DESIGN OF A CABLE HANDLING MACHINE

by

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This project is about the design of a device being able to measure and cut required lengths of rope-like materials. These are materials like steel wire ropes, hoses, fibre ropes, metal strips etc. that are manufacture and package in reels.

In order to do so, the machine has to follow a number of steps which have as stated above.

a) first step, is to unroll the reels.

b) second step, is to measure the required quantity.

c) third step, is to cut the material at the specified length.

d) fourth step, is to roll it back in another drum or reel.

The design and dimensions of the above device must be seriously examined so as to be competitive with similar machines and to provide easy installations and facilities to be moved, without great effort, if the conditions call for.

Another thing to be always bared in mind, while designing such innovative machines, is the ergonomics of the machine. The controls must be able to be found easily by the operator and the switches must be easy to operate. The positions for the stock quantity and the required quantity ie. the input and output, must be easily reached and must be in such height so that an average person could reach and lift the materials from the input/output drums. The machine must of course provide facility for emergency (cut-off) switch like all new and old machines (lathe, planning machines, drilling machines etc).

Machines constructed nowadays must have the advantage to be completely automatic and if possible to inform the operator of what is to take

place and what possitions the operator should attempt. In a few words,the word "machine" has to be replaced with phrases like "the metalic servant" or even better "the metalic instructor" (don't forget the computers). Of course a metalic servant is all what the cable handling machine is up to.

As one of the basic things such a machine should possesed is the information at any instant of the length being measured and the length to be measured on both the metric and imperial system.

1.2 PROBLEM DEFINITION/NEED OF DESIGN.

There are a lot of needs which call for the design of such a machine. Due to the nature of some materials like wire ropes, hoses, strips etc. to be found in reels there is a necessity to construct a machine to be able to measure the length of those reels in a very short time and with as less human effort as possible. There are ,of course, very easy ways to do so without having to unroll the reels and reroll them again.

One very easy way is to measure the number of complete circles the material generates around the reel and then the diameter of these circles. From high school the formula giving the perimeter of a circle is used and thus by multiplying a single perimeter of one circle by the number of circles the whole length is found. Although this method is very quick the problems arise just when a small quantity is required instead of the whole reel. That means that the quantity must be subtract from the reel ie unroll the reel measure the required quantity and then reroll it in another reel to keep it tidy. That except from the time needed for doing so, it also calls for the assistance of a second person and thus the total cost of doing the job is more.

In the industrial world the wires and other rope-like materials are wholesaled by weight to the various consultants and agents and thus the problem of receiving the exact length of the material is eliminated. Of course the consultants know through
experimentation and experience that an X quantity in Kg of a specific wire equals to Y metres of the same wire. That is the way orders are placed by the consultants. Coming to the consumers point of view things are a lot different. Consumers do not require huge amounts of these materials. What is likely to happen is that small amounts are to be required. In such a case

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