.

In order to address some of the aforementioned problems and create guidelines for the industry, there is the need for a workable criteria and indicators to guide industry. A criterion is an accepted standard used in making decisions or judgments about something or a category of conditions or processes by which sustainable quality may be assessed, which is characterized by a set of related indicators that could be employed to monitor targets periodically to assess change. Indicator measures an aspect of the criterion. A quantitative or qualitative variable which can be measured or described and which, when observed periodically, demonstrates trends and provide useful feedback and inputs for decision making apart from ensuring compliance.

Criteria and indicators are tools used to define, assess and monitor progress towards quality control. They list the main factors that influence the wood products quality and suggest indicators that, if measured over time, will help inspectorate and policy makers assess the extent to which productive practices are consistent with the guidelines. As it is often said, criteria and indicators are not an end in themselves; the critical thing is that they are applied, though voluntary in the timber industry, and that production is adapted accordingly so that the industry maintains the capacity to produce quality products for both domestic and international market.

In Ghana, assessment and monitoring of wood products specification and quality is done by means of standards. These standards are agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose. Ghana is a member of International Standards Organisation (ISO), hence complies with its quality definitions. These standards are regularly, while new ones are developed to address new challenges.

## **1.2 Objective of The Study**

The objective of this study was therefore to determine the status of wood product standards for different categories of products, areas not covered and assess constraint influencing their application.

## **2.0 Methodology**

The methods used in gathering data and information included use of questionnaires and discussions with officials of institutions such as Ghana Standards Board, Timber industry Development Division, Forestry Commission and members of Ghana Timber Association (GTA), Ghana Timber Millers Organisation and Small Scale-Carpenters Association as well as civil society.

## **3.0 Common Timber And Wood Products On The Ghanaian Market**

Ghana produces variety of product from timber to satisfy domestic market demands. Wood products are found in every home in Ghana. They vary in design, composition

and quality and these depend on financial capacity of individuals, location in the country, taste, culture, etc. These products do come from small and large scale companies with different levels of sophistication and design. Production is usually based on demand. Despite continuous use of obsolete equipment and inability of small scale wood workers to procure appropriate equipment and tools, there is a great diversity of timber products.

Apart from lumber which is most demanded for structural, constructional purpose and further processing, other timber and wood products found in the local market could be classified as follows:

***i. Furniture***

<i>STORAGE</i>	<i>SEATING</i>	<i>SURFACING</i>	<i>SETS</i>	<i>OTHER</i>
<i>Bookcase</i>	<i>Bean bag</i>	<i>Coffee table</i>	<i>Bedroom set</i>	<i>Aquarium</i>
<i>Cabinet</i>	<i>Bench</i>	<i>Desk</i>	<i>(group)</i>	<i>furniture</i>
<i>(furniture)</i>	<i>Chair</i>	<i>End table</i>	<i>Dinette (group)</i>	<i>Bed</i>
<i>Chest</i>	<i>Couch</i>	<i>Folding table</i>	<i>Dining set (group)</i>	<i>Door furniture</i>
<i>Cupboard</i>	<i>Footstool</i>	<i>Table</i>		<i>Headboard</i>
<i>Dresser (Chest of</i>	<i>Love seat</i>			<i>Hutch</i>
<i>drawers)</i>	<i>Recliner</i>			<i>Park furniture</i>
<i>Filing cabinet</i>	<i>Settee</i>			<i>Stadium seating</i>
<i>Sideboard</i>	<i>Sofa</i>			<i>Street furniture</i>
<i>Wardrobe</i>	<i>Stools</i>			

***ii. Building Members Such As:***

- Doors*
- Door And Window Frames*
- Flooring Parquets*
- Mouldings*
- T & G members etc*

***iii. Wood Composites***

- Veneer*
- Plywood*
- Particle Boards*
- Chip boards*

***iv Specialty Products***

- Toys*
- Broomsticks*
- Poultry feed trays*
- Crates*
- Pallets*

*Coffin*  
*Chop-boxes,*

Most of these commonly used wood products are produced by small scale carpenters who exhibit very little specialisation. Their products serve the local market and overland export to neighbouring countries such as Togo, Burkina Faso and Mali. (Ward & Gilbert (2001)).

#### **4.0 Availability Of Timber Products Standards For Application**

Although Ghanaian natural resources and other products are widely acclaimed in the international market, the domestic market is starved with appropriate criteria for specification and quality control. Timber merchants, ‘specifiers’, contractors, manufacturers, regulatory bodies, researchers, suppliers, wholesalers, retailers, and other stakeholders in the local market have no criterion or indicator for business negotiations and purchasing.

Ghana Standards Board (GSB) is mandated to provide standards for all products or assist other bodies to develop standards including timber and wood products standards. Currently GSB has selected 54 products standards as indicated below, comprising new standards to be developed, draft documents and standards under review. Ranking in a priority groups of a scale of 1-5, the standards were arranged as indicated below. The selected standards were scheduled to be executed in six years, depending on availability of funds and drafts.

	<b>WORK ITEM</b>	<b>STATE</b>
	<b>Priority I</b>	
1	GS 146-1:1992-Code of practice for wood treatment plants: Quality control and inspections	R
2	GS 146-2: 1992 Code of practice for wood treatment plants: Quality Control and Inspection	R
3	GS-145: 1992 –Specifications for wood poles for overhead power and telecommunication lines	R
4	GS 144:1992- Specifications for crossarms, transmission timbers and pole keys for overhead power and telecommunication lines	R
5	SABS 0324:1999-Inspection and supplemental treatment of treated wood utility poles	D
6	SANS 753:1994 – Pine, poles, cross-arms and spacers for power distribution, telephone systems and street lighting	D

7	GS 23:1970 Wood Technology - Glossary of Terms	R
<b>Priority II</b>		
8	GS 197:2000 - Wood Technology –Wooden Doors	R
9	GS 194:2000 Wood Technology – Wooden Frames for Doors, Windows and Ventilators	R
10	Ghana Grading rules and standards for square edged Sawn wood	N
11	ISO/DIS 2074 – Plywood -- Vocabulary	M
12	ISO/DIS 12465 Plywood -- Specifications	M
13	ISO/DIS 12466-1 Plywood – Bonding quality – Part 1: Test methods	M
14	ISO/DIS 12466-2 Plywood – Bonding quality – Part 2: Requirements	M
15	<i>Ghana Curl Veneer Standards &amp; Grading Rules</i>	N
16	<i>Ghana Rotary Veneer standards&amp; Grading Rules</i>	N
17	<i>Ghana Grading rules and standards and grading rules</i>	N
18	<i>Ghana sliced veneer standard and Grading rules</i>	N
19	<i>Ghana Plywood standard and Grading rules</i>	N
20	<i>Ghana rules for log (Adopted from the ATIBT Grading rules for Tropical logs)</i>	N
21	ISO 4470:1981 – Sawn timber – Determination of the average moisture content of a lot	A
22	ISO/DIS 21892 – International framework for classifying wood products durability based on use classes	M
23	ISO 5970:1979 – Furniture – Chairs and tables for educational institutions – Functional sizes.	A
24	ISO 9221-1: 1992 – Furniture –Children’s high chairs – Part 1: Safety requirements	A
25	ISO 9221-2: 1992 – Furniture –Children’s high chairs – Part 2: Test methods	A
26	ISO 1096:1999 – Plywood -- Classification	A
27	ISO 2426-3:2000 – Plywood – Classification by surface appearance – Part 3: Softwood	A
28	SABS 1528-7: 1991 – Children’s Cots for domestic use	D
<b>Priority III</b>		
29	ISO/DIS 21887 – Durability of wood and wood-based products – definition of use classes.	M
30	ISO/DIS – Round and sawn timber -- Vocabulary	M
31	ISO/DIS 21015 – Office furniture – Office work chairs – Test methods for the determination of stability, strength and durability	M
32	ISO/DIS 21016 – Office furniture – Tables and desks – Test methods for the determination of stability, strength and durability	M
33	DGS 196 – Specification for wooden knock-down and semi-assembled furniture	D
34	ISO 3129:175 – Wood – Sampling methods and general requirements for physical and mechanical tests	A
35	ISO 3130: 1975 – Wood – Determination of moisture content for physical and mechanical tests	A
36	ISO 3131: 1975 – Wood – Determination of density for physical and	A

	mechanical tests	
37	ISO 4858: 1982 – Wood – Determination of volumetric shrinkage	A
38	ISO 4860: 1982 – Wood – Determination of volumetric swelling	A
39	ISO 9709:2005 – Structural timber – Visual strength grading – Basic principles	A
40	ISO 13912:2005 – Structural timber – Machine grading – Basic principles	A
41	ISO/AWI: 24496 – Office furniture – Office work chairs – Methods for the determination of dimension	A
42	ISO 1098: 1975 – Veneer plywood for general use – General requirements	A
43	ISO 2426-1:2000 – Plywood – Classification by surface appearance – Part 1: General	A
44	ISO 2426-2:2000 – Plywood – Classification by surface appearance – Part 2: Hardwood	A
45	SABS 1528-1:1992 – Furniture -- Seating	D
46	SABS 1528-6: 1991- High chairs for domestic use	D
47	SABS 1528-4: 1991 – Bunk beds for domestic use	D
48	ISO 7170:2005 – Furniture – Storage units—Determination of strength and durability	D
49	ISO 7171: 1988 – Furniture – Storage units – Determination of stability	D
50	SABS 1528-2: 1996 – Desks, tables and computer stands	D
51	SABS 1528-3: 1991- Storage units	D
52	ISO 7173: 1989 – Furniture – Chairs and stools – Determination of strength and durability	D
53	ISO 7174-1: 1988 – Furniture – Chairs -- Determination of stability – Part 1: Upright chairs and stools	D
	<b>Priority IV</b>	
54	ISO 1954:1999 – Plywood – Tolerances on dimensions	A

### 3.1 Published Ghana Standards on timber and timber products

Despite the numerous challenges, GSB has been able to produce 15 standards for timber and timber products which are available for sale. Below is a summary and description of the standards.

- 1 **GS 145-1:2007** Timber and sawn logs --Specification for wood poles for overhead power and telecommunication lines – teak, afina, kusia and kusibiri poles.

This standard specifies the requirements for wood poles, anchor logs and stabilizer logs (hereinafter called poles, except where specifically referred to as



anchor logs or stabilizer logs) for overhead power and telecommunication lines.

The stakeholders for this standard are mainly the electrical and communication companies for utility services. It provides criteria for selecting timber species such as teak, afina, kusia and kusibiri which are highly patronised. It is significant because it also made provision for lesser used species.

- 2 **GS 145-2:2008** Timber and sawn logs -- Specification for wood poles for overhead power and telecommunication lines – pine poles.

This standard specifies requirements for pine poles, anchor logs and stability logs for overhead power and Telecommunication lines

Like **GS 145-1:2007**, this standard also targets the utility companies and provides alternative choice for the companies. They both assume similar status. The significance of this standard is seen in diversification and effort to explore alternative species apart from the native species. Pine is not a tropical species but temperate softwood which is being imported at large scale to augment the traditional species. This also provides useful criteria for treatment and assessment.

- 3 **GS 145-3:2008** Timber and sawn logs -- Specification for wood poles for overhead power and telecommunication lines – Eucalyptus poles.

This also specifies requirements for eucalyptus poles for overhead power and telecommunication lines. Like pine, eucalyptus is widely used in many parts of the world with all quality attributes as traditional species. However little is known about its performance in service in the tropics. It was therefore necessary to conduct scientific research and develop appropriate criteria for its treatment and conditions. It is expected that application of this standard will conserve teak, which is highly valued for its strength, durability and aesthetic grains and figure hence highly patronised for furniture and decorative wood products.

- 4 **GS 146-1:2007** Code of practice for wood treatment plants – Quality control procedures for wood treatment plants.

Describes the acceptable minimum requirements for exercising total quality control in wood preserving plants, and adherence is necessary in order to assure quality and reliability of treated timber products.

This is to ensure that the equipment used for the treatment of poles to meet the above standards also complies with international safety and environmental codes and ensures that only safe and approved equipment and chemicals are used.

- 5 **GS 146-2:2007** Code of practice for wood treatment plants – Quality control and inspection of timber products.

Describes the responsibilities and procedures pertaining to the quality control and inspection of timber products by treatment companies. Compliance to this standard is necessary in order to assure quality and reliability of treated timber products.

- 6 **GS 194:2003** Specification for wooden frames for door, window and ventilator.

This Standard specifies the requirements and methods of sampling and tests for wooden frames for door, window and ventilator generally used in residential buildings, offices, schools and hospitals.

Hitherto, this standard could be considered as a breakthrough with significant results in the local market. Traditionally, the criteria and indicators for wood and timber products were developed to address export requirements while neglecting the local needs. A lot of lumber was wasted in construction of windows and door frames as well as doors and ventilators, as artisans had no grading rules and were producing without specification of dimension or quality. Now GS 194:2003 is widely applied countrywide and doors could be bought from different sources and fit into a standard frame. Also where louvers are used there is no need to buy long blades and cut.

- 7 **GS 196:1996 Furniture** - Specification for knock-down and semi-assembled furniture.

Specifies general requirements, sampling and methods of test for knock-down and semi-assembled furniture. This standard does not refer to design or ergonomic considerations in order to afford maximum freedom in design and manufacture.

- 8 **GS 197:2003** Specification for wooden doors.

This standard specifies the requirements regarding material, size, construction, workmanship and finish, and tests of wooden doors. This standard supplements GS 194:2003 and ensures that doors are produced to meet GS 194:2003. This standard encourages division of labour, reduce waste and enhances performance as well as specialization.

- 9 **GS 198:2003** Wood products -- Plywood.

Specifies requirements for plywood manufactured in Ghana from either rotary cut or sliced veneers from Ghana woods bonded together with an adhesive.

- 10 **GS 23:1970** (reconfirmed 2008) Glossary of terms relating to timber and woodwork.

Lists terms used in Ghanaian timber standards, including plywood standards, and gives the definition of each term.

- 11 **FDGS 980** Furniture – Specification for Tables.

Specifies requirements relating to materials, sizes, construction, workmanship, finishing and tests for tables.

- 12 **FDGS 981** Furniture – Specification for Seating.

Specifies requirements relating to materials, sizes, construction, workmanship, finishing and tests for seating.

- 13 **FDGS 982** Furniture – Specification for Bedsteads.

Specifies requirements relating to materials, sizes, construction, workmanship, finishing and tests for Bedsteads.

14 **FDGS 983** Furniture – Specification for Furniture Components.

Establishes the general rules for the classification and grading of furniture components. This standard further spells out the requirements for machined wood products intended for general application in furniture and similar products

15 **FDGS 984** Semi-Manufactures of Timber – Specification for Planed Timber and Mouldings.

Establishes the general rules for the classification and grading of machined wood products. This standard further spells out the requirements for machined wood products intended for general application in furniture, joinery and similar products.

The following standards FDGS 980 Furniture – Specification for Tables, FDGS 981 Furniture – Specification for Seating, FDGS 982 Furniture – Specification for Bedsteads, FDGS 983 Furniture – Specification for Furniture Components, FDGS 984 Semi-Manufactures of Timber – Specification for Planed Timber and Mouldings as specified above were activity of the ITTO Project, PD 318/04 Rev. 2 Quality Control And Standardization Of Ghanaian Wood Products executed by the Forestry Research Institute of Ghana.

The standards were developed through collaboration with, Timber Industry Development Division of Forestry Commission and the Ghana Standards Board. They were the priority standards needs of the market which were identified through workshops, stakeholder meetings and research. These standards were developed to address local market requirements for quality.

## **5.0 Factors Influencing Quality Assurance Of Timber Products In Ghana**

### **5.1 Availability of Standards.**

In Ghana, almost all timber products produced by wood processing companies for export have some form of grading rules. At present, there are quality control guidelines, grading rules or standards for a vast majority of wood products which lacked standards but with high potentials for export. However, it is only for some

export products that quality control and standards are strictly applied despite the provision of standards.

Wood products including furniture produced for the domestic market on the other hand which did not have grading rules have now been provided. Thus the local market quality needs have been addressed in the formulation of the quality control guidelines and grading rules by formulating of the supplementary standards sponsored by ITTO. The study could not locate any company exporting complete furniture. Furniture companies produce furniture for the domestic market without standards because grading rules provided did not cover furniture. Standards are now available for some products and it is expected that a suitable policy could help salvage the local wood industry so that its domestic products will no longer be subjugated to a mediocre quality niche market.

Most of the relevant standards are new and are now being promoted with stakeholder consultations and fora. It is expected they will widely be patronised with education.

## **5.2 Knowledge Of Standard**

Apart from exportable wood products which are compelled to be produced according to the manufacturer's specifications and other standards, 92% of furniture and other wood workers interviewed had no idea about any standards in an earlier survey conducted by the project. However, some companies producing for a niche market have idea of Ghana standards for doors and window frames (*GS 197:2000 - Wood Technology –Wooden Doors and GS 194:2000 Wood-Technology – Wooden Frames for Doors, Windows and Ventilators*) and have access to their dimensional specifications without access to the whole document. They are therefore not able to apply their quality specifications.

About 3% of small scale carpenters seemed to be aware of standards for some domestic wood products such as window and door frames but have never used them. Even those who ever heard of the grading rules did not know where and how they could be assessed. Furniture design and dimension is strictly 'hereditary' i.e. the skill

is passed from master to the apprentice and by copying from friends and furniture's catalogues where dimensions are usually not shown.

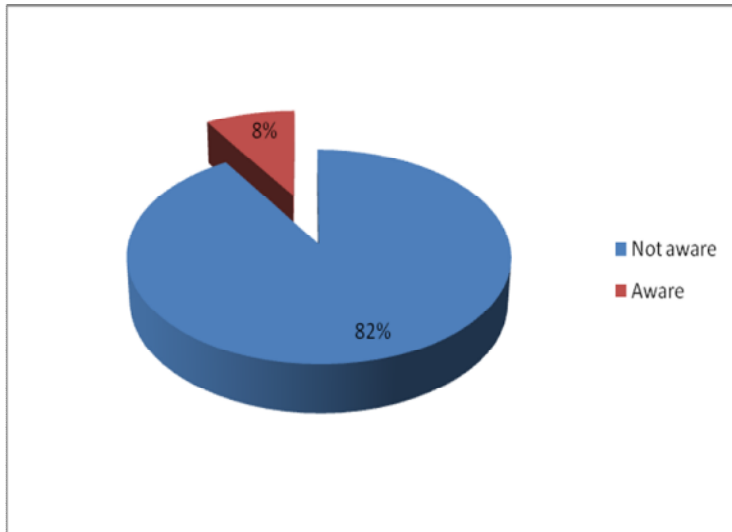


Figure 1 Knowledge of basic wood standards by small scale wood workers

It was observed that woodworkers from the polytechnics and other training institutions exhibited superiority in skill in furniture production but do not have access to any grading rule or skill. With the absence of standards especially for furniture and other domestic wood products many woodworkers have resolved to produce so called 'custom made' products to suit their customers. A holistic education programme is required to inform producers and buyers to get information about the need to apply standards and how to acquire them.

### 5.3 Cost of Standards and Affordability

Some timber and wood product standards are available for sale at Ghana Standards Board at an affordable cost. An average cost of a standard is about two day's wages of an artisan, therefore producing without standards could not be attributed to cost.

Standards are sold to enable standards organisations sustain the standards, review them regularly and also be able to partially recover cost. It is however interesting to observe that artisans are not ready to spend on them although they desire to apply them.

#### **5.4 Inadequate Training for Stakeholders, Public Education and Lack of Consumer Protection Facilities**

Standards are technical documents which can appear complicated and confusing to those introduced to them for the first time. To address this, GSB is supposed to organize general training programs on Standards and Quality to industry as well as tailored training programs designed for specific industries. In order to create quality consciousness, GSB also organises public education on standards and quality as well as publication in the news papers and in fora. It further conducts market surveillance on products certified by GSB to ensure that producers conform to standards and that the mark of conformity is not abused. GSB may trace manufacturing to factory gate by conducting factory quality audit. Furthermore it creates avenue for consumer complaints and disseminates information on relevant trade regulations and economic operators. This is further facilitated by provision of a reporting form at its website

The above functions of GSB indirectly disseminate standards to manufactures and consumers and also put into effect the standards, however this important role of GSB has been dormant probably due to lack of funds, disinterest by the other stakeholders or partial ineptitude. All consumers interviewed never had any such education on wood products. FAWAG also complained of lack of programmes which sought to train members on innovations and application of chemicals and equipment use as well as safe use to protect the environment. Often plywood and other wood products bought from the mills are not labelled for end use

#### **5.5 Availability of quality materials (Raw materials and Fittings)**

The timber industry has traditionally concentrated on exports to the neglect of the local market. To be able to meet exacting export orders, sawn timber recovery factor is only 20-40% of total log input and factory price is beyond the budget of the local consumer, who is competing with inferior and uncertified furniture from the far East. Thus wood sold in local market is usually export rejects which is inadequate and of poorer quality and therefore cannot be employed to produce certain grade of products of specific quality. Furthermore, the total volume of sawmill lumber available for domestic use is only 152,660 m<sup>3</sup> per year, yet the demand of the domestic end-users is about 384,730 m<sup>3</sup>.

Local market producers cannot therefore afford to buy quality dried wood from sawmills at export prices and could only buy the rejected ones from the mills. In addition, the market is flooded with poor quality of fittings and other inputs which cannot meet the standards to produce quality products especially furniture.

### **5.6 Furniture and Wood Science Training Institutions Lacking Capacity**

The study established that, both the universities and polytechnics lacked experts in wood grading/standardisation and quality control. Timber and furniture grading were being taught as general courses by non-expert lecturers instead of hiring personnel from TIDD or employing specialist in this areas, thus students trained in these institutions who might be employed as quality control officers are often too little equipped to handle grading since their capacity is inadequate.

### **5.7 State of Equipment and Machinery Employed in Production**

Contrary to the advancement in Technology and innovations as well as application of efficient and accurate equipment, primary and secondary processing in most of the mills and workshops/furniture firms mostly use over-aged equipment and some obsolete. This results in low recovery and high waste generation when they are employed to produce to contract specifications if they could be used.

Application of information technology for product design, process engineering, quality control and precision control was absent in almost all firms visited including Polytechnics which train personnel in quality control. The situation was even worse with small scale wood workers. This state of equipment results in inefficiency and inability to meet grade and contract specification apart from dimensions.

It was observed that many sawmills were not interested in investing into modern equipment since the continuous supply of resources is a mirage and even had to close some production lines. Most carpenters and furniture manufacturers on the other hand were most desirous of modern equipment albeit could not afford to purchase them. They also lack wood drying techniques and equipment thus could not get access to seasoned wood as required by standards.



Some companies on the other hand have state of the art equipment for processing and they are capable of producing quality products if guided and supported. Thus equipment for downstream wood processing are modern as some firms had invested in them especially hand tools which are affordable. A case in point is Scanstyle Mim Ltd. which produces quality furniture parts for export. This firm has achieved acceptable level of automation and precision processing using state of the art equipment, the only company in this category.

## **5.8 Market Taste And Demand**

Profitable production is based on the basic principle of demand and supply in economics. While some informed customers could place order for specific quality and dimension, the average person in the domestic market depends on the producer for a choice. It was observed that there has been a tremendous increase in local demand for wood and wood products especially furniture. This increasing demand for wood material has led to product diversity of wood, which now comes from small and large scale companies with different levels of sophistication and design and characterized by a more diverse array of species use (including LUS) and exotic designs available for use.

Most of these commonly used wood products are produced by small scale carpenters who exhibit very little specialisation. Their products serve the local market and overland export to neighbouring countries such as Togo, Burkina Faso and Mali. (Ward & Gilbert (2001). These carpenters have no designers and no showrooms.

Most wood products especially furniture manufactured in Ghana is considered 'custom made' as they are manufactured to the taste of the buyers or produced 'arbitrarily' to the manufacturers own composite specifications/ standards as there were no standards to guide both buyers and manufacturers until now that standards are available for use. Many furniture manufacturers copy designs from catalogues, friends and other sources without patent and dimensions. It is sad to observe that until a carpenter goes to the site to measure the size of a door frame one is not likely

to get a manufactured door that may fit into the frame as they are ignorant of the standards.

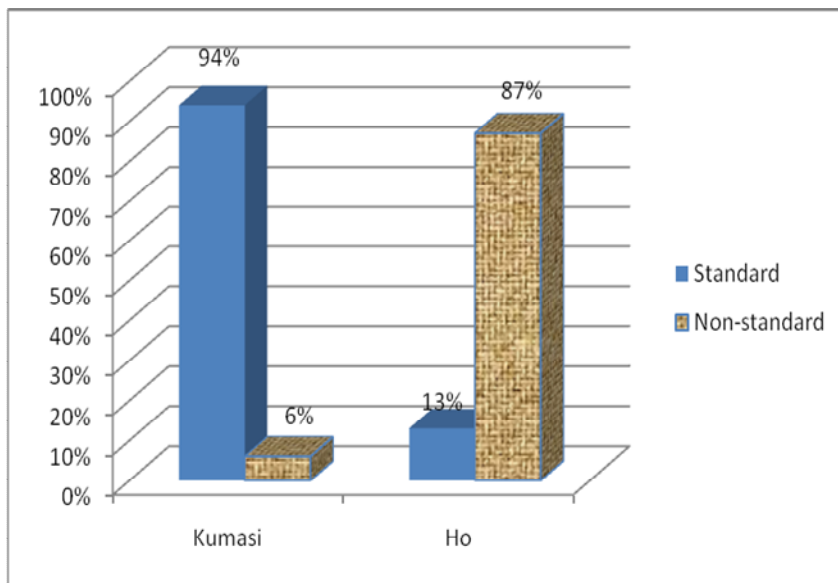


Figure 2 Application of standard dimensions in manufacturing of doors and frames by some wood workers in some parts of the country.

Furniture exhibited by roadsides is characterized by poor quality and mediocrity in manufacturing possibly due to the high demand for wood products. Large and medium local furniture makers/ tertiary processors also play a very important role in wood product supply especially to government institutions and elites. These producers are often able to purchase kiln-dried lumber from sawmills or stock timber long enough to allow for adequate air-drying. Furniture products at this level of the market are therefore of better quality and command higher prices. They have showrooms and would often deliver purchased products. Poor finishing probably due to non compliance to standards is a major barrier for such producers to enter the export market.

### 5.9 Cost of Producing To Meet Standards

Due to the problems such as lack of seasoned lumber, obsolete machinery, unskilled labour, competition from importers, etc, cost of producing furniture especially according to standard by those who have the ability, could be increased as much as 300%. Sampled opinion of consumer's willingness to pay percentages increase in cost for standards is shown in figure 3.

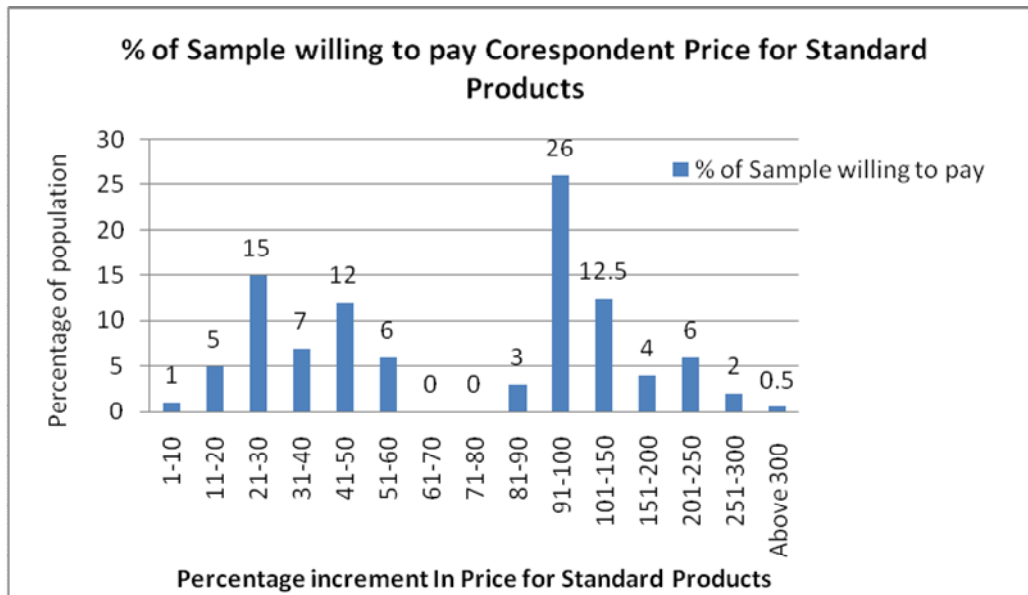


Figure 3 Percentage increment in cost for producing standard products and amount willing to pay by the customers

### 5.10 Legislative instrument

Standards produced are voluntary and not mandatory unlike in the case of food and drugs. Thus producers manufacture wood products in a free market without regulation. It is only in contracts execution that specifications are strictly adhered to. This state of affairs might be responsible for the haphazard nature of the domestic market and disinterest in standards application.

### 6.0 Conclusion and Recommendations

Furniture and wood products operate in a free market economy and the prices they receive depend mainly on inputs and demand and to some extent externally controlled due to competition from importers which is beyond their control. Furthermore, the level of employment created by the timber and furniture industry for Ghanaians with its socio-economic and political implications teeter on the survival of the industry and it is important to continue to explore all avenues to contribute to a good management scheme. It is therefore recommended that:

- Standards are promoted intensively so that stakeholders could be aware of them and their beneficial effects.
- Standards be incorporated into curriculum of wood training institutions to enable graduates from such institutions be equipped with knowledge in quality control and standards application.
- Standards be reviewed regularly to meet the contemporary needs of the local market.
- Wood products standards indirectly conserve wood since they specify quality leading to durability, they should therefore be employed especially in execution of government projects.
- Public education should be done by Ghana Standards Board to encourage merchants, ‘specifiers’, contractors, manufacturers, regulatory bodies, researchers, suppliers, wholesalers, retailers, and other stakeholders to take informed decisions in their bid to apply these standards in their area of application.

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Fabi Timbers LTD, Abuakwa	

Kpogas Standard Furniture Co.  
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