



Waste to Wealth: Recycling of Tyres for Decorative Furniture's

¹ *Suluka, A. B.*, ² *Lasisi, L. A.*, ³ *Oligbinde S. R*

¹ Department of Cultural and Creative Arts, Lagos State University of Education, (LASUED), Lagos State. Nigeria

^{2,3} Department of Art and Industrial Design, MoshoodAbiola Polytechnic, Abeokuta, Ogun State. Nigeria

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ABSTRACTS

Recycling provides a sustainable source of materials by processing a priority waste so that it can enter into a new cycle of life-extending the functional value of the original resource while reducing the energy required in production. This research will analyze the number of waste tires produced and discarded materials in Nigeria. However, it will find out ways to recycle the waste tyres into products to reduce the number of wastetyres within our society. This research will also seek to compare possible ways and means of recycling with case studies of recycling among the Nigeria Artists who have worked with various materials explorations and those that have experimented with different kinds of used tyres and also to the rest of the world.

Keywords: Waste-Wealth, Recycling, Tyres, Decorative, Furniture

1. INTRODUCTION

Wastes generally are inevitable products that are generated by every living organism. This extends from the simple unicellular organism such as amoeba to the complex multi-cellular organism such as man. The volume of waste generated by various organisms is related to their size or complexity. Before the industrial era, anthropogenic wastes include but were not limited to those from physiological processes, ashes from burning wood, and agricultural and animal wastes which are buried in the ground. However, with the increase in population, the volume of waste generated also increases.

The industrial era brought tremendous improvement in the standard of living of man. This was also accompanied by the introduction of different kinds of waste materials some of which are detrimental to our lives and the environment. These wastes are in form of solid wastes e.g. waste tires, broken glass, spent nuclear fuels, plastics; liquid wastes.

Recycling used tires was further encouraged by the fact that these materials were also expensive. The increasing use of synthetic rubber, however, lowered the manufacturing costs and reduced the need for recycling. Moreover, the development of steel belted tires in the late 1960's was almost the end of tire recycling since additional processing of tires was needed. Consequently, by 1995, the rate of rubber recycling fell to only 2%. (Reschner, 2008). In the long run, this research will aim to produce a culture of sustainable design where every product produced can be recycled at the end of its life cycle. Sustainable design is defined as the philosophy of designing physical objects, the built environment, and services to comply with the principles of economic, social, and ecological sustainability. Furthermore, products made through sustainable design are intended not to harm the environment either when being created or when they are being used. These products are also often designed to allow users to feel more connected or to relate to the natural environment.

This recycling goes hand in hand with Design for Environment, which is championed as a more responsible form of design. Design for Environment (DFE) is a general concept that refers to the variety of design approach that attempts to reduce the overall environmental impact of a product, or process. Or service, where environmental impacts are considered across its life cycle. It is a product philosophy that aims at generating minimum waste during the product lifecycle during production, marketing, distribution, use, and disposal.

1.1 Objectives of the Research

- (i). To establish the magnitude of dumped tyres.
- (ii). To explore the creative use of scrap tires to provide raw materials used in the design of new products.
- (iii). To create innovative sculptures plastics ceramics glass leather and jewelry products out of reclaimed tyres.

2.0 LITERATURE REVIEW

Anatsui (2005), noted the: in recycling /installation of wastes into art said this in one of his exhibition brochures. I found a big bag of liquor bottle tops thrown away in the bush. At the time I was searching for a pot monument, I kept the bags of bottle caps in the studio for several months until the idea eventually came to me that big stitching them to articulate some statement... *"There are three key statements in his opinion and the first is "a big bag of liquor bottle tops" he picked it up, but imagine how many of such bags are in the environment and what that could cause the environment in terms of environmental hazards. He was an artist engaging in the job of environmental sanitation as a result of his curiosity and invention in art. He further expresses his feeling about waste as Thrown away in the bush: This is commonly found in Africa and Nigeria to be precise. The attitude of the populace discarding their waste indiscriminately in the bushes, uncompleted buildings, unapproved refuse sites, and so on. Obvious of the challenges or threats this behavioral pattern could cause the society at large"*.

TejuoshoLanre,(2010), a sculptor and studio artist who has a Museum in Abeokuta, In an interview on waste and recycling products is of opinion that: My mum cried seeing me amidst garbages, huge heaps of recharge cards, pure water sachets, burnt woods, wigs, rags and so on. I stayed in the studio for almost months without hesitation. She sighed with relief six months later. When I participated in an exhibition at Eko Hotel in Lagos with articulated creativity ensembles. The exhibition is powered by UNESCO. My mum, friends, and finally thus, sequent understand that at least I still have my sanity intact but just irrational in my decision... *"Prevention is better than cure, so they say. Disaster is better prevented to a reasonable extent allowing it to occur and waste so much million of dollars, energy, and time to manage it. If the government could encourage this area of art through commissioned jobs and outright purchase of their exhibits, this will not only create the provision of enabling environment but will go a long way in providing jobs and cleaning up the environment thereby preventing disaster"*.

Balogun (2013), is of opinion that every tangible material is a potential ally in my creative process. Therefore, it is not out of order to describe my approach as eclectic. I seek the cooperation of a myriad of tangibles in my vicinity and re-engage them in my visual deliberations. The tyre is regarded worldwide as a menace because of its non-biodegradable properties. However, this feature makes it ideal for my art place. Its abundant availability also informs my choice of this particular medium at this time. The installation artists are armed with the same objective, i.e. to re-engage or to reawaken the dead objects. Thus, reducing waste which has the potential to cause disaster if left uncatered for, unutilized, unharnessed, and unexplored.

Billatos and Basaly (1997), also defined it as a design process that must be considered for conserving and reusing the earth's scarce resources; where energy and material consumption are optimized, minimal waste is generated and output waste streams from any process can be used as the raw materials (inputs) of another. Recycling of waste has drawn the attention of society based on the slogan "There is gold in our garbage" on hand and growing concern about environmental protection on the other hand. The main constituent of a tire is rubber and the largest single application of rubber is vehicle tyres. Also, the requirement for tyres is directly related to the growth of the automobile. The production of automobiles is forecast to continue to rise and is indicative of buoyant economic conditions for the tyre industry, but at the same time guarantee and annual discarded scrap tyre volume growing at the same rate as new tyre manufacture. (Recycling of tyres, 2009)

NEMA, (2008), Investing in appropriate technologies to handle the available scrap tyre stockpiles and the million scrap tyres that are generated annually in Kenya should make business sense and the government should create an enabling environment for investment in these by the private sector. This would help address the public health and environmental risks and create jobs that would enable the poor to escape the poverty trap as anticipated by Vision 2030.

Recycling waste tyres is a business like any production process where efficiency is central to sustainability Environmental consideration is another integral factor, although it's not the sole driver of the initiative. Energy or resource economics might be the determinants of resource recycling. In the interest of the environment, governments are putting measures to integrate environmental management into the production process of all business initiatives. As a result, the reuse and recycling of resources are not by choice but in the interest of environmental protection.



Plate 1: getting the tyre ready



Plate 2: placing of wood in the tyre



Plate 3: sewing the leather



Plate 4: covering the foam



Plate 5: cutting the plywood



Plate 6: End use of the product

3. PROBLEMS ASSOCIATED WITH UNCONTROLLED OR ILLEGAL SCRAP TYRE DISPOSAL

Waste tyres are considered a problem because they are difficult to get rid of safely through normal means such as leaving them in a landfill to decay or incinerating them. A tyre by itself is generally fairly large, but a great deal of that is open space. Their nature does not allow compression or folding to reduce the space occupied during disposal at landfills and they also do not degrade easily because of their chemical and physical feature. This often causes the following problems.

Human health problems: Indiscriminate and illegally discarding of waste tyres in the environment make Waste tyres reservoir of rainwater hence providing breeding space for mosquitoes and other vectors of diseases like malaria, dengue, and yellow fever. The composition of tyres include hazardous chemicals like cadmium, lead, and chromium which pose further risk to human health and the environment when disposed of inappropriately into the environment. This occurs when the waste tyres are indiscriminately combusted.

- a) **Air Pollution:** Complete combustion of a tyre, will produce carbon dioxide that contributes to greenhouse effects water vapor, and inert residues that may contain sulphur dioxide. Incomplete combustion releases dioxins and noxious gases. Furthermore, the following substances: volatile organic compounds and hazardous air pollutants such as polynuclear aromatic hydrocarbons (PAHs), dioxins, furans, hydrogen chloride, benzene, polychlorinated biphenyls (PCBs), arsenic, cadmium, nickel, mercury, zinc, chromium, and vanadium are released into the atmosphere.
- b) **Water Pollution:** Tyre combustion causes pyrolysis of the rubber, resulting in oily decomposition waste. The oily discharge can flow into nearby streams, ditches, and waterways or can leach into the groundwater. In cases where water is used to put out the fire, chemical compounds like aromatic liquids and paraffin may be carried by the water. Then the used water needs to be treated before it is disposed of, which does not often happen in practice. The situation can pollute nearby streams or may seep into the groundwater.
- c) **Soil Pollution:** Residues that remain on the soil after a fire can have an impact on the environment in two ways: Immediate pollution resulting from decomposing liquid products penetrating the soil. Gradual pollution is caused by the leaching of ash and unburned residues. Gradual leaching of oily discharge can occur and the toxic residues of the burnt tyre such as zinc salts can cause harm to fauna and flora It usually takes a long time for the contaminated soil to recover unless remediation and or rehabilitation measures are taken.

4. RESEARCH QUESTIONS

Even with laws in place, illegal dumping still occurs, presenting negative environmental impacts. The dumping of tyres is a problem in urban areas in Nigeria city. Most people think that the best way to dispose of scrap tyres is to burn them or throw them in dumpsites but this creates environmental strain. The opportunity to make use of used tyres is rarely appreciated.

- i. What are the perceptions of local communities about waste and recycling of discarded materials for found in their environment?
- ii. Does a waste management practice have an impact on sustainable development in Nigeria environment?

4.1 RESEARCH METHODOLOGY

This study employed a survey research design. The study was carried out in a selected area of waste disposal in Lagos state. A-6 items questionnaire split into two sections to cover the three research questions titled; what are the perceptions of local communities about waste and recycling of discarded materials for found in their environment? Does a waste management practice have an impact on sustainable development in Nigeria environment? Subsequently, the questionnaire was administered to 25 workers who are not part of the sample to test the reliability of the instrument and a Cronbach's Alpha reliability coefficient of 0.79 was obtained. It was then administered to the sample of randomly selected 100 environmental workers across the sampled the dumping site in Lagos State which include both males and females. The data collected was analyzed using descriptive statistics.

4.2 DATA PRESENTATION AND ANALYSIS

Data generated in the course of this research was presented in frequency distribution tables with raw figures and simple percentage analysis. The research used descriptive techniques which are based on quantitative analyses, taking into account the numerical values or the frequencies with which the various delineated items of the content analysis occurred.

Table: 1 what are the perceptions of local communities about waste and recycling of discarded materials for found in their environment?

S/N	ITEM	SD	D	A	AS	MEAN	STD.D
1.	How has it been used as relevant artistic resources?	51(51%)	20(20%)	15(15)	10(10%)	25.00	19.54
2.	How does it have an impact on environmental pollution with the enabling environment?	21(21%)	18(18%)	37(37%)	23(23%)	25.00	19.18
3.	Does government take any proactive measures and techniques to avert waste management?	21(21%)	30(30%)	31(31%)	18(8%)	25.00	13.78
	Weighted Average	25.00					

On item 1 in table 1, 51% of the respondents strongly agreed, 15% answered to agree, 20% responded to disagree and 10% of the respondents disagreed with the item. 23% and 37% of the respondents strongly agreed and agreed respectively with item 2, while 18% and 21% of the respondents disagreed and strongly disagreed with the item. Verifying if government takes any proactive measures and techniques to avert waste management in item 3, only 18% of the respondents strongly agreed, 31% disagreed and 21% strongly disagreed with the item. With the weighted average of 25.00, it was observed that the How has it been used as relevant artistic resources.

Table: 2 Does a waste management practice have an impact on sustainable development in Nigeria environment?

S/N	ITEM	SD	D	A	AS	MEAN	STD.D
4.	<i>What is the most accurate and efficient method for conducting audits on collected waste?</i>	14(14%)	41(41%)	15(15%)	30(30%)	25.00	16.39
5.	<i>Does your agency have the caacity to sort waste before it is picked up?</i>	30(30%)	24(24%)	29(29%)	16(16%)	25.00	12.99
6.	<i>What are the appropriate locations for receptacles throughout your working environment?</i>	45(45%)	20(20%)	18(18%)	17(17%)	25.00	10.10
	<i>Weighted Average</i>	25.00					

Item 4 from table 4 shows that 30% of the respondents indicated strongly agreed, 15% answered to agreed, disagreed had 41% while strongly disagreed had 14% and What is the most accurate and efficient method for conducting audits on collected waste. 16% and 29% of the respondents strongly agreed and agreed respectively to item 2, while 24% and 30% of the respondents disagreed and strongly disagreed to the item. On examining the Does your agency have the capacity to sort waste before it is picked up. In item 6, 17% of the respondents strongly agreed, 18% answered to agree, 20% responded to disagree and 45% of the respondents disagreed with the item. Based on the percentages in table 2 and the weighted average of 25.00, it was discovered that the Does a waste management practice have an impact on sustainable development in Nigeria environment.

5. RECOMMENDATIONS

If government provides for the vocational center (s) that are well founded with artists of sorts, Creative arts–led projects can make a difference on so many levels.

- i. Provides a way for people to reflect and commemorate how their community has changed and how it may be reformed.
- ii. Helping people within communities reconnect and break down barriers of social, isolation, which they came together in a vocational center to interact and participate in a creative challenging job.
- iii. Giving people a sense of normality when things around them seem out of their control is easily done through "distraction". Engaging them with art activities that occupy their time and mind.
- iv. Despite the innovations that it can help bring to the table a lot more has to be done for this problem to be fully tackled awareness has to be created about the impending crisis that may result in a tyre waste crisis in a few years.
- v. Sensitizing the public on environmental awareness on the dumping of tyre waste and the pollution the waste tyres cause in different situations. People should be aware that waste tyres are harmful to the environment. The government should also introduce a class on environmental pollution in the system so that as kids grow up they learn more about environmental pollution.

6. CONCLUSION

Recycling and industrial design go hand in hand In a new world that will want to produce products that are environmentally friendly, safe, and compliant, this means that the products should not cause health problems and any aspects of the product that could harm the user will be taken in

consideration. Industrial design ensures that all the areas of environmental conservation are incorporated into the design process. Proper measures must be taken to ensure products can be recycled or have benefits even after the end of their end product life cycle. This problem has been prevalent in the disposal of paper waste. Initiatives were started to ensure plastic bags could be recycled and people were urged to make more use of them instead of discarding or burning them after use. A designer has to incorporate aesthetics practically and materials into the overall design of a product. Since technology is not yet at the desired state in Africa, crafts are being encouraged to make new products out of recyclable arts in this case tyres.

This paper will create functional sculptures, incorporating different media and inspirations from tyres. Most of the products will aim at a predominantly female crowd. The researcher will also incorporate leather, glass, plastics, and other materials in coming up with different designs of products. It will create a setting whereby tyre will be used as a whole to avoid unnecessary waste. This will include a few pieces of furniture made from tyres. Ceramics will provide both utilitarian and sculptural purposes in their designs.

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