

AMPHIBIAN BIKE WITH FLOATING CHASSIS – A REVIEW

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ABSTRACT

According to the current scenario people are more liable on transport accommodation due to which the demands of vehicles are being increased day by day. Due to rise of urbanization and rapid increase in technology many new designs of vehicles are landed on the platform and its craze is gradually increasing. Thus, in order to be in the line of innovative vehicle design a concept has been followed so that to join two modes of transport with a single rope. This can be achieved by the help of “Amphibian Bike” in which the chassis is being designed in such a way that it can move both on land and on water. Various driving mechanisms are being setup in order to loco mote the bike on water as well as control its direction. Thus, blades are being setup which is being driven by the bike engine. This type of vehicle could become a dual mode of transport and can be used during an emergency such as flood or for performing routine work easily. Moreover, such setup is cost efficient and can be easily framed with any bike without any difficulty.

Keywords: Amphibian, Blades, Modified rear hub, Steer, Chassis

I.INTRODUCTION

Hearing the word of “bike” the first thing comes to our mind is that it is use as a mode of transport that can only run on road. A motorcycle often called a bike, motorbike, or cycle is a two or three-wheeledmotor vehicle. Motorcycle design varies greatly to suit a range of different purposes such as long distance travel, commuting, cruising, sport includingracing, and off-road riding etc. Many works were done on amphibian vehiclessuch as amphibian bicycle, cyclomer, quadski bike and the trend is being continued. [1]Amphibian means a vertebrate which lives on land and in the water. By using this concept, a common mode of transportis being provided for benefits of people live in remote areas and people stuck during floodsituation. Thus, proper frame is being designed on SOLIDWORK in order to get closer to the accurate result. For locomotion of the bike proper blades are given followed by shaft with end bearings as well as steering blade is provided for controlling the direction. Overall setup can be provided to any bike thus by achieving such setup leads to cost efficiency.

II.HISTORY

The first known self-propelled amphibious vehicle, a steam-powered wheeled dredging barge, named the Orukter Amphiboles, was conceived and built by United States inventor Oliver Evans in 1805, although it is disputed to have successfully travelled over land or water under its own steam. Inventor Gail Borden, better known for condensed milk, designed and tested a sail powered wagon in 1849. On testing it reportedly tipped over 50 feet (15 m) from shore, from an apparent lack of ballast to counteract the force of the wind in the sail. In the 1870s, logging companies in eastern Canada and the northern United States developed a steam-powered amphibious tug called an "Alligator" which could cross between lakes and rivers. The most successful Alligator tugs were produced by the firm of West and Peachey in Simcoe, Ontario. Until the late 1920s the efforts to unify a boat and an automobile mostly came down to simply putting wheels and axles on a boat hull, or getting a rolling chassis to float by blending a boat-like hull with the car's frame [2]. One of the first reasonably well documented cases was the 1905 amphibious petrol-powered carriage of T. Richmond (Jessup, Iowa, USA). Just like the world's first petrol-powered automobile (1885, Carl Benz) it was a three-wheeler. The single front wheel provided direction, both on land and in the water. A three-cylinder petrol combustion-engine powered the oversized rear wheels. In order to get the wheels to provide propulsion in the water, fins or buckets would be attached to the rear wheel spokes. Remarkably the boat-like hull was one of the first integral bodies ever used on a car. In Paris 1932, the "Cyclomer" was introduced which was intended to be used as an amphibious cycle containing hollow wheels and floats.

Later on the maiden voyage of the BARC (barge, amphibious, resupply, cargo) was at Fort Lawton, Washington in 1952. The four experimental BARCs were built by LeTourneau, which makes equipment much larger than the BARC, including off-shore oil drilling platforms. The BARC was designed to carry a 60-ton tank or fully equipped infantry company from ship to shore or back where there was no fixed port. Its empty weight was 97 1/2 tons. Its four tires were nine-and-a-half feet in diameter. It was 17-and-one-half feet high and powered by four 265 horsepower GMC marine diesel engines. Each engine drove one wheel on land. The two engines on each side of the BARC coupled to drive one of the twin propellers in the water. Top speed was 20 miles an hour on land and seven-and-a-half miles an hour in the water. The name was changed to LARC (Lighter, Amphibious, Resupply, and Cargo) in 1960.

Since the 1920s many diverse amphibious vehicles designs have been created for a broad range of applications, including recreation, expeditions, search & rescue, and military, leading to a myriad of concepts and variants. In some of them the amphibious capabilities are central to their purpose, whereas in others they are only an expansion to what has remained primarily a watercraft or a land vehicle. The design that came together with all the features needed for a practical all terrain amphibious vehicles was by Peter Prell of New Jersey. His design, unlike others, could operate not only on rivers and lakes but the sea and did not require firm ground to enter or exit the water. It combined a boat-like hull with tank-like tracks. In 1931 he tested a scaled down version of his invention. [3]

III.LITERATURE REVIEW

Moraga's Cycloet al. (5 June 2008) studied on amphibious vehicles and uses a simple tricycle frame to support which provide both the floatation and thrust. The wings on the powered wheels propel the vehicle in a similar way to a paddle wheel.[4]

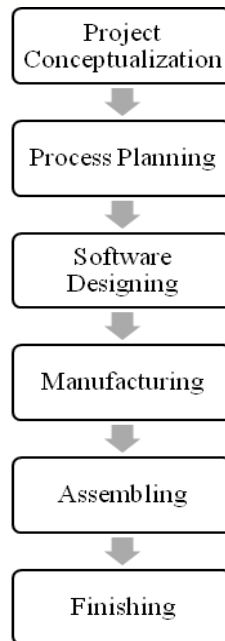
Prof. P. S. Shirsath et al. has given an idea in his paper regarding amphibian vehicle and performed a detailed study on it, further he proposed a method for fabricating an amphibian car. Finally he concluded that the speed of the amphibian car was same in water as that of the normal car running on road.[5]



Fig 1: Amphibian Bike [1]

IV.METHODOLOGY

In remote areas, it is difficult for everyone to cross the river with single mode of transport and during flood situation people who got stuck in there are not able to go their routine work. There is a need of convenience to move on road as well as over water efficiently with few modifications. Thus, the respective idea consists of a bike (small capacity engine) with floating chassis (removable) which is able to move on road as simple bike as well as over the water as like motorboat. The bike consists of floating chassis, blades, modified wheel hub (rear) and additional chain sprocket set. To move on road, it uses simple bike concept and to move over water it uses the chassis (frame connected to bike chassis) to support bike, modified hub which consists of additional sprocket to transmit power, blades to move the bike over water, steering to steer it. The objective of this idea is to provide common mode of transport which would be able to move on road and over water with small capacity bike engine. This bike is easily maintainable and economical as compared to motorboat.



The “Amphibian Bike” is a motorbike with some modifications in chassis that floats and has two wheels which can be converted at the touch when it has to be driven into the water. The chassis in this bike is being placed in such a way that it does not get affected when placed in water. The whole chassis is being design so that it can be able to move on land and in water easily. The body is covered with galvanized steel sheet and in order to provide direction a flat blade is being attached at rear end. This idea consists of bike (Discover 135cc 2007) with modified hub, chassis (frame connected to bike chassis), shaft containing blades and steering system to steer the bike over water. The “amphibian bike floating chassis” moves on road as simple bikes move but rear wheel is modified and additional sprocket is connected to this modified hub. The additional sprocket is used to drive shaft through chain and shaft containing blades. As blades moves, bike moves forward over water. As it is known, the bike engine is more efficient as well as economical as compared to motor boat engine. One of the more benefit of this amphibian bike is all parts are connected with help nuts & bolts and easily removable. Thus, if not necessary then one can easily remove the setup and can drive just like a simple bike[6].



Fig 2: Sprocket adjusted at rear wheel for driving blades & front view of bike



Fig 3: Blades aligned on a shaft and mounted by the end bearings

V.COST

S.NO.	List of Parts	Cost
1.	Bike	17500
2.	Frame	3000
3.	Blade	1500
4.	End Bearings	500
5.	Shaft	500
6.	Sprocket	750
7.	Sheet Metal	2400
8.	Paint & Polish	600
9.	Other Accessories	300
10.	Labor Cost	1450
	Total	28500

VI.FUTURE SCOPE

This type of vehicle can effectively be used in an emergency such as flood for rescuing purposes. It can also be used by various NGO's in order to provide food and other basic needs to the people who are being stuck in flood. Being from Gorakhpur it has been seen that during the flood emergency near its boundary villages, boats are been rented from the places such as Allahabad, Varanasi etc. Due to which heavy loss of life and property are encountered so by having such type of vehicle it can be reduced. Moreover, following advantages are also added up:

- Used in an emergency during flood.

- Due to the effect of flood many bridges are also damaged due to which travelling is not possible so this type of vehicles can be used.
- Used for patrolling near coastal areas.

VII.CONCLUSIONS

Amphibian Bikes can be used for multipurpose and this technology can be implemented in cars after future modifications. Having this type of vehicle is beneficial for the Government as well as for the common people. This bike is practically possible if the weight and shape of it is being accepted by the buoyancy force exerted by water. Since the shape of boat is designed in such a way so that it can easily cut the layers of water and moves further therefore the shape of the bike is also up to the mark.

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