Nigerian Journal of Ecology (2022) 18(1):34-39

ISSN: 1116-753X (Print); E-ISSN: 2955-084X (Online)

Evaluation of Impact of Plank Re-Dimensioning Activities on Bodija Plank Market Environment in Ibadan, oyo State, Nigeria

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(Accepted 24 June 2023)

ABSTRACT

Bodija Plank Market (BPM) occupies a major section of the Bodija International Market in Ibadan North Local Government Area, Ibadan, Oyo State, Nigeria. It serves plank traders and buyers from all over the country and the plank market activities have been affected by the market growth and trade volume. This study investigated the impact of plank re-processing activities in relation to waste generation and disposal on the immediate environment of the BPM. Data were collected using on-site-assessment and oral interview conducted on 30 machine operators and 30 plank sellers randomly selected from the market. It was evident that plank re-dimensioning is a major activity at BPM and 89% of respondents reported that it has been on for about 15 years. The bulk of the plank stocks (87%) in the market originate from flitching and this was the major factor causing re-dimensioning at the market. Observation revealed that re-conversion process with locally fabricated machine increases waste generation because they are rarely calibrated though cost less (average of Ninety Thousand Naira ($180) as at January, 2020. However, plank re-dimensioning at BPM with locally fabricated machine impacts negatively on the environment in that releases not less than 75dbA of noise to the environment, constantly emits incomplete combusted fossil fuel into the environment while it generates more solid and kerf wastes that are most often either dumped in the BPM surrounding drainage channels or burnt to release gaseous pollutant into the BPM immediate environment. This study affirms that for about 15 years from now, many more activities other than plank selling have been on in Bodija plank market with plank re-dimensioning being a major activity generating waste which its poor disposal is impacting negatively on the Bodija plank market's immediate environment. The waste generated can however be re-processed as secondary raw material for composite production to reduce negative environmental impact.

Keywords: Bodija plank market, Plank re-dimensioning, Flitching, Environmental pollution

INTRODUCTION

Environment has been described by Kaushik and Kaushik (2014) as the sum total of water, air and land cum inter-relationship among them and activities of human and animal. This definition is considered apt in that it adequately caters for both tangible and non-tangible parameters that dictate status of environment. However, anthropogenic activities undoubtedly contribute significantly to environmental status and with the continuous increase in human population (Western, 2001) the need for development will evidently have an impact on the state of the environment. Pollution from human activities have been reported to affect the biophysical components of the environment as well as its biodiversity, leading to the deterioration of its sustainability, threatening the health and

life of living organisms (Marchwinska-Wyrwal et al., 2011; Kampa and castanas, 2008; Sofer et al., 2012).

Wood has been employed for various end uses : tables, chairs, boards, frames, rafts, sheds, roofing, flooring, pulp and paper, chemicals and fuel among others as reported in a plethora of literatures (Lucas *et al*, 2006; Fuwape, 2003; Onilude, 2011). As a result of the increased pressure on the utilization of wood for various basic and essential purposes, there is an increasing need to continually process wood for various purposes (Adewole, 2010). This is corroborated by (Fegely, 2005) who opines that as the Gross Domestic Product (GDP) increases in developing countries, demand tends to industrial wood products including sawn timber, panels and paper, and this demand will continually increase. Wood processing is therefore inevitable as long as wood, from trees are available and as long as the needs of man are to be satisfied (Fuwape, 2003; Izekor, 2011).

Wood processing activities thus form an integral part of the anthropogenic activities that are carried out as a result of the need for man to survive. This need arises as a consequence of the increasing population and urbanization. Logs are often primarily processed into dimension lumber at sawmill to meet different end uses (Lucas and Olorunnisola, 2002; Adewole, *et al.*, 2010). Trading of already sawn dimension lumber is expectedly carried out as exclusive activity in plank market. Though other ancillary trading activities may go side by side depending on the size of the market, the original plan of plank market is not to play host to plank reconversion. But large plank markets like Bodija Plank market now engage in further processing of the plank into dimension lumbers which takes place at the pre-supposedly lumber selling points, otherwise called plank market, before selling to the end users. This re-processing of plank into various sizes of dimension lumber is carried out using locally fabricated machines that use fossil fuels as energy source.

The Bodija plank market, which may be regarded as one of the most populous plank markets in Ibadan, has continually experienced an accumulation of various activities regarded as ancillary activities, apart from the wood processing activities for which the market was initially planned and designed. These ancillary activities, which are not in the master plan of the plank market, are as a result of the need for an increase in rate of production due to the increase in demand of products of the plank market. The lack of information on the possible effects of these activities on the immediate environment serves as a limitation to appropriately prediction of the state of the environment at the study location, hence, the importance of this study.

The processing activities carried out in the Bodija plank market have the potential of posing health and environmental problems to people living and working around the market area. Also, noise produced from these activities has the potential to impact the hearing abilities of inhabitants and workers, as it is a form of air pollution. It is also necessary to ascertain the type and nature of the equipment used during the wood processing activities. Ejuvbekpokpo (2014) identified wood processing machineries as potential sources of emissions that can adversely affect the environment. In Nigeria, the high cost of procurement and importation of wood working machines has birthed the need for local manufacturers who specialised in fabricating wood working machines. With a rule of thumb, a considerable amount of these machines may have been fabricated locally without information on their potential contributions to adverse environmental effect through partial combustion of the fossil fuel that is their energy source. The dearth of information on the emission characteristics of these locally manufactured wood working

machineries constitutes the first reason for initiating this study.

MATERIALS AND METHODS

This study investigated the plank re-conversion activities that accompany plank selling activities at Bodija Plank Market (BPM) in Ibadan, North Local Government Area of Ibadan, Oyo State, Nigeria with a view to ascertain the impact of the plank re-conversion activity on the immediate environment of the plank market. The impact was measured in terms of wood waste generated and disposal adequacy. Also considered was the impact of the machines that are employed in the reconversion processes with respect to contribution to emission and noise released to the immediate environment. Activities going on at the BPM were ascertained via on-site-assessment while other related information was gathered through oral interview of 60 respondents comprising of 30 each of machine operators and plank sellers that were randomly selected from the market. Data were analysed using descriptive statistical tools.

RESULTS AND DISCUSSION

Status of BPM and Respondents Characteristics

The BPM section of Bodija international market has grown from a mere plank selling unit to a full-fledged plank market serving as hub of several ancillary activities including re-conversion of planks into dimension lumber. It covers not less than 50% of the total 10 hectares of land hosting the entire Bodija international market as reported by Aremu (2015). The plank selling unit shown in Plate 1 is currently divided into ten zones with about 144 sheds in each zone. The plank market now comprises of plank sellers, wood processing operators, wood working machine fabricator, furniture and joinery makers, engineered wood products and other building materials shops, food vendors and other trading stores. The plank market continues to expand with an average population of between 6,000 and 7,000 persons plying their trade in that section.

Plate 1: Sectional View of the Bodija Plank Market

The result shows that plank sellers are predominantly male with the ratio of male to female being 7:3. But no female is involved in wood processing activities, maybe because of the skill and energy input required for the activity to be carried out efficiently. The size of people working at the market further projects the extent of activities that are continually undertaken at the BPM. The responses of respondents in relation to estimate of workers at the BPM are presented in Figure 1.

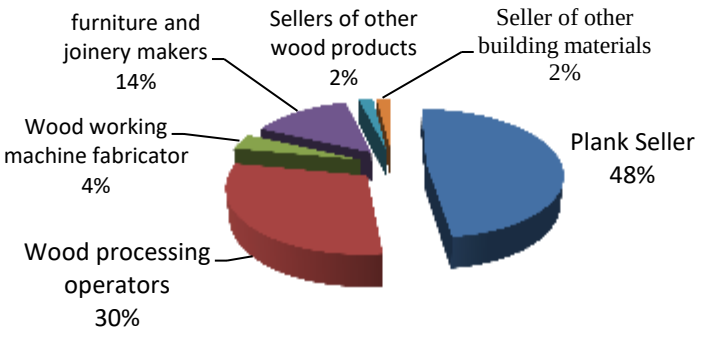

Figure 1: Distribution of On-going Activities at Bodija Plank Market, Ibadan, Nigeria

Status of Machines in Use for Re-Dimensioning of Plank at Bodija Plank Market (BPM)

There are two machines that are utilized at BPM for reducing sawn boards into dimension lumber. The commonest portable ripping machine is displayed in Plate 2 and is powered with internal combustion engine that utilizes fossil fuel as the energy source. The second machine displayed in Plate 3 is sometimes powered with electricity, though 86% of the machines employed for re-conversion activities employ fossil fuel as source of energy.

Plate 2: Most Common Machine that is in Use for Re-converting Planks at BPM

Plate 3: Electric Powered Re-conversion Machine

It is worthy to note that inconsistent supply of electricity was largely responsible for the adoption of machines that depend on fossil fuel as energy source. Indeed the few machines that still run on electricity depend on Generators that are powered with fossil fuel. The period of running with generator is sometimes as long as 75% of the total running time of operation according to 92% of the total respondents. Thus, not less than 90% of the machines run either directly or indirectly on fossil fuel. The implication of using fossil fuels as energy source is the potential for having partial or incomplete combustion of the fuel during the machine operation as a result of deficiency in the amount of oxygen supplied to allow the fuel to completely react to produce carbon dioxide. Hence, the likelihood of discharging toxic gaseous-like carbon monoxide into the BPM environment. Thus, there is possibility of it posing adverse effects on the health of operators and those who work or live in the vicinity.

Waste Generated During Re-Dimensioning and Handling

There are peculiarities in the two types of machines that are employed for plank re-conversion, they are all locally manufactured, hardly calibrated and are portable. The cost of acquiring imported machines has encouraged development of local capacity that leads to fabricating the machines locally. Also, non-availability of the imported machine parts and the escalating spare parts cost further encourages the use of locally manufactured machines for plant re-conversion to dimension lumber at BPM.

It was noted that the rate of carbon emission from the fossil fuel powered machines are worrisome to even the operators. The average noise released by a typical locally manufactured plank re-conversion machine was recorded as 75dbA. This value is a little above normal decibel of 70dbA that is recommended for continuous exposure to noise over time by (INAD, 2020). Hence, the operations of these machines constitute noise pollution in the immediate environment.

The bulk of the plank stocks (87%) at BPM originated from flitching and this was the major factor causing re-dimensioning at the market. The observed deficiency of the locally manufactured machines that are been used for plank reconversion is that it increases volume of mis-manufactured, off-cuts and kerf wastes generated generally at the BPM as shown in Plate 4. This study observed that

these wastes are hardly properly disposed. They are most often burnt in open space, thereby causing environmental pollution. Those that were not burnt often find their ways to the drainage systems surrounding the BPM. Apart from the degraded waste becoming eye sore, it interacts with the water in the existing shallow wells in the area. This has been confirmed by earlier work by Adewole and Oyewole, (2016)

Plate 2: Waste Generated Using the Common Machine Plank Re-conversion at BPM

CONCLUSION AND RECOMMENDATION

This study confirmed that the activities at the Bodija plank market goes beyond mere selling of planks and boards. The planks and boards are currently re-converted into various sizes of dimension lumbers. Also, that the volume of re-conversion activities are large and have been on for not less than 15 years. There are two types of wood working machine that are used for undertaking the conversion. All the two types were locally manufactured within the Bodija Plank Market by indigenous wood-working equipment fabricators at affordable cost [average of Ninety Thousand Naira ($180)] as at January, 2020 to the users. The two machine types run mostly on fossil fuel as the main source of energy. The bulk of the plank stocks (87%) in at BPM originated from flitching and this was the major factor causing re-dimensioning at the market. Plank re-dimensioning at BPM with locally fabricated machine impacts negatively on the environment in that it releases not less than 75dbA of noise to the environment, constantly emits incomplete combusted fossil fuel into the environment while it generates more solid and kerf wastes that are most often either dumped in the BPM surrounding drainage channels or burnt to release gaseous pollutant into the BPM immediate environment.

It is recommended that proper enumeration of the machines utilized in the wood processing activities cum ancillary activities is carried out. This is to ensure adequate planning for the establishment of other plank markets. Also that the waste generated should be explored for use as secondary raw material for composite production to reduce negative environmental impact.

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