

SOLAR POWERED HYBRIDE WATER WHEELER

¹Prajapati Sureshkumar ²Raj Surajsinh ³Gajjar Jaydeep ⁴Chauhan Kiransinh ⁵Rana Priyank

⁶Mr. Bhaumik Bhandari ⁷Dr. Dipesh Patel

^{1,2,3,4,5} Students of D.A.Degree Engineering & Technology, Mahemdabad-Gujarat

⁶ Assistant Professor in Mechanical Engineering Department, ⁷Head of the institute

Abstract

Water wheelers are used everywhere and are economical compared to the currently existing water board system. They form an economical medium for amusement purposes as well as traveling across lakes and rivers in the rural areas. However, most of the water wheelers are pedal operated and require human effort to move from one place to another. This forms a major drawback as currently existing human powered water wheelers which need to be a major area of focus. This project deals with the design and development of an economical hybrid waterwheel which can be operated not only by human efforts but also other hybrid power sources such as a portable engine as well as solar power since the proposed project implements 3 different modes of operation of a water wheeler. The proposed project forms a technical advantage over the currently existing water wheelers. The modes of operation involve a hybrid Split Drive system which can be operated either using a Pedal via human efforts, an Engine which is incorporated on the water wheeler itself and Solar Energy, which utilizes electricity generated by Solar panels to drive the machine.

Keywords

DC motor, Solar panel, Battery, Blade

Introduction

In the era of increasing fuel cost, preference is given to a system which can operate over mechanical force or advantage compared to fuel operated systems. However, there are limitations of mechanical based systems or to be more precise human effort based systems as they are not practical and human force cannot meet the required expectations. The ultimate goal of the current project is to develop a hybrid human powered water wheeler.

Water wheelers are currently used everywhere and almost every existing water wheeler available in the market is pedal based. The water wheelers are used for travelling across lakes, rivers and major application is the amusement parks and purposes. People come to amusement parks for leisure purposes where water wheelers are usually employed.

Currently water wheelers only come in human operated modes. The unman operated water wheelers are seen commonly and come in different variants including but not limited to single sitter, two sitter, four sitter and so on. However, to operate the water wheelers a large amount of human effort is required. The pedals need to be operated and is considered to be fine for amusement purposes. However, other than amusement water wheelers are also used in different areas for crossing the river or lake. In such cases the

pedal operated water wheelers are not a good idea as it requires a lot of human efforts. Additionally the number of people the water wheeler is supposed to

carry is also limited due to the limitations of human efforts. This causes fatigue and hence is a major drawback. On the other hand the water wheelers have an advantage also. They are economical compare to boats or any other medium for transport over the water. This being the reason the proposed project forms a major area of focus as emphasis should be given to development of efficient water wheeler which can cross the lakes and rivers with minimum efforts.

There are lots of human powered boats (such as pedal boats, hydro ski etc.) in swimming pools and other shallow water bodies. These boats are generally used for recreational and competition purposes. They are very often designed based on elementary Archimedes principle. Apart from some of the boats used for competition whose data are often proprietary, the other human powered boats do not undergo careful scientific or technical performance evaluation owing to tight budget for one-off designs without model testing. Consequently, there is a dearth of information and knowledge regarding the performance characteristics of human powered boats.

This project deals with the development of hybrid multimode water wheelers which can be operated by using any of the three modes i.e. the pedal operated, fuel operated and the solar operated. The modes can be changed easily using levers and depending upon the situation the water wheeler can be operated using any of the three modes. Additionally this project focuses on increasing the overall efficiency of water wheelers using split drive system since the proposed water wheeler has single propellers in comparison to multiple one.

Literature review

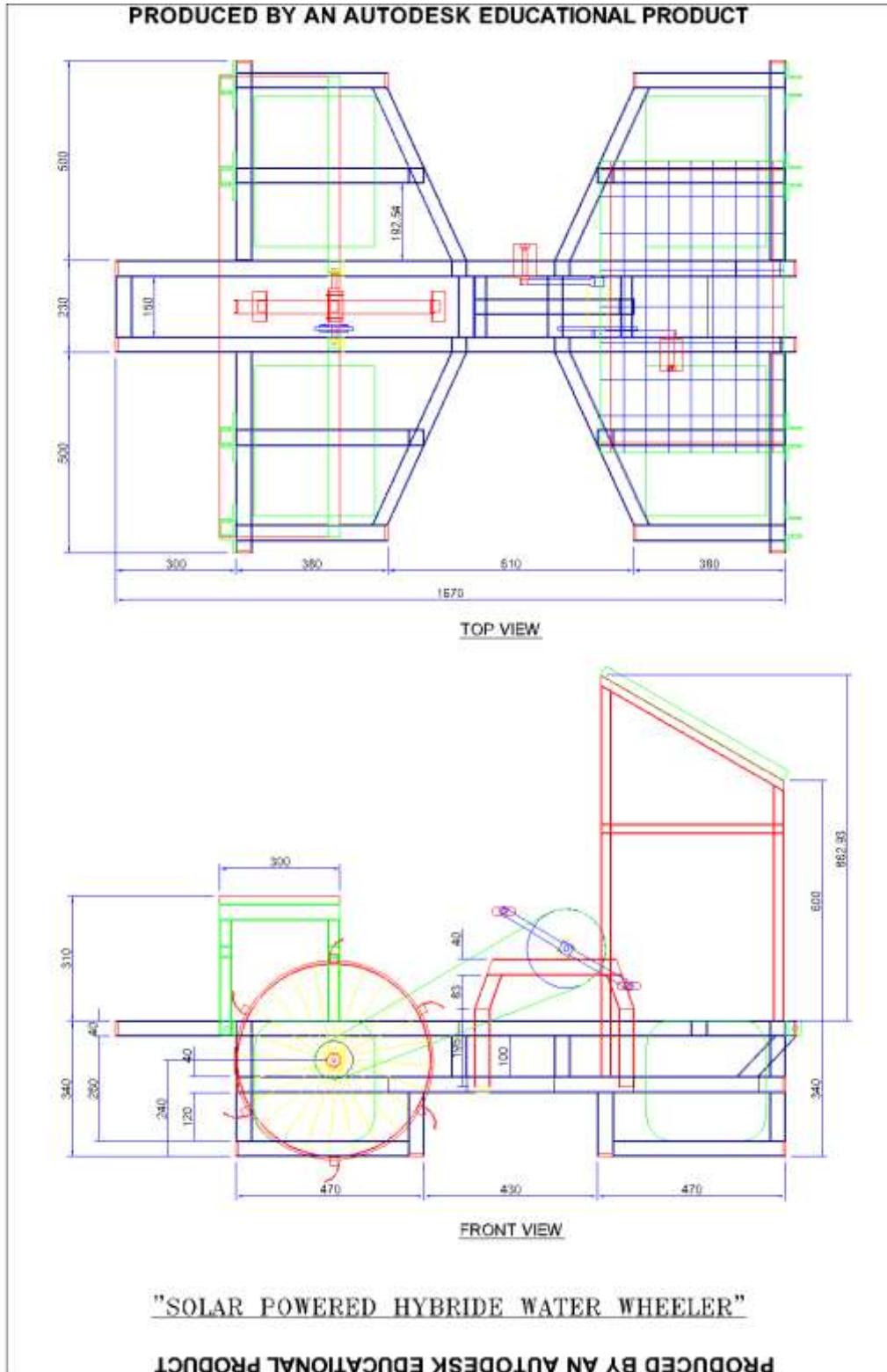
Before we actually start with the project it was important to make market study and understand the current existing systems. With this forming the first phase towards the approach of the project, a number of research papers were studied to understand the currently existing systems. In addition since this is a new topic the amount of data available is very less so a brief study was done over the internet which is documented below.

“Mark Knapp” wrote in his patent that a pedal powered boat that uses a flexible shaft to drive a propeller. By using a flexible shaft, the user seat can be placed lower in the vessel, thereby increasing stability. The device also uses a pair of foot pegs and a ratcheted straight driver, which eliminates standard pedals, with their sweeping circular motion. This straight drive not only increases the efficiency of the lake power, it also converts the rotary action of the pedals to a linear motion that reduces the amount of space required to operate the unit. Thus, the driver unit can be placed under a seat so that it does not excessively intrude into the space of the boat. This invention relates to pedal powered boats and particularly pedal powered boats using a flexible drive shaft. Pedal powered boats have been used for many years in many different situations. Many lakes or ponds in parks have small catamaran-type boats that users pedal leisurely around the pond. Although these boats are fun, they are not very practical, except as amusement. Moreover, it is also highly controllable at low speeds, such as those used during fishing. The operator can stop the boat quickly by not pedaling. Moreover, the operator can move a fair distance by pedaling, while still having full use of his or her hands.

“The British company Water Witch” offers two boats that are especially designed to clean up marine debris. The Buddy Catamaran is a litter retrieval and waterway maintenance boat for marinas, harbors and inland waterways. The Buddy is built from aluminum and designed for ease of operation and low cost of ownership, this road transportable vessel features a removable basket, which can be lifted and tipped directly into a skip or shore side receptacle for disposal. The boat can filter a water surface of 92 x 92 meters per hour. The filter system can be adjusted to collect different sizes of flotsam The Buddy is

extremely adaptable for a huge range of applications ranging from fast response to pollution control needs, to diving and maintenance support. This vessel really earns her keep! The design incorporates a variety of 'pods' that sit between the twin hulls enabling many tasks to be undertaken. The pod system allows heavy items to be loaded directly onto the quayside and lifted onto the vessel via a crane with no need to manhandle the equipment to the water.

Design



Scope and Objective

The main objective of the project is to design and develop hybrid multimode water wheeler which can be operated for transportation over water by putting it in any mode of operation. The objectives of the project are:

- Design and fabricate a water wheeler which can be easily and portably used for transportation over the water medium
- To make the water wheeler hybrid by implementing multiple modes of operation in the same
- To incorporate Pedal based driving systems which can make the machine powered using the pedaling systems
- To implement Engine Drive system which consist of portable engine on the machine which drives the machine
- To make the machine solar powered which will make the machine green and eco friendly
- To implement multiple propellers using split drive system which can provide more power to the machine
- To make the machine economical.

Results and Discussion

Discussion

There are lots of human powered boats (pedal boats, hydro ski etc) in swimming pools and other shallow water bodies. These boats are generally used for recreational and competition purposes. They are very often designed based on elementary Archimedes principle.

Apart from some of the boats used for competition whose data are often proprietary, the other human powered boats do not undergo careful scientific or technical performance evaluation owing to tight budget for one-off designs without model testing. Consequently, there is a dearth of information and knowledge regarding the performance characteristics of human powered boats. This project deals with the development of hybrid multimode water wheelers which can be operated by using any of the three modes i.e. the pedal operated, fuel operated and the solar operated. The modes can be changed easily using levers and depending upon the situation the water wheeler can be operated using any of the three modes. Additionally this project focuses on increasing the overall efficiency of water wheelers using split drive system since the proposed water wheeler has single propellers in comparison to multiple one.

Results

The proposed project is expected to form a hybrid medium for transportation over the water medium. The proposed project is expected to provide the user of the machine with the freedom to choose the medium to operate the machine. The machine can be operated using the pedal based drive train which doesn't require any fuel and requires human effort. This is applicable in silent stable waters such as lakes. For the proposed machine is expected to be implemented on hybrid system which makes it easy to use the power of onboard engine or solar Energy to propel machine.

This is applicable and makes the machine fit to operate in moving water where the flow of water also needs to be considered. Additionally the proposed machine is also expected to be more efficient compared to existing water wheelers since at a time 4 propellers are running.

- The proposed concept can be used to Move across rivers or lakes easily.
- Mode of transportation to cross lakes and rivers
- Can be used by fishermen
- Can be used as an economical alternative to boats

- Can be used to transport materials over the water medium.
- Helpful in flood for rescue and food supply
- New trend setup for upgraded technology.
- Helpful to clean the water from the swimming pools.

Conclusion

In the overall concept we come to know that these water wheelers are most economic and better in performance with the best efficiency. These are leading to be a new trend in the automobiles as water transport.

References

- R. Abd Aziz “Improvement and Optimization of Tyre Nut Removal with 114 PCD”. University Malaysia Pahang, Thesis Degree, 2008
- V. Sarkar “Mechanics of Machines”. Tata McGraw-Hill, 2004[5.] E. Oberg, F. D. Jones, H. L. Horton and H. H. Ryffel (2008) “Machinery’s Handbook 28th Edition”.
- Different nut arrangement, Source: <http://www.wheelfit.edu>
- G.B.S. Narang, “Automobile Engineering”, Khanna Publishers, Delhi, 1991.
- Mechanisms In Modern Engineering Design Vol. V. Part I.

