

The Application of Rhizophora Wood to Design: A Walking Stick for Elderly

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Abstract—The objective of this research is to use Rhizophora wood to design a walking stick for elderly. The research was conducted by studying the behavior and the type of walking sticks used by 70 elderly aged between 60-80 years in Pragnamdaeng Sub-District, Samudsongkram Province. Questionnaires were used to collect data which were calculated to find percentage, mean, and standard deviation. The results are as follows: 1) most elderly use walking sticks due to the Osteoarthritis of the knees. 2) Most elderly need to use walking sticks because the walking sticks help to balance their positioning and prevent from stumble. 3) Most elderly agree that Rhizophora wood is suitable to make a walking stick because of its strength and toughness. 4) The design of the walking stick should be fine and practical with comfortable handle and the tip of the stick must not be slippery.

Keywords—Elderly, Product design, Rhizophora wood, Walking Stick.

I. INTRODUCTION

ELDERLY are people over 60 years old. Most of them are prone to disease, syndromes, and sickness especially on the declining of muscle strength. This physical fatigue is an obstacle in daily life activities leading to more accidents [1]. With the demographic change of citizen social structure, the number of elderly in Thailand has increased significantly. So, there should be a preparation for assistive devices for the elderly.

Most accidents with the elderly are from tripping and stumbling resulting in injury to any part of their bodies due to Osteoarthritis of bones and fatigue muscles. Walking sticks can be used to prevent them from accidents because the walking sticks help support body weight, reduce force on the knee, increase more balance, and support positioning [2], [3].

Apart from its functions, when designing the walking stick, the material and its property must be considered [4], [5]. At the present, both synthetic and natural materials are used in production. The researcher had an idea to apply local material such as Rhizophora wood to design a walking stick for the elderly due to its strength and durability [6]. This can help the use of local raw material to produce a product for the elderly in the community which can also increase the income of people in the community as well.

II. OBJECTIVES

1. To investigate the need of the elderly in the local area affecting the walking stick design.
2. To employ Rhizophora wood to design a walking stick for the elderly.

III. METHODOLOGY

A. Research Procedure

The researcher studied the properties of Rhizophora wood to design a walking stick for the elderly by using various literature review, related researches, field work study, and interview of local people with the steps of research below:

- Step 1.* Investigate the behavior of the elderly in the community especially on their use of walking sticks.
Step 2. Apply the data from the elderly behavior to design the walking stick.

B. Design Concepts

Elderly are people with over 60 years old. Most of them are prone to disease, syndromes, and sickness especially on the declining of muscle strength. This physical fatigue is an obstacle in daily life activities leading to more accidents. Most accidents with the elderly are from tripping and stumbling resulting in injury to any part of their bodies due to Osteoarthritis of bones and fatigue muscles. Walking sticks can be used to prevent them from accidents because the walking sticks help support body weight, reduce force on the knee, increase more balance, and support positioning. Therefore, the researcher uses the data from the study to be a guideline to design walking stick for the elderly.



Fig. 1 Concept of the walking stick for the Elderly

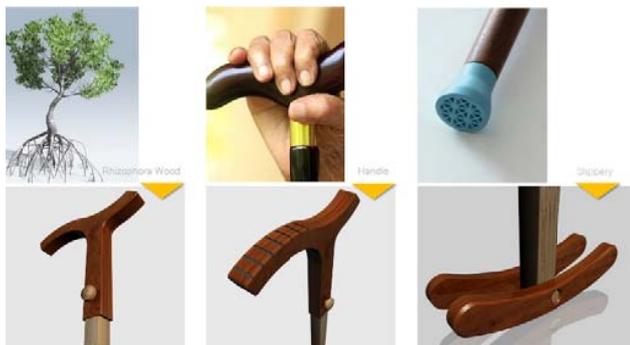


Fig. 2 Detail of the walking stick for the Elderly

IV. RESULTS

The opinions of the elderly showed that walking stick can help them in everyday positioning at high level (mean = 4.21, SD = 0.797). They mentioned that walking stick can prevent them from stumbling at high level (mean = 4.26, SD = 0.774). The length of the walking stick takes an important role in helping their position which was reported at high level (mean = 3.94, SD = 0.842). They also required adjustable stick at high level (mean = 3.96, SD = 0.842). The stick handle should be gripped comfortably and non-slippery (mean = 4.30, SD = 0.729). The tip of the stick should prevent from slippery (mean = 4.31, SD = 0.733). The design of the walking stick should be fine and modern (mean = 3.27, SD = 0.916). The price of the walking stick affected the buying decision at the average level (mean = 2.90, SD = 1.092). They reported the need to use the walking stick at high level (mean = 4.44, SD = 0.581). However, they reported their satisfaction average -to- low on their present walking sticks (mean = 2.45, SD = 1.016) as shown in Table I.

TABLE I
MEAN AND SD OF THE ELDERLY OPINIONS ON THE WALKING STICKS

Item	Mean	S.D.	level
The walking stick can help them in everyday positioning	4.21	0.797	High
The walking stick can prevent them from stumbling	4.26	0.774	High
The length of the walking stick takes an important role in helping their position	3.94	0.842	High
The adjustable walking stick	3.96	0.842	High
The stick handle should be gripped comfortably and non slippery	4.30	0.729	High
The tip of the stick should prevent from slippery	4.31	0.733	High
The design of the walking stick should be fine and modern	3.27	0.916	High
The price of the walking stick affected the buying decision	2.90	1.092	Average
The need to use the walking stick	4.44	0.581	High
The satisfaction on their present walking sticks	2.45	1.016	Low

V. DISCUSSION

According to the study of the elderly needs on the use of the walking sticks, it was found that Rhizophora wood was suitable to make a walking stick because of its strength and toughness. The researcher conducted the study with 70 elderly

and searching related literatures and researches with the results as follows:

1. Most elderly use walking sticks due to the Osteoarthritis of the knees.
2. Most elderly need to use walking sticks because the walking sticks help to balance their positioning and prevent from stumble.
3. Most elderly agree that Rhizophora wood is suitable to make a walking stick because of its strength and toughness. In addition, it is a local plant which is available and cheap.
4. The design of the walking stick should be fine and practical with comfortable handle and the tip of the stick must not be slippery.

The data from the study showed that the walking sticks for the elderly should be practical and strong to support their positioning. The design should be based on ergonomics design especially on practical handle and non-slippery. Therefore, the researcher applied the data from the elderly behavior to design the walking stick as shown in Figs. 3 and 4 below.



Fig. 3 The handle and the tip of the walking stick



Fig. 4 Computer graphic model of the walking stick for the Elderly



Fig. 5 Assembly of the walking stick for the Elderly



Fig. 6 Dimension of the walking stick for the Elderly

VI. SUGGESTIONS

1. There should be a study to investigate elderly behaviors in urban areas and on other factors as the database to design a walking stick for them.
2. There should be a study on the properties of other wood and compare with the Rhizophora wood as the database for design other products suitable for worldwide market.

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