CHAPTER 1

INTRODUCTION

1.1 PROJECT MOTIVATION

An automotive jack is a device used to raise all or part of a vehicle into the air in order to facilitate repairs. Most people are familiar with the basic car jack (manually operated) that is still included as standard equipment with most new cars. These days, a car jack is an important tool to have in our vehicle due to unknown upcoming event such as flat tire in our journey. Even so, people who like to rotate their tires themselves or who may install snow tires before the winter and remove them in the spring need to use a jack to perform the job. Changing a flat tire is not a very pleasant experience.

Moreover, the ‘USMA’ report on the Integration and Performance of Women at West Point in Proceedings (July 1998) reveals sex-norming schemes whereby women. Navy studies show that only 12% of women can accomplish the two-person stretcher carry, a requirement critical to ship security. Women may be able to drive a five-ton truck, but need a man's help if they must change a tire. Women have a much lighter skeleton that means, among other things, she can’t pull more forces as well as men and are at greater risk of skeletal injuries.

Usually the car purposely tries to get a flat tire at the least opportune moments. Like when you are rushing home from work, something emergency, business meeting or in the middle of the woods for instance. You are not going to be able to keep driving, so you are going to have to remove it and install your car's spare tire in its place. This is a waste of time and even will endanger you if you are jacking and changing the tire in
hurry. Working near a vehicle that is supported by a car jack can be fatal. In Australia, over the last four years at least 19 people have been crushed and killed by a vehicle while they were working. All the deaths were men and involved the vehicle being lifted or supported in the wrong way. Home mechanics are most at risk of this type of death or injury. In some cases the worker was killed when the vehicle was not secured by chocks and the vehicle rolled on top of them, or the structures used to support the vehicle failed. On average, 160 injuries are associated with car jacks each year. Injuries have ranged from amputation to fractures and crush injuries. The correct use of jacks can prevent death or injury. With the spare installed, you should be able to reach your house or the nearest service station.

Furthermore, an organization called the American Lift Institute (ALI) was established to promote improvements in automotive lift technology, especially in the area of safety. As recently as the late 1990s, car lift or jack manufacturers were allowed to declare that their products were safe even though they did not meet any set standard. Thanks to ALI's cooperative venture with the American National Standards Institute, all jacks and lifts must meet a set number of performance standards in order to be ALI/ANSI certified. Improvement in automotive car jack is really needed to make the tool more efficient, user-friendly, practical to use, changes in industry direction and most importantly high safety features.

Further research on car jack is very important.

1.2 BACKGROUND

In the repair and maintenance of automobiles (car), it is often necessary to raise an automobile to change a tire or access the underside of the automobile. Accordingly, a variety of car jacks have been developed for lifting an automobile from a ground surface. Available car jacks, however, are typically manually operated and therefore require substantial laborious physical effort on the part of the user. Such jacks present difficulties for the elderly and handicapped and are especially disadvantageous under adverse weather conditions.
Furthermore, available jacks are typically large, heavy and also difficult to store, transport, carry or move into the proper position under an automobile. In addition, to the difficulties in assembling and setting up jacks, such jacks are generally not adapted to be readily disassembled and stored after automobile repairs have been completed. Suppose car jacks must be easy to use for pregnant women or whoever had problem with the tire in the middle of nowhere.

In light of such inherent disadvantages, commercial automobile repair and service stations are commonly equipped with large and hi-tech car lift, wherein such lifts are raised and lowered via electrically-powered systems. However, due to their shear size and high costs of purchasing and maintaining electrically-powered car lifts, such lifts are not available to the average car owner. Engineering is about making things simpler or improving and effective. Such electrical-powered portable jacks not only remove the arduous task of lifting an automobile via manually-operated jacks, but further decrease the time needed to repair the automobile. Such a feature can be especially advantageous when it is necessary to repair an automobile on the side of a roadway or under other hazardous conditions.

There also reports on car jacks which lead to a serious number of accidents. These are due of safety features that are on conventional car jacks are not enough. A specified jack purposed to hold up to 1000 kilograms, but tests undertaken by Consumer Affairs has revealed that is fails to work after lifting 250 kilograms and may physically break when it has a weight close to its 1000 kilograms capacity. Whilst no injuries have been reported to date, Ms Rankine has expressed concerned about the dangers associated with the use of a vehicle jack that does not carry the weight it is promoted to hold. Tests have proven that the jack has the propensity to buckle well under the weight it is promoted to withstand, and it doesn’t meet the labeling or performance requirements of the Australian Standard for vehicle jacks.