THE ANALYSIS OF SUITABLE FRAME (STRUCTURE) FOR A PEDAL CAR

By

MOLLIGODA M.L.C.Y.

Supervised by

Dr. M.A.R.V.FERNANDO

This thesis was submitted to the Department of Mechanical Engineering of the University of Moratuwa in partial fulfillment of the requirements for the Degree of Master of Engineering in Manufacturing Systems Engineering

Department of Mechanical Engineering
University of Moratuwa
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DECLARATION

This Dissertation paper contains no material which has been accepted for the award of any other degree or diploma in any University or equivalent institution in Sri Lanka or abroad, and that to the best of my knowledge and belief, contains no material previously published or written by any other person, except where due reference is made in the text of this Dissertation.

I carried out the work described in this Dissertation under the supervision of Dr.M.A.R.V.Fernando.

Signature: *UOM Verified Signature* Date: 18th July 2006

Name of Student: M.L.C.Y.Molligoda

Registration No: 02/9631

(Supervisor's comments to be written here)

Signature *UOM Verified Signature* Date: 29th Sept 2006

Name of Supervisor: Dr. M.A.R.V.Fernando

PREFACE

The study on "Analysis of Various Body Shapes and Suitable Structure for a Pedal Car" carried out in partial fulfillment of the examination requirements of "Master of Engineering in Manufacturing Systems Engineering" postgraduate degree program.

The design of the pedal car could be divided in to three categories as follows.

I. Analysis Of Various Body Shapes And Suitable Structure For A Peddle Car

II. The Analysis of Power Transmission System

III. The Ergonomic Analysis

The study was carried out to the best of my abilities and I hope the findings and recommendations, which are discussed in detail towards the latter part of the report, would be of some use to the future researches of this subject.

M.L.C.Y.Molligoda

ABSTRACT

This study is mainly focused on to determine a suitable structure for the pedal car by considering following areas.

1. To determine the number of wheels for the pedal car
2. Driven drive (whether front or rear)
3. Number of wheels for steering

"Tadpole car" is the final designed of the research because it is comparatively easy to fabricate and, there are so many advantages when fixing power transmission and steering mechanisms.

Here the steering mechanism couples with front wheels of the "tadpole" structure. It governs by standard bicycle handle. End of the handle, by using two steel rods, couples with pin joint to the front wheels.

Suspensions are necessary to maintain comfort-ability of the car. Therefore front wheels are assembled with two springs. And Rear wheel later part was assembled with pin joint and upper joint introduced with coil spring. This combination helps to maintain Constance distance between flywheel and the rear wheel.

Brake must be with the vehicle to safe operation of it. Here all three wheels are controlled at the same time by jamming one liver. It is important for the stability of the vehicle while stopping.

Steel Conduits are used for the fabrication of first embodiment. But after Cosmos analysis, it reveals that maximum stress occurred on the structure is 27 N/mm^2.

For Cosmos analysis, numbers of possible load combinations were applied on seat and paddles. Seat load considered as distributed load and pedal load took as point load

Further this research can turn to another area of "law weight structures". Herein maximum efficiency can be achieved by reducing the body weight of the car. And it will help to popularize the car. Because generally riders like easy- handling vehicles.

This goal would be achieved by replacing steel parts with Aluminum alloy or Timber structures wherever possible.

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