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## Design Of Water Bicycle

*A.Akhi<sup>1</sup>, SR.Asif Basha<sup>2</sup>, S.Moulali<sup>3</sup>, D.Karthik Kumar<sup>4</sup>, M.Srinath<sup>5</sup>*

Under the guidance of A.Prasad Reddy Assistant Professor & HOD, Department of Mechanical Engineering, Sanskrithi School Of Engineering College , Puttaparthi , Sri Sathya Sai (district),Andhrapradesh,India.

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### ABSTRACT:-

For humans to survive and thrive in the sophisticated, developed world of today, travel is crucial. And in order to accomplish this, he needs to travel as quickly and as little as feasible. From ancient times, humans have entertained fantastical visions of a machine that could move both on land and in water. Bicycles were the first of these devices to be developed; they were actually patented and built with differing degrees of success. An amphibious bike is a mode of transportation that can operate both on land and in water. Most riders use it as an exercise or enjoyment tool. It moves the bicycle by utilising the cycling principle or mechanism.

By cycling on the pedal, individuals will be able to move the propeller that is attached to it. The bicycle will advance in this way. The goal of the current effort is to significantly lessen, if not completely eliminate, some of the more common drawbacks and flaws of earlier art aquatic cycles, as previously mentioned. The focus of this work is specifically on an aquatic cycle that can function both on land and in water, and that has the ability to be amphibious. The current thesis focuses on creating an innovative product called the Amphibious Bicycle. The goal of the current effort is to significantly lessen, if not completely eliminate, some of the more common drawbacks and flaws of earlier art aquatic cycles, as previously mentioned. The focus of this work is specifically on an aquatic cycle that can function both on land and in water, and that has the ability to be amphibious. The goal of this thesis was to create a model of an amphibious bicycle that would facilitate a seamless transfer from the water to the land while being transported.

Subsequently, multiple experiments were conducted on the artificial model to verify its practicability in real-world scenarios.

The bicycle is a special kind of watercraft that combines the well-known idea of a bicycle with the capability of moving over water. Its fundamental idea is to give people a fresh and entertaining leisure experience on the sea. The bicycle is meant to combine exercise with water exploration and is intended for use in leisure, fitness, and possibly tourism applications. It aims to provide users with an eco-friendly way to navigate aquatic bodies with a focus on eco-friendly interaction.

Its versatile design makes it suitable for a wide range of uses, from leisurely rides to instructional initiatives and even competitive water sports. The bicycle is a multipurpose and entertaining mode of transportation that encourages people to pedal across aquatic areas and promotes awareness of aquatic ecosystems. It does this by combining a unique blend of entertainment and practicality.

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**Key Words:-** Travelling, Fitness , Ecofriendly

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## I – INTRODUCTION

Man has, since early times, conceived in fanciful illusions of a device that would travel on both land and water. Such devices were soon created in the form of bicycles and were in fact patented and constructed with varying degrees of success. Early works bear evidence to man's such early desires. Devices such as these, though illustrating a reduction to practice of man's interest, fell far short of a both practical and commercially feasible cycle construction. Such devices were, for example, incapable of aquatic guidance. Aquatic stability was hazardous. Deployment of pontoons and retraction thereof upon re-entry to land was complex, time consuming, and frequently frustrating. Moreover, mobility in the water was unsatisfactory as power transmission mechanics was crude and inefficient. In addition to all these shortcomings, few if any of the prior art aquatic bicycles were capable of either or both land and water operation and by no means could they, in reality, be considered so readily convertible as to be termed "AMPHIBIOUS". It is with these shortcomings in mind that we were conceived, in the form of the present project, an Water Bicycle. Water Bicycle is a means of transportation that can move on both land and surface of the water. Usually people ride it for entertainment or exercise purpose. It applies the cycling principle or mechanism to move the bicycle. People will cycle on the pedal and this will move the propeller (Blades) which is connected with it. By this, the water bicycle will move forward. This project is proposed in order to design the bicycle that use for the travelling and can be used in short distance. The designing of the bicycle is included of the frame design, pedaling , plating system with disc & casing pipe for sailing of bicycle and the riding comfort for the rider. The design is done in group but with separate task and objective, which is each of people done different parts for the bicycle.

Here's a basic introduction to how water bicycles work:

#### **Frame:**

Like a regular bicycle, a water bicycle has a frame that supports the rider and holds all the components together. This frame is often made of lightweight and corrosion-resistant materials like aluminum or stainless steel to withstand exposure to water.

#### **Propulsion:**

Water bicycles are propelled by pedaling, just like a traditional bicycle. The pedals are connected to a propeller or paddle wheel located beneath the waterline. As the rider pedals, the propeller or paddle wheel spins, pushing the water backwards and propelling the bike forward.

#### **Steering:**

Steering mechanisms on water bicycles which helps us to change the direction of the water bicycle vary depending on the design. Some models use a rudder system similar to those found on boats, which is controlled by a handlebar.

#### **Uses:**

Water bicycles are popular for recreational use on lakes, rivers, and calm coastal waters. They offer a fun and eco-friendly way to explore the waterways while getting exercise at the same time. Some water bicycles are also used for eco-tourism, allowing riders to observe marine life up close without disturbing the environment.

Overall, water bicycles provide a unique and enjoyable way to experience the water, combining the simplicity of cycling with the tranquility of being on the water.

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### **Water Bicycle Functions are:**

- **Transportation:**

Water bicycles perform as a mode of transportation across of water bodies means like boats might not be available or practical. The water bicycle can be used for shortest distance travel, especially in places such as lakes, rivers, and canals.

- **Recreation:**

One of the primary functions of water bicycles is to create the enjoyment. The water bicycle offers a entertainment and engaging way to explore the water bodies, providing riders with a unique environment of their surroundings. Whether it's cruising along a shoreline, navigating through water trails, or simply enjoying a leisurely ride, water bicycles enhance recreational experiences on the water.

- **Exercise and Fitness:**

Riding a water bicycle provides a low-impact cardiovascular workout. Pedaling engages leg muscles, improves cardiovascular health, and also improves the muscle strength and also helps the human body fit and enhances overall fitness levels. It's a one of the form of exercise suitable for people of various aged people and fitness levels, making it an appealing option for those seeking outdoor activities that promote health and wellness.

- **Eco-friendly Transportation:**

Water bicycles are environmentally eco - friendly as the water bicycle operates only on the basis of human power, and also does not require any fuel or electricity. This aspect with the growing interest in sustainable transportation options and eco-tourism initiatives.

- **Tourism and Sightseeing:**

Water bicycles serve as a platform for tourism and sightseeing activities. The water bicycles enable tourists to leisurely explore scenic areas, observe wildlife, and access points of interest along coastlines, lakeshores, and rivers. Water bicycle tours may be guided or self-guided, providing opportunities for immersive experiences in natural and cultural environments.

- **Water Rescue and Lifesaving:**

In some cases, the water bicycles are used for water rescue and lifesaving operations. Their maneuverability and relative speed make them suitable for reaching individuals in distress or navigating shallow waters where traditional rescue boats may have difficulty accessing. Water bicycles equipped with rescue-specific features like lifebuoys or emergency communication systems can serve as valuable assets in emergency response situations.

## II- DESIGN OF WATER BICYCLE

Design of the model for amphibious bicycle can be done by making such attachments in the normal bicycle which should not cause any hindrance while running on land and should support smooth motion in the water. As per the design aspects few things should be primarily taken care of like buoyancy forces exerted by water on the body and easy handling of attachments. After number of brainstorming sessions, we finalized a design which has four different sections to be designed like Front float, Rear float, Frame and Blades.

Design of Bicycle:

When Bicycle will be taken in water then buoyancy force will acts over it. To balance the weight of the body one float on each side of bicycle should be attached. However, while running in the water, some provisions (Blades) are required for forward motion of the bicycle.

Hence, taking care of all these aspects design of proposed model is divided into three different sections as:

1. Shape of Float
2. Design of the Float
3. Design of Blades

### 1. Shape of Float:

Before finalizing the dimensions of floats, consideration of the shape of the floats is obvious. Thus we know while running vehicle in land or water some drag force will act on floats, to minimize this resistance to motion of the bicycle, aerofoil shape bodies are the best but due to manufacturing difficulties, we selected triangular shape at the front edge of the front float.

### 2. Design of the Float:

For finding the dimensions of the float, it should satisfy the Archimedes's Principle of buoyancy which stated that "Any object, fully or partially immersed in a fluid, is buoyed up by a force equal to the weight of the fluid displaced by the object.

### 3. Design of Blades:

Blades are attached on the spokes of rear wheel to provide the motion in forward direction while running on the water. To design the blades we made one assumption that Air drag and friction/viscous/skin drag are negligible in comparison to the pressure/form drag.

### ***Fabrication of Frame:***

To attach the floats to the bicycle wheels some special attachments /frames are required to be fabricated. These attachments should be such that they withstand the load while running in land or on the water. Initially we tried with a simple frame made up of steel rod of diameter 6 mm. to reduce the overall weight of the frame. But it got failed while running in the water because strength of the rod used in frame, was less and could not counter the forces exerted on it. Hence, frame got bent and redesigning of frame was needed at that point.

### ***Fabrication of Blades:***

As designed in the proposed model some blades of special cross section were required for the forward motion (Propulsion) of the bicycle in the water. Blades should be attached over the spokes of rear wheel. Blades should be fixed such that while running the bicycle inside the water, it should not rotate.

G.I sheets have sufficient strength to sustain the drag force while running inside the water, so blades were easily manufactured by the G.I. sheets of designed cross section of proposed model. Blades were fastened with the help of screw and nut over the spokes of rear wheel rim, just attach to the rim from one side.

As shown in the fabricated blades were designed in trapezium shape to balance the drag force over the body. Blades gave the forward motion to the bicycle while running in the water

### ***Bicycle Water Test:***

Before going for the final testing inside the running water, we have to check it once that bicycle should float on the water. During this floatation test, bicycle should also remain stable so that it could balance the weight of the whole body (proposed model).

To conduct this test we immersed the bicycle in the water and leave that. After some time it was stable and float on the water as shown in the below figure.



#### Bicycle Driving Test On The Water:

Hence at the end we can say that proposed model can easily move on the land as well as on the water also. In this way proposed model satisfies the main objective of the work, i.e. smooth transition of bicycle from land to water during transportation.



#### Bicycle Driving Test On The Road:

It was the major part of the testing on the model to conduct the driving test on the model fabricated. This test was conducted into two steps as initially it was tested on the land followed by testing it in the water. As shown in the figures 4.2 and 4.3, it was smoothly running over the land and water.



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### III-WATER BICYCLE IN DIFFERENT VIEWS

Water Bicycle different type of views :

#### Front View:

In this front view of the design of the water bicycle shows us the frame of the bicycle and also the casing pipes. The frame is used to absorb the force and does not reflect on the bicycle. The casing pipes used to float the bicycle.





Side View:

The side view of the bicycle shows us the bicycle , the casing pipes and also the rim of the cycle which has the plates. The casing pipes used to float the bicycle.The plates used to move the bicycle by moving the water.The rim is connected to the back tire of the chain which changes the direction of the bicycle.



Back View:

The back view of the water bicycle shows us the casing pipes,plates with rim and the bicycle. The casing pipes used to float the bicycle.The plates used to move the bicycle by moving the water.The rim is connected to the back tire of the chain which changes the direction of the bicycle.



Top View:

The top view of the bicycle shows us the casing pipes,plates with the rim and the bicycle. The casing pipes used to float the bicycle.The plates used to move the bicycle by moving the water.The rim is connected to the back tire of the chain which changes the direction of the bicycle.



#### IV - PROJECT IMPLEMENTATION

The main reason to design the bicycle is to overcome the problem with the pollution and with the economy. Future bicycle is the best technical application and best solution for the better world and upcoming generation middle class and lower middle class families. This bicycle is offered in low cost only.

The water bike is a pedal operated vehicle that is very economical with low maintenance cost, less pollution and eco-friendly in nature. Bicycles are attractive in nature and look like a bicycle but have an aquatic experience and provide an environmentally friendly, fun, efficient and convenient way to travel. Bicycles are driven with the help of pedals and it has plates connected to chain drive to move the bicycle.

#### V RESULT & CONCLUSION

The bicycle project is taken to overcome the problems faced by the poor people in flood zone areas and also people living in the forest regions. This bicycle project was made in the view of economical factors and is made so as to be easily accessed by any people from India and also in the world. India is the country which is rich in monsoon. There are various parts in India that receive more rainfall and get floods due to more rains. The more percentage of people in India lies below the poverty line and as to face major problems during any of such kind of disasters and natural calamities. During floods more people in the Indian community has to suffer from breakdown of transportation services. In case of floods generally boats are used and no solution as such has come up to overcome the problem. This solution is one of its kind and far better than rowing boat amidst floods. The bicycle can provide solution to this problem. An bicycle is a multi purpose vehicle which is used to navigate in water and run on land. It can be a main vehicle for the poor people who are in the flood prone regions. In the last few years, the frequency and intensity of floods have thoroughly increased in India. Due to the crippled transportation means caused by floods the evacuation process becomes quite difficult and sometimes barely impossible. The bicycle can be proved an ingenious, economically viable and easily available solution.

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