

## Performance Analysis of Simple Aircraft in Increasing Energy Efficiency

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### ABSTRACT

This research aims to analyze the performance of simple aircraft in increasing energy efficiency. Simple airplanes are one example of a simple machine used to convert force into useful energy. In this study, we conducted a series of experiments to measure various factors that influence the efficiency of a simple aircraft, including tilt angle, arm length, and applied load. The results of this research provide important information about how we can improve the efficiency of simple aircraft and optimize energy use in everyday applications.

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## INTRODUCTION

Simple machines are tools that use physics principles to make it easier for humans to do work. There are four types of simple machines that will be discussed in this article, namely levers, pulleys, inclined planes, and rotating wheels. Each type of simple aircraft has different functions and uses in everyday life. Increasing energy efficiency when using simple aircraft can be done in several ways. One way is to reduce friction in simple aircraft. Ensuring that all parts of a simple aircraft move smoothly and with minimal friction can help reduce the energy required to move the aircraft. Besides herefore, using light materials to make simple aircraft can also increase energy efficiency. Light materials will reduce the energy required to move simple aircraft. Improving the design of simple aircraft is also an important step in increasing energy efficiency. By positioning the pulley or lever so that it works efficiently, the energy required to move a simple aircraft can be optimized.

Finally, reducing the load placed on simple aircraft can also help improve energy efficiency. By reducing the load, the energy required to move a simple aircraft will be reduced. By implementing these steps, energy efficiency in using a simple aircraft can be increased, so that energy use becomes more efficient. This research aims to analyze the factors that influence the energy efficiency of simple aircraft. With a better understanding of the performance of simple aircraft, we can develop more efficient designs and optimize the use of natural energy for various everyday applications. In this article, we will discuss the abstract, introduction, methods, results and discussion, and conclusions.

## METHOD

In this study, we use an experimental approach to analyze the performance of a simple aircraft. We built several simple airplane models with varying arm lengths and tilt angles. Each simple aircraft model is tested with different loads to measure the resulting energy efficiency. We record this data and perform statistical analysis to identify emerging patterns and trends.

## RESULTS AND DISCUSSION

The research results show that the arm length and tilt angle of a simple aircraft affect the efficiency of the energy produced. The longer the arm and the greater the tilt angle, the higher the energy efficiency obtained. However, there is a certain limit where the energy efficiency starts to decrease with increasing arm length and inclination angle. In addition, the applied load also affects the energy efficiency of simple aircraft. In studying simple plane material, we can do work that makes it easier for us to do things with several types of simple planes such as levers, pulleys, inclined planes, and wheels with axles.

### Levers/Levers

Lever/A lever is the simplest type of simple machine. This lever consists of a rigid rod (for example, wood or bamboo) that rotates around a fixed point called the fulcrum. Apart from the fulcrum point which is the support for the lever, there are two other points on the lever, namely the load point and the force point. The load point is the point where the power places or places the load to be lifted or moved, while the power is the point where power is exerted to lift or move the load. The lever/lever functions to tip, pull or lift heavy objects. Levers work by changing the amount of force required to lift a load. In a large lever, the mechanical advantage produced is very dependent on the position of the fulcrum, force point and load point.

### Pulley

A pulley is a wheel that rotates on its axis. Usually the pulley also has a rope or chain as a link. Based on how it works, a pulley is a type of lever because it has a fulcrum, force and load. Pulleys are classified into three, namely fixed pulleys, free pulleys and compound pulleys.

### Inclined plane

An inclined plane is a type of simple plane that is used to move objects along a slanted path. An inclined plane is a type of simple plane consisting of a flat plane with one end higher. This inclined plane is positioned at an angle to reduce the force needed to move an object to a higher place compared to lifting it vertically. Inclined planes provide the advantage of allowing us to move an object to a higher place with less force. And this inclined plane also has a weakness, namely the distance that must be traveled to move an object is longer (far). The advantage of this inclined plane depends on the base of the inclined plane and its height. Because the smaller the angle of inclination of the object, the greater the advantage of the mechanism or the smaller the force that must be exerted.

### Axle wheel

Axle wheels are wheels connected to an axle that can rotate together. So the wheel and axle consist of two cylinders with different radii and joined at the center. The axle wheel is a type of simple machine that is often found in tools such as car steering wheels, ship steering wheels, bicycle wheels. Wheels and axles work by changing the magnitude of the force and direction of the force used to move a rotating object.

Based on the results of the analysis and discussion found, there are several factors that influence the energy efficiency of simple aircraft. Some of these factors include:

1. Friction between simple aircraft parts can reduce energy efficiency. In analyzing the factors that influence the energy efficiency of simple aircraft, it is important to pay attention to and reduce friction between simple aircraft components.

2. Materials used. Choosing the right material can also affect the energy efficiency of simple aircraft. Using lightweight, friction-resistant materials can help reduce the energy required to move simple aircraft.
3. Simple aircraft design also plays an important role in energy efficiency. Simple aircraft design improvements, such as positioning pulleys or levers so they work efficiently, can help optimize energy use.
4. The load placed on a simple aircraft can also affect energy efficiency. Reducing the load placed on a simple aircraft can reduce the energy required to move it.

By analyzing these factors and taking appropriate steps, the energy efficiency of simple aircraft can be improved. This will help reduce excessive energy use and increase the efficiency of using simple aircraft.

Efficient use of simple aircraft. In daily activities, the use of simple, efficient machines can help reduce energy consumption. For example, proper use of pulleys can reduce the force required to lift a load. Efficient use of technology. The use of efficient technology in simple aircraft can also increase energy efficiency. For example, using axle wheels that have low friction can reduce energy wasted due to friction. Use of renewable energy sources. Using renewable energy sources such as solar energy or wind energy in simple aircraft can help reduce dependence on fossil energy sources which are limited and have the potential to damage the environment. Good care and maintenance. Performing proper care and maintenance on simple aircraft can help maintain energy efficiency. For example, ensuring that the pulley or wheel shaft is in good condition and free from excessive friction.

Efficiency is the ability to use resources optimally by producing maximum output with minimum sacrifice. In various fields of life, such as business, industry, management, and economics, efficiency refers to the ability to use resources in the most optimal way to achieve desired goals. In the context of simple aircraft, increasing energy efficiency means using energy resources in the most optimal way to propel the aircraft. Several steps that can be taken to increase energy efficiency when using simple aircraft include reducing friction, using lightweight materials, improving design, and reducing the load placed on simple aircraft. By increasing energy efficiency in the use of simple aircraft, energy use can be reduced, which in turn can save costs and reduce negative environmental impacts resulting from excessive energy use.

Increasing energy efficiency in simple aircraft can provide benefits in everyday life, such as reducing energy consumption, reducing costs, and reducing negative impacts on the environment. Regarding increasing energy efficiency, there are several ways that can be done. One way is to use a simple plane. Simple machines can help increase energy efficiency by changing the direction or magnitude of a force. For example, using a pulley can help reduce the effort required to lift or lower a load. By using pulleys, weights can be lifted more easily and using less energy.

Besides Therefore, in the context of transportation, increasing energy efficiency can also be achieved by using more effective and efficient transportation technology, such as modern aircraft. The use of more efficient aircraft can reduce fuel consumption and greenhouse gas emissions, thereby increasing energy efficiency in the aviation industry as a whole. Increasing energy efficiency can also be achieved by saving strategies on cooling and chiller systems in the food industry. By saving energy on the cooling system, energy efficiency can increase large capital investments.

## CONCLUSION

Based on the research results, we conclude that arm length, tilt angle, and applied load are important factors influencing the energy efficiency of simple aircraft. Increasing the arm length and tilt angle can improve energy efficiency, but with certain limitations. In developing simple aircraft designs, it is necessary to consider these factors in order to achieve optimal energy efficiency. The

use of simple machines such as levers, inclined planes, pulleys and pivoted wheels can help increase energy efficiency by reducing the effort required to do work. Apart from that, the use of more efficient transportation technology and energy saving strategies in industrial systems can also contribute to increasing overall energy efficiency. Efficiency is the ability to use resources optimally by producing maximum output with minimal sacrifice. In various fields of life, such as business, industry, management and economics, efficiency refers to the ability to use resources in the most optimal way to achieve desired goals. By increasing energy efficiency in the use of simple aircraft, energy use can be reduced, which in turn This in turn can save costs and reduce negative environmental impacts resulting from excessive energy use.

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