



**DESIGN OF PULLEY SYSTEM FOR TRANSFERRING
THE OIL SAMPLES FROM GROUND FLOOR TO 3RD
FLOOR AT COMPANY IN KAPAR KLANG**

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ABSTRACT

In the oil industry, for example, the wasting time has a detrimental impact on the company's production. At Sumber Petroleum Cemerlang Sdn. Bhd. (SPC) the process of transferring oil samples to the Quality Control (QC) lab costs a lot of time wasted by using manpower instead of using a proper mechanism method. The problem at SPC can be solved by proposing a proper mechanism method for the process of transferring oil samples. This project is focusing on designing a pulley system for transferring the oil samples to the QC lab to reduce the transferring oil samples time. Research journals or previous studies conducted by previous researchers have been collected as a reference to complete this study. The simulation of the design has been done by using computer-aided design (CAD) software which is CATIA V5R20. For the simulation, the mechanism of the pulley works when the motor is turned on and it will cause the basket attached with the rope in the pulley system to move down through the window of the QC lab on the 3rd floor to the ground floor. Once the basket is filled with the bottle of oil samples, it will move up back to the QC lab. The result obtained shows that the use of a motorized pulley system is better than manpower for transferring the oil samples. The time taken by the pulley system for transferring the oil samples was 160s and it is better than using manpower that consumes 420 - 480s to walk from the ground floor to the QC lab. From the recorded time taken by the pulley system, time-saving gained was about 62 – 67 percent by using the motorized pulley system. Besides, by using this proper mechanism, any dangers or risk of hazards to the workers can be avoided as the worker have to walk up the stairs for transferring the oil samples. The safety of workers also can be optimized. Hopefully, this project can be a better solution for SPC company to overcome time wasted while transferring the oil samples to the QC lab on the 3rd floor of the company.

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CHAPTER ONE

INTRODUCTION

1.1 Research Background

Cable-pulley systems are widely used in construction machinery fields, such as the multi-rope friction hoisting system of deep coal mines, the luffing system of cranes, and the cable-driven parallel manipulator of Five-hundred-meter Aperture Spherical Telescope (FAST) [1] [2]. Pulley systems utilize mechanical advantage to pull weighted loads. A continuous cable travels through many pulleys to lift a load in the cable pulley system. The main advantages of this sort of mechanism are its structural simplicity, quick lifting speed, and reduced friction. Then, another major advantage of the pulley system is that it can be adjustable meaning that it can be moved along the length of the haul line [3]. There are many kinds of pulley systems such as compound pulley systems, the concepts of throw, internal versus external pulling systems, and the 120° rule [3]. Every pulley system has its advantage based on its criteria. The data gathered shows that some motorized pulley system has some difficulties to determine the power of the motor with different amount of load. The material of the cable used is also affected when there are differences in load measured. This research was conducted due to solve the problem of wasted time faced by the workers at the company in Kapar Klang to transfer oil samples. Time taken by the workers to transfer oil samples to the Quality Control lab (QC) on the 3rd floor was longer which was 7-8 minutes. This study is focusing more on designing and modelling the pulley system to overcome the problem faced by the SPC company and to meet the objectives of the research by using CATIA V5R20 software. An analysis simulation which is Finite Element Analysis (FEA) was done to record the effectiveness of the material used in the pulley system mechanism.