

Community Service: Assistance of Water Hyacinth Craftsmen to Design Ergonomic Chairs, Bantul, Yogyakarta

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Abstract

This community service aims to determine the use of water hyacinth waste for handicrafts. Water hyacinth waste is also considered an unprofitable pest plant. The problem faced has a solution: utilizing water hyacinth in various fields, one of which is product materials. This design aims to help reduce water pollution while combining traditional and modern minimalism with water hyacinth waste materials and carbon steel.

Keywords:

Small Medium Enterprise, Feasibility Study, Business Incubator, Business Expansion

Introduction

In Indonesia, water hyacinth known by its Latin name *Eichornia crassipes* is a type of plant whose roots have no growing medium except water. This wild water hyacinth plant is usually found in calm streams such as rivers or lakes, which has a negative impact, such as disrupting mobility in the water. For fishermen, the wild water hyacinth plant disturbs fishing boats, and this wild water hyacinth plant can damage the environment because the water hyacinth is The dead will accumulate little by little to the surface so that over time, the waters will become shallow and can disrupt the ecosystem in the waters. Water hyacinth waste crafts are enough to provide several changes to the environment and even create new jobs for the community at CV. TASHINDA, which is located on Jl. Bibis Raya, Kasihan District, Bantul Regency, Special Region of Yogyakarta, Central Java, has managed water hyacinth plant waste as a basic material for crafts.

Literature Review

Assistance to water hyacinth craftsmen in Bantul, Yogyakarta was carried out to help waterhyacinth craftsmen understand ergonomic furniture design. This assistance at least provides good and useful insight for further furniture design from water hyacinth craftsmen in the Bantul area, Yogyakarta. This mentoring activity lasted for 1 week, providing material on anthropometric data, measurements, tensile tests, and design using software.

Product Development

According to Harsokoerno (2004), product design is an initial step in the product manufacturing process. In the design stage, a decision will influence other activities that follow. Among these essential decisions are decisions that have consequences on whether the domestic industry can participate in a development project. According to (Ulrich-Eppinger 2001), the product development process is divided into six stages (phases) of product development.

Ergonomics

In the history of ergonomics and contemporary contributions, it is proposed that it is one of the modern sciences, drawn both from the field and from the laboratory, and includes elements of arts and crafts (Wilson, 2000; Joes et al. 2020).

Market Research

Market definition is a rough but sometimes helpful tool for identifying market forces. The ambiguity regarding what analysts mean by market power (price above marginal cost or excess profit) cannot be resolved by market share (Sutianto 2021; Phangestu 2021).

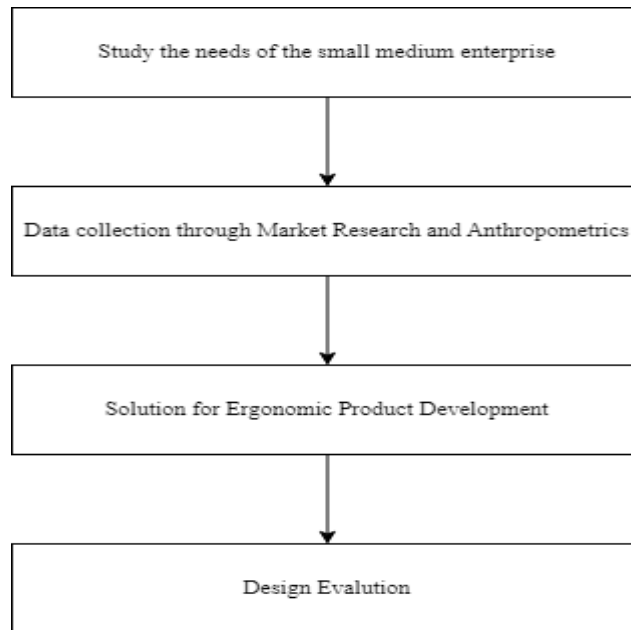


Figure 1. Method for Community Service

The Method for Community Service in Figure 1 in such of activities as below:

- a. Analyzing the needs for managing wild water hyacinth waste in Central Java.
- b. Collect data on consumer needs and ergonomic product design data
- c. Create ergonomic designs and prototypes
- d. Evaluation of water hyacinth waste management solutions.

Tensile Test

According to Askeland 1985, the tensile test is a method used to test the strength of a material by applying a force load along the same axis. The results obtained from tensile testing are very important in engineering and product design because they produce material strength data. Tensile testing is used to measure the resistance of a material to static forces applied slowly. The tensile test aims to determine the ability to withstand tension at a particular power level (Kholil et al. 2020).

Anthropometrics

Anthropometry comes from "anthro" which means human, and "metric" which comes from the word measure. By definition, anthropometry is a field that studies the size or calibration of the human body. Anthropometry is one of the branches of ergonomics that has a connection or connection with measuring a person's body dimensions, which can be used to carry out ergonomic designs. Data on the sizes of all human body parts from certain ethnic groups is presented in percentage form (Cahyadi and Soeprapto 2021).

Community service methodology

3. Results and Discussion

In Indonesia, water hyacinth, known by its Latin name *Eichornia crassipes*, is a plant whose roots have no growing medium except water. This wild water hyacinth plant is usually found in calm streams such as rivers or lakes, which has a negative impact, such as disrupting mobility in the water. For fishermen, the wild water hyacinth plant disturbs fishing boats and this wild water hyacinth plant can damage the environment because the water hyacinth is The dead will accumulate little by little to the surface so that over time the waters will become shallow and can disrupt the ecosystem in the waters [1].

Therefore, with the large growth of wild water hyacinth waste, it can be used as raw material for the craft industry because water hyacinth waste contains natural fibers that have a natural texture that is distinctive, unique attractive, and environmentally friendly. Water hyacinth material is a new alternative material that is currently being developed on the market as an alternative raw material for making furniture to support activities [2].

The application of this potential material, water hyacinth waste, is expected to provide aesthetic value, bringing an atmosphere of comfort to the room. Water hyacinth waste can be used as a business opportunity for creative industries by turning products from water hyacinth waste into woven material that can have high commercial value.



Figure 2. Water Hyacinth Waste in the Bengawan Solo area

Water hyacinth waste crafts are enough to change the environment and even create new jobs for the community at CV. TASHINDA which is located on Jl. Bibis Raya, Kasihan District, Bantul Regency, Special Region of Yogyakarta, Central Java which has managed water hyacinth plant waste as a basic material for crafts.

One of the negative impacts caused by water hyacinths is its ability to disrupt water traffic. Its rapid and extensive growth can cause blockages in irrigation channels, canals and waterways. This can potentially cause flooding in the surrounding area and hinder normal water flow. That is why we need the best solution for water hyacinth waste management by designing good and ergonomic furniture. Water hyacinth itself is strong as a unit. It is coiled and woven into several pieces of water hyacinth stems, where several surveys have proven good water hyacinth tensile test results.

The following are photos of assistance to water hyacinth craftsmen in Bantul, Central Java.



Figure 3. The following are photos of assistance to water hyacinth craftsmen in Bantul, CentralJava

Conclusion

The Company felt that the proposal from Untar's students to design an ergonomic chair was quite good. This also provides additional designs for existing chairs without a touch of ergonomics and market research. This design will be accepted and popular by the community in the future, and the Company can further develop it for other needed features.

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Autobiography

Lina Gozali has been a lecturer in the Industrial Engineering Department at Universitas Tarumanagara since 2006 and a freelance lecturer at Universitas Trisakti since 1995. She got her Bachelor's degree at Trisakti University, Jakarta - Indonesia, then she earned her Master's Degree at STIE IBII, Jakarta – Indonesia, and graduated with her PhD at Universiti Teknologi Malaysia, Kuala Lumpur – Malaysia in 2018. Her apprentice college experience was in paper at Kertas Bekasi Teguh, shoe at PT Jaya Harapan Barutama, and automotive chain drive industry at Federal Superior Chain Manufacturing. She teaches Production System and Supply Chain Management Subjects and her Ph.D. research about Indonesian Business Incubator. She has actively written for almost 40 publications since 2008 in the industrial engineering research sector, covering production scheduling, plant layout, maintenance, line balancing, supply chain management, production planning, and inventory control. She had been working at PT. Astra Otoparts Tbk as International.

Mario Ajipangestu is a final year student in Industrial Engineering, Faculty of Engineering at Tarumanagara University, Jakarta, Indonesia. He is a student who is focused on industrial management, improvement, manufacturing, and project planning. He likes something new and challenging as an improvement to be better. He is also active in several activities such as being a head committee and coordinator in several events. Now he is doing his thesis which takes improvement in project management.

Ronaldo Setiawan Ronaldo Setiawan is a final year Industrial Engineering student, Faculty of Engineering, Tarumanagara University, Jakarta, Indonesia. He is an active student in several activities of the "Industrial Engineering Student Association" organization as well as the student activity unit "Tarumanagara University Engineering Nature Lover Students" as the core management body, chief executive or coordinator of several events. He also often takes part-time jobs or works freelance at bazaars, food festivals, exhibitions, concerts and so on. Currently he is working on his final thesis assignment which discusses a concept for designing innovative modifications by utilizing water hyacinth waste as raw material for craft and creative industries that create new economic opportunities for local communities. This not only reduces the negative impact of water hyacinth on the environment but also supports sustainable economic growth and creates local jobs.

Frans Jusuf Daywin was born in Makasar, Indonesia on 24 th November 1942. is a lecturer in the Department of Agricultural Engineering at Faculty of Agricultural Technology Bogor Agricultural University since 1964 conducted teaching, research, and extension work in the field of farm power and

machinery and become a professor in Internal Combustion Engine and Farm Power directing and supervising undergraduate and graduate students' thesis and dissertation and retired as a professor in 2007. In 1994 up to present as a professor in Internal Combustion Engine and Farm Power at Mechanical Engineering Program Study and Industrial Engineering Program Study Universitas Tarumanagara, directing and supervising undergraduate student's theses in Agricultural Engineering and Food Engineering Desain. In 2016 up to present teaching undergraduate courses of the introduction of concept technology, research methodology, and seminar, writing a scientific paper and scientific communication, and directing and supervising undergraduate student's theses in Industrial Engineering Program Study at the Faculty of Engineering Universitas Tarumanagara. He got his Ir degree in Agricultural Engineering, Bogor Agricultural University Indonesia in 1966, and finished the Master of Science in Agricultural Engineering at the University of Philippines, Los Banos, the Philippines 1981, and got the Doctor in Agricultural Engineering, Bogor Agricultural University Indonesia in 1991. He joined 4-month farm machinery training at ISEKI CO, AOTS, Japan in 1969- and 14-days agricultural engineering training at IRRI, Los Banos the Philippines, in March 1980. He received the honors "SATYA LANCANA KARYA SATYA XXX TAHUN" from the President of the Republic of Indonesia, April 22nd, 2006, and receive appreciation as Team Jury from the Government of Indonesia Minister of Industry in Industry Start-Up 2008.