CREATIVE PRODUCT DEVELOPMENT FROM RECYCLE WOOD WASTE

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ABSTRACT

Wood waste refers to the end-of-life products, failed products, off cuts, shavings and sawdust of all timber products.[3] This excludes forest residues, often referred to as primary wood waste. It also excludes green or garden waste materials such as branches, bushes and tree stumps.[9] Wood waste can be reclaimed to become new product such as new table, door or anything. In general, current practice is that wood furniture's that are no longer usable or badly damaged will be thrown away. Notable example is the availability of damaged furniture from public buildings such schools, offices and various other public workplaces. Feasibility study on reclaiming this valuable wood wastes resources are carefully discussed in this paper.

Keyword: Wood waste, recycle, new product, green, furniture.

PROBLEM STATEMENT

Now there are many types of wood or wooden things that are thrown away when it is damaged or already too old. From our observation, wastes that are not widely reused are wood. The best example is availability of damaged furniture from schools like table, chair or cupboard. There must be a better way on how to reuse the wood to be transformed into a new application of product such as new door, new table and so on. In this way the waste dumped away as rubbish will be lesser, hence a plus point for better maintenance of our lovely natural environment. In every country across the globe, there are tens of thousands of tons of old wood and wood waste classified as hazardous, such as electric or telephone poles, sleepers, garden wood, structural timber, etc. The average useful life of these wooden poles is approximately 35 years.[8] Recycling is an urgent matter as a result of changes in regulations which are forcing those operating the systems to find ways in dealing with these products with a view of recycling or reusing them. Recycling treated wood waste is problematic as it contains polluting elements (chromium, copper, arsenic), which generally is classified as hazardous. This wood waste should neither be neglected nor be burnt in the open atmosphere. It must be collected and treated in the same way as the waste by which it was contaminated.[8] Thus the holder and the producer of wood waste must disposed of this waste properly to avoid affecting human health and definitely our environment.

OBJECTIVE

The main purpose of this study is to reduce wood that are no longer in used anymore. Public practice in generally is that most of used furniture that are no longer in service or severely damaged will be discarded away. Most notable example is damaged furniture at schools such as tables, chairs and cupboards. The damaged furniture often is placed at the rear of buildings. Without proper recycling the furniture might eventually be burned away. In this project used furniture is valuable ingredient for making new furniture products. Used furniture should be recycled so it won't be left unattended such that they would eventually become severely damaged or badly deteriorated and of little recycle value.

PROJECT DESCRIPTION

RECYCLING

What is recycling? From *Sir Jonathon Porritt on his speech on 2006 and The League of Women Voters (1993)* recycling involves processing of used materials (waste) into new products to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution (from incineration) and water pollution (from land filling) by reducing the need for "conventional" waste disposal, and lower greenhouse gas emissions as compared to virgin production. Recycling is a key component of modern waste reduction and is the third component of the "Reduce, Reuse, and Recycle" waste system hierarchy.[1][2] The best way to ensure our environment is a good way of recycling.

WOOD WASTE DEFINITION AND CLASIFICATION

The NSW Department of Environment and Climate Change defines wood waste as waste refers to the end-of-life products, failed products, off cuts, shavings and sawdust of all timber products. This excludes forest residues, often referred to as primary wood waste. It also excludes green or garden waste materials such as branches, bushes and tree stumps. Wood waste, then, is the waste from all timber products.[3]

As state in J. Taylor and M. Warnke (2008) [3] and Matthew Warnken [9] there are three groups of timber products:

Untreated Timber

- Hardwood, many species
- Softwood, usually radiate pine

Engineered Timber Products

- Particleboard
- Medium density fibreboard
- Plywood
- Low and high density fibreboard
- Oriented strand board
- Finger jointed timber

Treated timbers

- Copper Chrome Arsenate (CCA)
- Light Organic Solvent Preservative (LOSP)
- Creosote preservative

TYPES OF WOOD

HARDWOOD

Hardwood is wood from angiosperm trees (more strictly speaking non-monocot angiosperm trees). It may also be used for those trees themselves: these are usually broad-leaved; in temperate and boreal latitudes they are mostly deciduous, but in tropics and subtropics mostly evergreen. Hardwood contrasts with softwood (which comes from conifer trees). Hardwoods are not necessarily harder than softwoods. In both groups there is an enormous variation in actual wood hardness, with the range in density in hardwoods completely including that of softwoods; some hardwoods (e.g. balsa) are softer than most softwoods, while yew is an example of hard softwood. The hardest hardwoods are much harder than any softwood. There are about a hundred times as many hardwoods as softwoods.[4]

SOFTWOOD

Softwood is the source of about 80% of the world's production of timber, with traditional centres of production being the Baltic region (including Scandinavia and Russia) and North America. The term softwood is used as opposed to hardwood, which is the wood from angiosperm trees. Softwoods are not necessarily softer than hardwoods.[5] In both groups there is an enormous variation in actual wood hardness, with the range in density in hardwoods completely including that of softwoods; some hardwoods (e.g. balsa) are softer than most softwoods, while the hardest hardwoods are much harder than any softwood; this is not surprising as there are about a hundred times as many hardwoods as there are softwoods.[4] The woods of longleaf pine, douglas fir, and they are much harder in the mechanical sense than several hardwoods.[6]

PROJECT PROCEDURE

QUALITY FUNCTION DEPLOYMENT (QFD)

One of the most important methods in product development and design is using Quality Function Deployment (QFD) technique. QFD is a comprehensive quality system that systematically links the needs of the customer with various business functions and organizational processes, such as marketing, design, quality, production, manufacturing, sales, etc., aligning the entire company toward achieving a common goal.

QFD consists of:

- Understanding Customer Requirements
- Quality Systems Thinking + Psychology + Knowledge/Epistemology
- Maximizing Positive Quality That Adds Value
- Comprehensive Quality System for Customer Satisfaction
- Strategy to Stay Ahead of The Game

As a quality system that implements elements of Systems Thinking with elements of Psychology and Epistemology (knowledge), QFD provides a system of comprehensive development process for:

- Understanding 'true' customer needs from the customer's perspective
- What 'value' means to the customer, from the customer's perspective
- Understanding how customers or end users become interested, choose, and are satisfied
- Analyzing how do we know the needs of the customer
- Deciding what features to include

- Determining what level of performance to deliver
- Intelligently linking the needs of the customer with design, development, engineering, manufacturing, and service functions.[7]

SURVEY OR QUESTIONNAIRE

Feedback from users, owner and furniture consumers is useful input in determining what can be done with wood waste and how to improve the existing design model of furniture that are derived from wood waste. The data collected during the survey must be carefully analyzed. SPSS is the intended computer software to be used for this project survey statistical analysis**.**

CONCLUSION

Recycling is becoming an urgent matter as a result of changes in the regulations which are forcing those operating the systems to find ways of dealing with these products with a view to recycle them.[8] The idea to use a wood waste as a main source in making a new product can help our country become cleaner and a more sustainable approach of environment management. This development also can be transformed into a new commercial industry thus helping our country improve our economy further.

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