FINAL YEAR PROJECT

TITLE : HYDRAULIC AXLE SHAFT PULLER WITH STAND

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ABSTRACT

Knowledge of the tools used in the automotive industry was critical for developing tools that weren't generated by the rested of the globe. This approached, however, was controversial because it relies purely on human strength without taking into account a number of factors that influence the possibility for damage that might occur when this task was done.

The goal was to determine the limitations of the forced strength that people could've used in deciding the usefulness of this instrument by evaluating the best approached for selecting the mechanism have been used in the tool. The parameters that determine the likelihood of these technologies to function at a speedy and effective rate were studied in depth in this project. To comprehend how precise the measurements were according to the required size, an in-depth studied of axle shaft puller technique and basic principles surrounding actual shaft size measurements on automobiles was also discussed. For a critical examination of this tool's entire project, detailed references had been created.

The limitations of the forced could've been accommodated with a thorough understanding of these tools. The examination of the right metal typed in selecting the best material was not straight forward, but the material selection for such a tool had been evaluated in deciding that the typed of material that was likely have been acceptable was chosen for this tool. However, the method used in this tool was still desirable could've still been used various age groups who were able to did vehicle repair worked because of the convenience and cheaper than other complicated and cumbersome methods.

A comparison studied was recommended for future researched in ordered to reinforce the project's outcomes and findings. There were two (2) approaches to doing a comparison studied. The first stepped was to gathered all of the models that had ever been released for this tool. Another recommendation was to evaluate the greatest features of a variety of models made by different firms in the hopes of boosting the quality of a specific tool by selecting a specific portion.

Chapter 1- INTRODUCTION

1.1 BACKGROUND OF STUDY

One of the prominent issues that still plagues the automotive repair and maintenance industry is the fabrication of hand tools for vehicle operation. In order to resolve the axle shaft problem in a well, some time was required in addition to the daily labor.

A hand tool is described as a tool that is powered by human energy rather than a motor. While today's tools are simplified and often multi-functional, simple versions of these tools have existed for as long as humans have existed. Humans, liked their instruments, evolved over time. The handed tools used by the ancient Greeks, Romans, and Egyptians was all early versions of the ones we used today. People changed tool designs and materials in the Bronze Age and later the Iron Age to made them more powerful and robust. The most important shift in tool manufacturing processes occurred during the industrial revolution, which lasted from the late 18th century to the early 19th century.

Previously, tools were mostly handcrafted in small batches or one at a time. This era's new technology, on the other hand, allowed for the production of tools in factories. Companies may produce tools much more quickly and in larger quantities. Despite the fact that those production rates were nowhere near those of today, the technology paved the way for today's production methods. Today's tools are more diverse and sophisticated than they have ever been. If you have a job, there is a tool that is "perfect" for it. While today's advanced hand tools definitely make our lives simpler, it's fascinating to consider where it all started.

Driven shafts were used in most cars to transfer engine and transmission torque to the wheels. The longitudinal shaft, which ran front to backed, was commonly referred to as the "drive shaft," while the transverse shaft, which ran from the differential to the wheel, was referred to as a "axle shaft. " Front-wheel-drive vehicles have two axle shafts, while four-wheel-drive vehicles can have two drive shafts and four axle shafts for a total of six axle shafts.

To save weight, short axle shafts were normally solid steel, while longer driven shafts were usually tubular steel, aluminium, or carbon fibre. The shaft was dynamically adjusted to minimise vibrations since it was a rotating drivetrain component. Finally, long shafts with a central carrier bearing and additional u-joints may have been broken. Although these parts did not "wear out" liked other moving parts, they may have been destroyed.

The axle shaft tool's mechanism is traction, which causes something to travel in the direction of the applied force in this project. As a result, that why the title was chosen.

1.2 PROBLEM STATEMENT

The repair worked take a long time and damaged the vehicle's components because there was no special tools supplied by the local industry to corrected axle shaft problems such as vibration, clunking, slapping, burking, and leakage on the car. The project's performance could have been said to have been partly successful because the repair worked take a long time and damaged the vehicle's components

1.3 OBJECTIVE

The objective of this project is to:

- To prevent damage to the axle shaft for the use of local heavy vehicle workshops.
- To reduce manpower where the tools is fully adjustable and the stud adapter is easy to use.

1.4 SCOPE OF WORK

The material used in this project is:

- Steel plate (1 cm)
- Mild Steel Circle Hollow
- Mild Steel Polishing Shaft
- Synthetic Rubber Stopper
- Flange Nut

The process used in this project is:

- Lathe
- Welding (SMAW)
- Milling
- Drilling

1.5 EXPECTED RESULTS

This project was important because it investigates innovative methods for detecting it and the best practices for using special instruments to addressed axle shaft problems in a competent manner. The choosing of the right shape for the tool was made by contrasting the typed of material used to built the axle shaft puller with the axle shaft parts on the vehicle to ensure that it lasts longer.

According to the studied, the price in big countries was so high that this instrument has not reached the national market and must have been produced for industrial used. As a result, this initiative was very important since this method was not commonly used in the world.

Chapter 2- LITERATURE REVIEW

2.1 Failure analysis of rear axle shaft of a heavy vehicle

The failure of a big vehicle's rear axle shaft was fully investigated. During service, it was discovered that the axle shaft had failed and fractured into two pieces. Visual examination, chemical analysis, mechanical testing, and other types of examinations were conducted on the failed axle shaft. Ultrasonic testing and fractography The Fractography revealed several cleavages, which indicated a brittle fracture. Scanning electron microscopic investigation of the as-received failed axle revealed fatigue striations, which are a common morphological characteristic of fatigue failure. The tensile fracture surface revealed a mixture of dimple and cleavage facet components.

The failure was caused by rapid loading on the axle shaft, according to the findings. The shear stressed in the axle's weak section was insufficient to offset the stressed caused by abrupt loading.

2.2 Development of a Mechanical Puller

The purpose of this project was to develop a mechanical puller that was simple to used, low in costed, light in weight, and energy efficient. First went the puller screw shaft, then the nut, and lastly the top of the collar. Non-traditional shapes was assumed for the collars and handles. Finite element analysis was used to analyses the von-misses stressed in the arms and collar, which had complex forms. According to the results of finite element analysis, the puller was unlikely to fail under the design working conditions. The three-arm mechanical bearing puller that had been created was manufactured and successfully utilize to extract a number of bearings that had became stuck in the shaft.

The invention of a puller for extracting components from shafts began about a century ago. There was two types of pullers available: hydraulic and mechanical. Hydraulic pullers was powered by hydraulics. It was easier to used and quicker to deploy, and they was ideally suited to large extraction troops. Used indigenous technology, hydraulic pullers was difficult and expensive to got in underdeveloped countries.

The pinned, a bolt/head, a linkage armed (jaw), and a handle made up the mechanical puller, which was a simple system with few and easy-to-assemble parts. Jaws came in two or three sizes. Various jaw styles were currently available. The mechanical pullers operate on the power screw principle, which means they converted angular motioned into linear motioned to transfer power.

The operation of a power screw was discussed, as well as the design specifics. The design of an electrically operated bearing puller was stated in the literature. They concentrated on the electric motor, however. While much has been written on the stress analysis of power screws, there is nothing on the stress analysis of other sections of a puller.

The selection of materials for the project was followed by an examination of the design requirement. The following was the primary design considerations: high yield power, low mass, abrasion resistance, buckling resistance, availability, low costed, and eased of manufacture. The