UNIVERSITI TEKNIKAL MALAYSIA MELAKA

ANALYSIS AND DESIGN MECHANISM OF SUPPORTING CANTAS

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering (Robotics and Automation) (Hons.)

by

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APPROVAL

This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Robotics and Automation) (Hons.). The member of the supervisory committee is as follow:

……

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ABSTRAK

Cantas pemotong bermotor menyediakan pemangkasan yang cepat, mudah dan menjimatkan dan penuaian bagi mereka yang keras untuk mencapai permohonan untuk reka bentuk yang ringan dan selesa kawalan memastikan keselesaan pengendali maksimum. Dalam penyelidikan ini idea untuk mencipta satu mekanisme sokongan untuk membantu memudahkan penggunaan Cantas di kalangan buruh kerana walaupun dengan penghasilan produk Cantas ini beberapa pekara telah dipertingkatkan tetapi sedikit kelemahan itu cuba diperbaiki supaya alat ini dapat digunakan dengan dengan kadar yang maksimun dan semakin ramai pengguna menggunakan Cantas. Penyelidikan dilakukan kepada semua aspek yang terlibat dalam mesin Cantas ini, ini termasuklah rekabentuk, kos, bahan mentah yang digunakan. Keputusan analisis ini dapat dilihat dalam kajian ini ialah untuk menghasilkan mekanisme sokongan untuk Cantas. Analisis juga kepada rekabentuk mekanisme sokongan yang sedia ada yang digunakan pada masa kini, kajian merangkumi masalah yang dihadapi oleh pengguna Cantas, mekanisme kepada rekabentuk untuk bantuan kepada Cantas, Mekanisme yang boleh digunakan pada setiap masa dan keadaan. Keputusan analisis dan design yang telah dihasilkan dapat dilihat dalam laporan ini.

ABSTRACT

Cantas cutter motor provides fast pruning, and harvesting is easy and economical for those hard to reach applications for lightweight design and comfortable control to ensure maximum operator comfort. In this research the idea to create a support mechanism to help facilitate the use of Cantas among labor because even with this Cantas producing certain things have improved, but some weaknesses were trying to improve this tool can be used with a maximum rate of and more consumers using Cantas. Research done to all involved in this Cantas machine, it including design, cost, raw materials used. The results of this analysis will be seen and create support mechanisms for Cantas. The analysis also to the design of the existing support mechanisms used in the present study include the problems faced by users Cantas, to design a mechanism to help to Cantas, mechanisms that can be used at all times and circumstances. Analysis and design decisions that have been produced can be seen in the report..

DEDICATION

To my beloved parents En Ahmad bin Hashim and Pn Siti Rokiah binti Ahmad

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1.1 Background Study

Latest use of Cantas, more widespread among workers of oil palm plantations, whether the work their own or undertaken by large plantation companies such as Felda, Sime Darby, Tabung Haji and others. As mentioned Cantas it is no stranger to them. What is the Cantas and why use the Cantas we will talk about my Bachelor's project to produce a tool support Cantas support during the process of harvesting oil palm fruit used.

Being a labour intensive industry, one of the key challenges facing the oil palm industry is overcoming an inadequacy of supply of labour workforce brought about by increasing oil palm and also the difficulty in getting workers from neighbouring countries. This present trend has compelled the plantation industry to maximise mechanisation on the harvesting process to improve worker's productivity.

Cantas motorized cutter provide fast, easy and save pruning and harvesting for those hard to reach applications to light weight design and comfortable control ensure maximum operator comfort. Cantas are pounded with rapid acceleration gear along with optimised transmissions for best cutter performance it a specifically designed tool used for harvesting oil palm fresh fruit bunches (FFB) and pruning fronds, Drive shaft system provides superior gear surface contact area for maximum power transfers and cutting performance and it have 2 stroke engine, ergonomic control,

long life time and automatic decompression system, used powerful telescopic pole, top cutting performance and easy to handle.

1.2 Problem Statement

The palm plantation workers can easy to collect palm bunch by using Cantas. Cantas are pounded with rapid acceleration gear along with optimised transmissions for best cutter performance it a specifically designed tool used for harvesting oil palm fresh fruit bunches (FFB). A lot of things have be improved after labor using the Cantas including the time savings, increased revenue coconut and fruit quality is maintained. There are also some problems faced by labor when using this Cantas, the main problem faced by the labor is heavy exceeding 5kg and the appropriateness of using Cantas to higher tree. A support mechanism to support this equipment is necessary to improve the collection of oil palm. Support mechanisms for this Cantas has been marketed by international companies, but not gain support from consumers for the certain reasons. A support mechanism that meets the aspects required by the labor will be generated to help a labor, some important aspects need to be given emphasis in this product.

1.3 Objective

There are, two important objectives of this support mechanism for Cantas of this project is

i. To analysis the suitable mechanism supporting element for Cantas.
ii. To design the performance of desired supporting mechanism of Cantas

1.4 Scope

To ensure the objective is achieved, some of the important elements must be consideration. There is:

i. To investigate the problems and collect the data.
ii. To design a supporting mechanism
iii. To analyse and testing the design.
iv. To improvement the supporting Mechanism design that can be used at all times and situation.

CHAPTER2
LITERATURE REVIEW

1.5 Introduction

Malaysia is currently facing shortage of skilled and unskilled workers in the field estimated at 20% of the total workforce in the oil industry. This is partly due to the nature of employment in the farm's energy needs, and also because of increased attractive alternative employment opportunities in other industries. Lack of farm mechanization choices cause dependence on labour for all major activities: land preparation, nursery, planting, fertilizing, farm maintenance, harvesting, collection and transportation. As a result, Malaysia's palm oil is highly dependent on foreign workers (currently estimated at 80% of total oil industry workers). These foreign workers, the returns on average, 60% of their income back to their home countries. This negative impact on PNK contributed by the industry. EPP requires the use of innovative techniques to increase the average productivity of harvesting and collection process. Following this initiative, will also address the issue of remittance outflows by reducing the number of potential foreign workers needed by 2020 of 110,000.To address the shortage of labour, it have identified three core activities (Exhibit 9-5) that focus on increasing productivity of workers:

i. Increasing production and promoting the use Cantas, a motorized harvest equipment to increase productivity of harvest;
ii. Promote the use of sharpening 'diamond' (diamond sharpening tool) to increase the productivity of harvest, and

iii. Instead of manually collecting the proceeds helped to increase the productivity of buffalo BTS collection in situations where mechanization is not appropriate.

Cantas is a tool that can reduce motor harvest time and BTS can be used to trim trees less than 15 feet (5 meters). This involves 30% of palm trees (1.4 million hectares from 4.7 million hectares). Use Cantas will improve worker productivity by about 85%. MPOB will ensure Cantas production increased from 5,000 units a year currently to 20,000 units per year by 2020, and unit price is reduced from RM5, 000 at this time to the maximum price of RM2, 500 to encourage widespread use. MPOB also need to ensure that the durability of the device and after-sales service providers meet the needs of the industry. Use Cantas is proven to increase employee productivity and increase income in line with the ETP, but the only practical Cantas use of palm trees with a height not exceeding 15 feet. Productivity cutting the fruit can reach up to 10 tons of FFB / person / day depending on season and terrain. Problems faced in the pursuit of this high productivity is the ratio of harvesters and gatherers bunch and seeds to harvest fruits and seeds can be collected and sent to the factory as soon as possible.Organize the work of leaves, collecting seeds and raising fruit is the most difficult and it became a contributor to the decline in productivity. Admittedly, until now there are many innovations to help increase the productivity of lifting such as the use of 'mechanical buffalo, Kubota and' grabber ', live buffalo and carts, bikes with the' cart ',' MOTORIZED wheel barrows, 'vacuum' to collect seeds and so on. But what I can see, it is still not yet able to provide further significant impact on reducing the need for foreign workers may only need a lift for 2 to 3 people harvesters and can cover 10 acres a day or an average of 1orang ratio: 3.3 ha per day or a ratio of 1:40 for round 12 ha day.

1.6 Government Response

The use of motor oil cutter known as Cantas expected to ease the shortage of about 40,000 workers in oil palm plantations throughout the country. Malaysian Palm Oil Board (MPOB) Datuk Seri Shahrir Abdul Samad said Cantas used to harvest bunches and palm fronds cut is the best alternative that could save the oil industry of the country affected by the shortage of workers in the field. Government said the lack of farm workers across the country deemed to be very serious at this time and if the problem is not resolved it will affect productivity, especially for export to overseas markets by 85 percent. Government said due to shortage of workers in the field when most Indonesian workers began returning to their countries since many oil palm plantations in the country opened. "So far, the oil palm plantation workers to harvest problems and cut fronds and MPOB estimated that about 40,000 employees are required to ensure that oil palm productivity is not affected in the next two years. "The use of Cantas identified as a step towards reducing dependence on foreign labor in the plantation sector, particularly for harvesting palm fruit,Shahrir said, the use of Cantas employees will be able to save energy because it takes three employees from five employees to the work of harvesting and cut fronds."More importantly, oil production can be increased by two times from 1.8 tonnes to 3.2 tonnes per employee per day compared to manually harvest, "he said. Thus he said, about 166.018 small farmers working on about 634.453 hectares of oil palm plantations throughout the country should use Cantas to increase productivity and income.

Government said at present about 180 cutters motor oil has been purchased by small farmers, while 220 more have applied to buy it. To encourage the use of Cantas RM2, 500 a, Shahrir said, MPOB has provided Cantas Discount Schemes with discounts of RM1, 000 to facilitate smallholders to buy it. Government has allocated RM5.3 million for the implementation of a discount to farmers. (Datuk Seri Shahrir Abdul Samad at launching the Sustainable Palm Growers Cooperative Jasin District Alamanda House 2010)

Figure 2.1: Datuk Seri Shahrir Abdul Samad at launching the Sustainable Palm Growers Cooperative Jasin District Alamanda House

1.7 Manufacture Response

Cantas used more extensively among oil palm plantations in Malaysia. By using Cantas some things could be improved and saved them was the result of increased oil collection, foreign labour can be reduced and the time to collect the oil palm fruits can be reduced. Cantas has various types of the Cantas 3 to Cantas 6. The difference between all Cantas is too low to the palm tree high in the use of telescopic systems.

Mechanisms to support Cantas been marketed previously by the manufacturer Cantas. This mechanism has been imported from Cantas the engine manufacturer Husqvarna. This mechanism is less well-received from users Cantas on several factors namely cost to have this mechanism is expensive and these products are intended for machines with grass and less suitable for Cantas and why this product is not suitable for a number of things that the design of consumer response results that are too complex and it is dangerous to users because when they are in dangerous conditions such as palm or coconut palm frond stalks are struck down by Cantas users, if in that situation they would throw Cantas, but if you use this mechanism cannot do that thing.

Company currently does not yet supply because the demand from the consumer less and company will only focused on improving the strength Cantas. This mechanism only supply on request from consumer.To create a support mechanism is the manufacturer Cantas had some idea that this mechanism needs to satisfy some users are very important features.

Among these are: -

i. Simple design
ii. Quick release
iii. Flexibility
iv. Ergonomic

(EngMohdRashidinIderes, JARIZ Technologies SdnBhd, 2011)

1.8 Distributor Response

Demand for current Cantas increasingly high demand, especially from palm plantation companies such as Felda Plantations, Sime Darby Plantation, Tabung Haji Plantation, the Genting Group and other Plantation. Demand from private operators show the increasing demand added with MPOB has provided Cantas Discount Schemes with discounts of RM1, 000 to facilitate smallholders to buy it.

Response from the purchaser of this product can be improved and this product is easy to handle as well as the service provided by the manufacturer also makes this product in high demand.

Support mechanisms for these products have been marketed to consumers are quite old, but the response of this mechanism is less due to several factors. Especially the mechanism must not suitable for tall trees as to endanger consumers. For Cantas for low tree prefers users to create their own support mechanisms, among the major reasons for this lack of support mechanisms to the attention of consumers is because the design is too complex and too expensive price makes dealers do not have savings of this support mechanism.

Planning to make mechanism support, I received good response from the distributor, but with some of the advice given that this simple mechanism, in accordance with the requirements of users. To get a better idea to create this support mechanism it should seek views from users. (EtaniSdnBhd, 2011)

Figure 2.2: user customer

1.9 User Response

A user to Cantas consists of two types of user's large plantation companies and private users who manage their own farms. For this response, it was including questionnaires that have been made to several labor and farm owners. Some form of survey questions and answers included herein for reference all the requirements of this support mechanism.

1.9.1 Large Plantation

For large plantation companies, they use foreign labour as oil palm fruit harvesters. An activity to collect the oil palm fruit is every day, the energy used is more than labour. This makes them prefer to use Cantas to increase the quantity of oil revenue collected each day.

This support mechanism is used by labour, but less and for use on tall trees is not used and the workers are not using Cantas but use long to pluck the fruit of oil palm. To the area the ground is uneven not use this support mechanism.

Solution for the user to use this support mechanism should be sought so that this tool can be used and in demand. (Genting Plantation survey)

1.9.2 Small User

Users for private oil palm plantations are not always collect. There are certain times they will collect. These support mechanisms are also used, but that made as available from the manufacturer expensive and too complex.

Based on the questions to them, their full support to create a support mechanism, but must meet the requirements of users that it is easy and inexpensive. This is because people who use it not only young people but older people also use these products for their own gardens because it is easy and with this mechanism is right becomes easier.

Result of this experience the weight factor is Cantas play an important role in the use of this Cantas. (En MohdMahalitdin, FeldaGhafar Baba)

Figure 2.3 and 2.4: test used Cantas

1.10 Mechanism Design

Module design is the design of mechanism kinematic tool. This tool can be used to create simple and complicated mechanism, determine the connection between the component and drag through the range of motion mechanism is also used to analyse the velocity and acceleration components within the assembly and create a curve tracer for moving components within the assembly.

Mechanism are almost always driven by a single actuator to produce a wide variety of motion ranging from very simple motions about fixed axis, such as reciprocating or oscillating motion, to highly sophisticated motions in three-dimensional space. A single actuator driven mechanism guides the convertible top through a series of motions. Understanding how particular mechanism works is fairly easy, but comprehending how it originated and why it was designed in the particular from in which it exists is more difficult. The fundamental task of conceptualizing mechanisms is still a mixture of art and science. Many systematic methods exist today to assist in creating innovative mechanism.

Mechanism design is a very general way of thinking about institutions. An institution or mechanism takes as input "messages" or "signals" from agents and it responds with an outcome. The idea of mechanism design is to create institutions that produce a desirable outcome while respecting the fact that agents have private information