

## Skill Needs of Technical College Students for Effective Processing of Timber for Building Construction in Rivers State

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### Abstract

### Original Research Article

This study was designed to determine the skill needs of technical college students for effective processing of timber for building construction in Rivers State. This study was necessitated in response to the prevailing issue of deterioration of timber members in building construction. Three specific purposes of the study with three corresponding research questions and three null hypotheses were formulated to guide the study. A survey research designed was used for the study. The population was 81 which include 66 timber processors and 15 building teachers in technical in the colleges. The instrument used for data collection was questionnaire which contains 27 skilled items. The 27 items questionnaire was structured on four point rating scale of strongly agree (AS) = 4, Agree (A) = 3, disagree (D) = 2 and strongly disagree (SD) = 1. Reliability was determined using cronbach Alpa and the result yielded a reliability coefficient of 0.89. Eighty one copies of the questionnaire were distributed, correctly completed and returned within three days. This accounts for 100 percent return rate. The instrument which was used to elicit responses from the respondents was validated by an expert from Enugu State University of science and technology, Department of Technology and Vocational Education and two other experts from Rivers State University, in the department of Technical and Vocational Education. The research questions were analyzed using mean with standard deviation. Any mean score of 2.50 and above were regarded as agree while items with mean below 2.50 were regarded as disagree. The null hypotheses were tested at .05 level of significance using t-test. The findings of the study showed that technical college students must acquire conversion skills such as ability to read out figures on measuring tapes, seasoning skill such as ability to remove back and preservative skills such as ability to handle chemical, if they must go into timber processing. Based on the findings the following recommendations were made, Technical college students should be trained on skills needed for effective timber processing. The government should motivate teachers teaching technical courses in technical college. This, in turn will help the teachers to impact the right knowledge in terms of practical courses. The students of Technical colleges especially building/wood work students should have a training programme to improve their competencies in timber processing. That will enable them to be self-employed in their areas of specializations.

**Keywords:** Timber Processing, Technical Education, Building Construction, Wood Conversion, Preservation Skills.

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## INTRODUCTION

Timber is a natural material and agricultural product found in the forest. Specifically, it is gotten from a standing tree after the tree has been cut down (Ivor 2012). Stephen and Christopher (2015) described timbers as trees that has been cut for use in building construction and other general purposes like wood pulp for paper production and fire wood for cooking. Timber are generally grouped into two namely, hard and soft timber. Hard timber are generally known as broad leaves trees that are hard, tough, dense and dark coloured with acid, aromatic or even poisonous secretions. Also, the medullar rays in hard timber are usually more clearly

visible than softwood. Although, not all hardwood are hard. Typical examples of hard timber are Mahogany, Mazonia, Mangrove, Walnut and Iroko. While soft timber are generally known as needle leaves tree. It is coniferous with cone-shaped seed vessels and narrow needle shaped leaves. They are usually elastic and easy to work on and have resinous or sweet secretion. Typical example of soft timber are; douglas, pitch, pine, cedar and white afara etc. Duggal (2010) noted that physical properties of timber include; colour, grain, texture, moisture content movement, shrinkage, swelling. The mechanical properties include compressive strength, tensile strength, stiffness, toughness, and hardness and

also it has ability to damper vibrations. It is available in large quantities in the forested parts of Nigeria (Rivers State) and it has provided a broad range of building products and materials for construction.

According to Nunnally (2011), Timber is one of the humankind's oldest construction materials, since pre-historic times. Today, it is still widely used to construct residential, commercial and industrial buildings, as well as such varied structure as piers, bridges, retaining walls and power transmission towers. In support of this statement, Nwafor (2016) stated that roof trusses, doors and windows (timber frame/ panel), timber floors, timber staircase and timbering in loose soil are products of timber. But before timber could be used in building construction, the swan timber is logged and transported to the sawmill for processing to different marketable sizes such as 50mm x 50mm x3, 600mm, 50mm x 100mm x3, 600mm, 50mm x 150mm x 3,600mm, 75mm x 100mm x 3,600mm and other sizes.

Processing is to put a raw material through an industry or manufacturing process to change its present states (Hornby, 2006). Also Okafor (2010) added that processing involves making food, materials or goods ready to be used or sold through preservation or improving in same way. The effective processing of timber in the sawmill requires various methods. The methods include conversion, seasoning and application of preservatives (chemicals).

Timber conversion according to Nwafor (2016) is the splitting of timber material into marketable sizes for consumers' consumptions. The method of conversion of timber includes, quarter sawing, tangential sawing, through and through sawing amongst others. Hornby (2006) defines conversion as the process of putting something into other forms. This study regards conversion as putting timber into useable form. Seasoning of timber follows after the conversion process.

Seasoning is the process of removing the moisture content in freshly logged timber before use for construction (Nwafor 2016). According to Onyia (2010), there are two major types of seasoning in the processing of timber; these are; air or natural and kiln or artificial seasoning. In the air seasoning, fresh timber is stacked under cover in the open with the provision for free circulation of air between the individual pieces while in kiln seasoning, timber is kept in a specially built chamber called kiln and the timber is seasoned under a controlled temperature, humidity and circulation. The combination of the two methods is also used where timber is first partially air-seasoned and then put into kiln at the final moisture content required. At the medium the timber could be better preserved.

Nwafor (2016) noted that timber preservation is an application of chemical (preservatives), timber

treatment or pressure treatment that can extend the life of timber. These generally increase the durability and resistance from being destroyed by pest or fungi. Nunnally (2011) pointed that wood preservation by chemical treatment is the principal method used today to prevent against decay and insect damage. Surface treatment of wood has largely been replaced by pressure treatment, which forces the preservatives deep into wood cells. The principal wood preservatives used for below ground application includes creosote and chromate copper arsenate (CCA) common treatment for above – ground application include copper azoles (CA), alkaline copper quaternary (ACQ) and others. These preservatives leave a paintable non-staining surface of the timber. The effective performances in timber processing require certain skills and knowledge.

Skill was described by Aneke (2011) as the ability to carry a task with predetermined result often within a given amount of time, energy or both. Osuala (2004) sees skill as ability to use the acquired competencies, attitudes and behaviour after an exposure to theories and practices inherent in a field of study. Agboeze (2010) added that skill means the professional ability to perform or carry out a task very well. The researcher sees skill as the capacity of a person to accomplish a task with degree precision and certainty. With reference to this study, skill is the technique and practical ability to processing timber such as being able to convert, seasoned and preserved timber. For conversion, the skills include; ability to survey and find out the size of timber required by the customers, ability to measure the required log length, ability to choose a suitable conversion method for the log etc., while for seasoning, the skills involved include ability to provide adequate space for stacking of the timber, ability to arrange the stickers to be directly on top of one another, ability to collect a sample piece from the timber being seasoned, ability to calculate the used moisture content amongst other and for preservatives, the skills include, the ability to know the right preservative for a particular attack, ability to recommend correct preservatives, ability to mix chemical in proportion, ability to take necessary measures to avoid reaction of the chemical on the workers, ability to access the efficiency of the preservatives etc. These skills can be acquired by technical college students when they go on excursion to registered saw mill factory where timber are processed by the processors and supervised by the foremen who have the skills in processing of timber. The teachers take the students to skill acquisition centre where skills in processing of timber are taught by the professionals. These teachers who are professional in technical colleges teach the students as well.

According to Federal Republic of Nigeria (2013), technical college is used as a comprehensive term referring to those aspects of the education process involving in addition to general education, the study of

technologies and related science and the application of practical skill, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. Furthermore, technical college is an integral part of general education and means of preparing for occupational fields and for effective participation in the world of work. Ogwo and Oranu (2006) defined technical college as the vocational preparation of students for jobs involving applied science and modern technology. It emphasizes the understanding and practical application of basic principles of science and mathematics. Its objective is the preparation of graduates for occupations that are closed above the skill craft and below scientific or engineering professional such as basic conversion, seasoning and preservation of timber products for building construction. Uzodinma (2015), Technical Colleges are designed to prepare students to acquire practical skills, basic scientific knowledge and attitude required as craftsmen and technician at sub-professional levels. Technical college students can effectively process timber that could be used for construction if they are exposed to skills involved in it.

Nwafor (2016) noted, that timber products that are used for construction purposes do not stand test of time, in most cases, they start to shrink or pour out dust while still at the selling/ purchasing point or after using it for permanent construction work .It might be that the processing method is poor; this necessitated the study to determine the skill needs of technical college students for effective processing of timber for building construction in Rivers State.

### Statement of the Problem

Timber is a versatile material with wide range of applications in building construction. For example, it can be used in building of formworks foundation piles, structural component e.g. (columns, beams, joist) roofing (e.g. rafters, purlins and bracings), batten, staircase, flooring, walling, etc. hence, it shows that partially every building component of a house can be fabricated from timber. It is therefore, possible for the prefabrication of a timber house using only timber.

The researcher observed that timber used in various aspects of building by building engineers deteriorate or fail very fast. Such failures include bowing, cupping, checking, springing, collapse, case hardening and attack by insect like woodworms, beetle and termites and even fungi by throwing out dust, minute silky hollow threads which rapidly developed into an interlocked network covering the timber. Does it mean that the timber processors and most technical college students who are in the business lack the require skills (the ability to survey and find out the size of timber required by the customers, the ability to provide space for proper stacking of the timber and the ability to mix chemicals in proportion during the processing of timber

etc)? Hence the study to determine the skill needs of technical college students for effective processing of timber for building construction in Rivers State.

### Purpose of the Study

The main purpose of the study is to determine the skill need of technical college students for effective processing of timber for building construction in Rivers State. Specifically, the study sought to determine;

1. Timber conversion skills needed by technical college students for effective processing of timber materials for building construction in Rivers State.
2. Timber seasoning skills needed by technical college students for effective processing of timber materials for building construction in Rivers State.
3. Timber preservative skills needed by technical college students for effective processing of timber materials for building construction in Rivers State.

### Research Question

The following research question guided the study.

1. What are the timber conversion skills needed by technical students of colleges of education for effective processing of timber material for building construction in Rivers State?
2. What are the timber seasoning skills needed by technical students of colleges of education for effective processing of timber materials for building construction in Rivers State?
3. What are the timber preservatives skills needed by technical students of colleges of education for effective processing of timber materials for building construction?

### Hypotheses

The following hypotheses guided the study.

- Ho<sub>1</sub>: There is no significant difference in mean ratings of timber processors and teachers on the timber conversion skills needed by technical college students for effective processing of timber for building construction in Rivers State.
- Ho<sub>2</sub>: There is no significant difference in the mean rating of timber processors and teachers on the timber seasoning skills needed by technical college students for effective processing of timber for building construction in Rivers State.
- Ho<sub>3</sub>: there is no significant difference between the mean rating of timber processors and teachers on the timber preservative skills needed by technical college students for effective processing of timber for building construction in Rivers State.

## METHOD

A survey design was adopted for the study. Survey research design in the view of Osuala, (2007) is a procedure used in obtaining data from a sample or relevant population that are familiar with the ideas related to the objectives of the study through interview or questionnaire. The study was carried out at Technical colleges in Rivers State. The population of the study was 81, made up of 66 timber processors who are registered and 15 teachers of building option of the Technical Colleges in Rivers State. The population was manageable hence there was no sampling. The instrument used for data collection was a questionnaire developed from literature review, which contains 27 skilled items. The items statement was divided into three sections. Section A deals with conversion skills, seasoning skills and preservatives skills involve in the processors of timber. The 25 – item questionnaire was structured on four point rating scale of strongly agree (AS) = 4, Agree (A) = 3, disagree (D) = 2 and strongly disagree (SD) = 1 for each research questionnaire item.

The instrument was subjected to both face and content validation by three experts, one from Technology and Vocational Education Department, Enugu State University of Science and technology Enugu and two from Rivers State University, one from the department of Technical and Vocational Education and the other is

an expert in measurement and evaluation. The validates were served with a copy of the instrument for validation. Their suggestions, constructive criticisms and modifications were basis for producing the final copy of the instrument and were used for collecting data for the study. Cronbach’s Alpha was employed to test the reliability which yielded 0.89 as the reliability coefficient. Mean with standard deviation was used to answer the research questions. To determine the degree of agreement of respondent, it was decided that any item with mean of 2.50 and above was regarded as agreed. While those whose means are below 2.50 was regarded as disagreed. t- test was used to test the null hypothesis. If the calculated t – value was greater than t-critical value of 1.671 at 0.05 level of significance, the null hypothesis will be rejected. Otherwise, it will not be rejected.

**RESULTS**

The results of the study are presented in tables according to the research questions and corresponded hypotheses.

**Research question 1**

What are the timber conversion skills needed by technical college students for effective processing of timber for building construction in Rivers State?

**Table 1: Mean scores with standard deviation of the respondents on conversion skills needed by technical college students for effective processing of timber for building construction in Rivers State**

S/N	Conversion Skill	Timber Processing expert (66)				Teachers (15)		Aggregate (81)
		X <sub>1</sub>	SD <sub>1</sub>	X <sub>2</sub>	SD <sub>2</sub>	X <sub>G</sub>	SD <sub>G</sub>	Dec.
1	Ability to survey and find out the size of timber required by the customers.	3.20	1.01	3.50	0.77	3.35	0.89	Agree
2	Ability to measure the required log length.	3.40	0.84	3.02	1.02	3.21	1.93	Agree
3	Ability to choose a suitable conversion method for the log.	3.36	0.82	3.30	1.01	3.33	0.92	Agree
4	Ability to ensure that the method used for conversion projects the grain of the wood.	3.36	0.83	2.50	1.18	2.93	1.01	Agree
5	Ability to guide and direct the chain saw machinists during conversion.	3.02	0.88	3.02	0.82	3.02	1.70	Agree
6	Ability to guide and direct local pith conversion (sawyers).	3.17	0.94	3.02	1.40	3.09	1.17	Agree
7	Ability to secure your timber from any form of attacks before taken them to the seasoning site.	3.44	0.74	3.01	0.76	3.23	0.75	Agree
<b>Grand mean/pull standard deviation</b>		<b>3.27</b>	<b>0.87</b>	<b>3.05</b>	<b>0.99</b>	<b>3.17</b>	<b>1.19</b>	<b>Agree</b>

Result in Table 1 revealed that all the 7 items had their overall mean rating from 2.93 to 3.35 which is greater than the cutoff point of 2.50. The respondents are therefore of the opinions that timber conversion skills are needed by technical college students for effective processing of timber for building construction in Rivers State. The standard deviation also ranged from 0.75 to

1.93 indicating homogeneity of opinions of the responded.

**H<sub>01</sub>:** There is no significance difference between the opinion of timber processors and teachers on the timber conversion skill needed by the technical college students for effective processing of timber for building construction in Rivers State.

**Table 2: t – test summary for significant difference between timber processors and teachers on timber conversion skills needed by technical college students for effective processing of timber for building construction in Rivers State**

Respondents	N	$\bar{X}$	SD	D.F	t-cal	t-crit	Remark
Timber Processor Expert	66	3.27	0.87	79	0.78	1.671	Not rejected
Lecturers	15	3.05	0.99				

The data presented in table 2 show a computed t-value of 0.78 which indicated that t-calculated is less than t-critical value of 1.671 at 79 degree of freedom, hence the null; hypothesis is not rejected. Timber processor and teachers in technical department have uniform opinion on timber conversion skills needed by

technical student for effective processing of timber for building construction in Rivers State.

**Research Question 2**

What are the timber seasoning skills needed by technical college students for effective processing of timber for building construction in Rivers State?

**Table 3: Mean scores with standard deviation of the respondents on seasoning skills needed by technical college students for effective processing of timber for building construction in Rivers State**

S/N	Seasoning Skill	Timber Processing expert (66)		Lecturers (15)			Aggregate (81)	
		X <sub>1</sub>	SD <sub>1</sub>	X <sub>2</sub>	SD <sub>2</sub>	X <sub>G</sub>	SD <sub>G</sub>	Dec.
8	Ability to provide adequate space for stacking of the timber.	3.06	1.03	3.13	1.00	3.10	1.03	Agree
9	Ability to provide the correct sizes of bearers for the stack.	3.29	0.84	3.10	1.00	3.19	0.92	Agree
10	Ability to space the bearers to check seasoning on the timber defects.	3.38	0.80	3.20	0.92	3.29	0.86	Agree
11	Ability to select the appropriate size of stickers for the stack.	3.56	0.61	3.10	1.00	3.33	0.81	Agree
12	Ability to space the stickers uniformly along the timber to ensure air circulation.	3.47	0.73	3.20	0.75	3.34	0.73	Agree
13	Ability to arrange the stickers to be directly on top of one another.	3.11	0.68	3.15	0.53	3.13	0.61	Agree
14	Ability to lay the boards (timber) directly on top of one another.	3.50	0.61	3.08	1.05	3.29	0.83	Agree
15	Ability to collect a sample peace from the timber being seasoned.	3.48	0.77	3.06	0.92	3.27	0.85	Agree
16	Ability to calculate the used sample peace and percentage moisture content.	3.50	0.66	3.04	0.87	3.27	0.77	Agree
17	Ability to provide a good shade for natural seasoning.	3.40	0.90	3.02	0.82	3.21	1.72	Agree
18	Ability to operate the system used for kiln seasoning.	3.02	0.88	3.20	1.40	3.20	1.14	Agree
	<b>Grand mean/pull standard deviation</b>	<b>3.34</b>	<b>0.77</b>	<b>3.12</b>	<b>0.93</b>	<b>3.24</b>	<b>0.93</b>	<b>Agree</b>

Result in Table 3 revealed that all the 11 items had their overall mean rating from 3.10 to 3.34 which is greater than the cutoff point of 2.50. The respondents are therefore of the opinion that timber seasoning skills are needed by technical college students for effective processing of timber for building construction in Rivers State. The standard deviation also ranged from 0.77 to

1.72 also indicating homogeneity of opinions of opinions of the responded.

**H0<sub>2</sub>:** There is no significance difference between the opinion of timber processors and teachers on the timber seasoning skill needed by the technical college students for effective processing of timber for building construction in Rivers State.

**Table 4: t – test summary for significant difference between timber processors and teachers on timber seasoning skills needed by technical college students for effective processing of timber for building construction in Rivers State**

Respondents	N	$\bar{X}$	SD	D.F	t-cal	t-crit	Remark
Timber Processor Expert	66	3.34	0.77	79	0.81	1.671	Not rejected
Lecturers	15	3.12	0.93				

The data presented in table 4 show a computed t-value of 0.81 which indicated that t-calculated is less than t-critical value of 1.671 at 79 degree of freedom, hence the null; hypothesis is not rejected. Timber processor and teachers in technical department have uniform opinion on timber seasoning skills needed by

technical student for effective processing of timber for building construction in Rivers State.

**Research Question 3**

What are the timber preservatives skills needed by technical college students for effective processing of timber for building construction in Rivers State?

**Table 5: Mean (x) scores with standard deviation of the respondents on preservatives skills needed by technical college students for effective processing of timber for building construction in Rivers State**

S/N	Preservative Skill	Timber Processing expert (66)		Lecturers (15)		Aggregate (81)		
		$X_1$	$SD_1$	$X_2$	$SD_2$	$X_G$	$SD_G$	Dec.
19	Ability to know the right preservation for a particular attack.	3.45	0.75	3.30	1.00	3.38	0.88	Agree
20	Ability to recommend correct preservatives.	2.27	0.92	2.95	0.77	3.11	0.85	Agree
21	Ability to mix chemical in proportions.	3.18	0.92	2.54	1.06	2.86	0.99	Agree
22	Ability to apply each preservative on the timber.	3.15	0.90	3.24	0.54	3.20	0.72	Agree
23	Ability to take necessary measures to avoid reaction of the chemical on the worker.	3.32	0.82	3.30	0.86	3.31	0.84	Agree
24	Ability to ensure the permeability of the preservative into the timber.	3.31	0.81	3.10	1.00	3.21	0.91	Agree
25	Ability to soak timber in preservatives.	3.30	0.78	3.02	1.00	3.21	0.89	Agree
36	Ability to access the efficiency of the preservative.	3.40	0.84	3.20	0.95	3.30	0.10	Agree
27	Ability to dilute adverse preservative on timber.	3.50	0.71	3.02	0.88	3.26	0.10	Agree
	<b>Grand mean/pull standard deviation</b>	<b>2.88</b>	<b>0.83</b>	<b>3.07</b>	<b>0.89</b>	<b>3.20</b>	<b>0.69</b>	<b>Agree</b>

Result in Table 5 revealed that all the 9 items had their overall mean rating from 2.86 to 3.38 which is greater than the cutoff point of 2.50. The respondents are therefore of the opinion that timber preservative skills are needed by technical college students for effective processing of timber for building construction in Rivers State. The standard deviation also ranged from 0.10 to 0.99 also indicating that their opinions are the same.

**H03:** There is no significance difference between the opinion of timber processors and teachers on the timber preservative skill needed by the technical college students for effective processing of timber for building construction in Rivers State.

**Table 6: t – test summary for significant difference between timber processors and teachers on timber preservative skills needed by technical college students for effective processing of timber for building construction in Rivers State**

Respondents	N	$\bar{X}$	SD	D.F	t-cal	t-crit	Remark
Timber Processor Expert	66	2.88	0.83	79	0.71	1.671	Not rejected
Lecturers	15	3.07	0.89				

The data presented in table 6 show a computed t-value of 0.71 which indicated that t-calculated is less than t-critical value of 1.671 at 79 degree of freedom, hence the null; hypothesis is not rejected. Timber processor and teachers in technical department have uniform opinion on timber preservative skills needed by

technical student for effective processing of timber for building construction in Rivers State.

**DISCUSSION OF RESULTS**

The result of the study regarding research question one revealed that the 7 item statements

investigated were found to be viable timber conversion skill need by technical students of education for effective processing of timber materials for building construction in Rivers State. All the 7 item for both timber processors and teachers and mean ratings above the cut off mark of 2.50. This implies that the listed skills ability to read out figure on measuring tape, mark across the log girth of a timber, cut logs into boards by series of parallel saw cut, and ability to operate wood machine are all necessary skill need by student of Technical college for the effective processing of timber.

The respondents view showed that they were in agreement with Agboeze (2010) who stated that skill is the professional ability to perform or carry out a task very well. With these skill people can find their way into self employment or paid employment in public and private sectors of the economy. The researcher would want to state that the most important thing is that effort should be geared towards acquiring these skills by student of technical college for building construction.

Result in table 2 also revealed that all the 11 items skill on seasoning of timber are required by student for effective processing of timber material for building construction. All the items for both timber processors and teachers had mean ratings above the cut off mark of 2.50. This also implies that ability to remove bark, stack, seal boards, cover log, rough milling etc are all necessary skill in the processing of timber and it is need by the students of technical college.

This is in line with Nwafor (2010) who noted that seasoning of timber is the process of removing the moisture content from freshly cut tree; this enable the effective usage. The researcher would want to state that the skill needed in timber seasoning is important in that, it prepares timber for effective use.

Result in table 3 also reveals that the 9 items listed on the skill needed for preservative in timber is important. All the item for both timber processors and teachers had mean rating above the cut off point of 2.50. The listed skills, ability to handle chemical, ability to incising timber, ability to dipping timber etc. are needed by the students of technical college for effective processing of timber.

This is in line with Nunnally (2011), who said that wood preservation by chemical treatment is the principal method used today to prevent against decay and insect damage.

Nwafor (2010), added that wood preservative increase the durability and resistance of being destroyed by pest or fungi. The researcher would want to say that, these skills on timber preservation play important role in the timber processing. It makes timber durable when used for building construction.

## CONCLUSION

Building is very important in human existence, hence timber has been one of the useful material used in construction of a building since prehistorically times. Timber which has great advantage over other building material in terms of cost, durability, aesthetic and others. For timber to be effectively used, it must be properly processed to avoid attack by insect fungi and other defect. The processing of timber is not just cutting down trees and start using it for construction purposes rather it involved conversion, seasoning and application of preservatives with various skills such as skills ability to read out figure on measuring tape, ability to remove bark and ability to handle chemical. These are processes and skills that are used to prepare quality timber that will last long when used in building construct

## Recommendations

Based on the findings, the following recommendations were made;

1. Technical college students should be trained on skills needed for effective timber processing.
2. The government should motivate teachers teaching technical causes in technical college. This in turn help the teacher to impact the right knowledge in terms of practical courses.
3. The students of Technical colleges especially building construction/wood students should have a training programme to improve their competencies in timber processing. That will enable them be self employed in their areas of specialization.

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