

A STUDY ON OUTDOOR ELLIPTICAL CYCLE

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ABSTRACT

A trend for design customization of cycle is developing in recent years. During the development phase, a proper surveillance is to be given for the comfort of ride on the cycle. In this study, the concept is to design the cycle frame in such a way that it is of the right shape and size w.r.t ergonomics to fit the human body. Key features of the cycle are frame design, material used, riding posture, various test performed are also discussed below. Further, in this study a detailed methodology is given to help the designer to making it economical as well as efficiently for elliptical cycle. From the viewpoint of ergonomics, the concept of "fitting object to the human body" is designed into the cycle frame in this project. Firstly the important feature points like frame design, wheel size, materials required, method of fabrication and troubleshooting are discussed.

Keyword: Elliptical cycle, frame, ride, economical, ergonomics.

1. INTRODUCTION

A cycle, often called a bike or cycle, is a human-powered, pedal-driven, single-track vehicle, having two wheels attached to a frame, one behind the other. The cycle has undergone continual adaptation and improvement since its inception. This cycle is an elliptical cycle. By developing the elliptical trainer motion and combining it with the functionality of a cycle, the elliptical cycle delivers a high performance workout experience that closely mimics running outdoors while eliminating the impact. It gives the most comfortable, fun and efficient way to get out and stay active. Also it gives the natural atmosphere as we ride in outdoor atmosphere. This cycle is perfect for anyone who wants to get a great cardiovascular workout outdoors without damaging their body. It is particularly well-suited for runners who want to enjoy a running-like experience while giving their knees and joints a break from the wear and tear caused by running. This cycle is also ideal for cyclists who want to get the experience of cycling without the discomfort caused by sitting on a conventional bike seat or riding in a hunched-over position. This cycle is easy

to ride and more stable than it looks. Riding an Elipti Move requires the same amount of balance as is required to ride a traditional bike or scooter. Like anything new and different, it takes some getting used to, but we've found that most people get comfortable within 5 minutes of riding it. A cycle further referred as either bikes or cycles. Being the most common thing to be seen in India, as it is cheap and efficient for many people in the country. It is human driven, pedal driven Cycles can be divided into many different types: by function, by number of riders, by general construction, by gearing. The most common ones include utility bike, mountain bike, racing bikes, touring bikes, hybrid bikes cruiser bikes, and BMX bikes. Cycles of a rarer types are tandems, low riders, tall bikes, fixed gear, folding models, etc. 99% of the energy produced by the rider is transferred from body to pedals and further transmitted to the wheels.

1.1 Problem Statement

- Exercise is the need of today's fast food generation
- Obesity is also main problem of this generation for this we are working on a cycle.
- We selected outdoor type because indoor gym is quite boring, as outdoor cycling gives us fresh air and enhances our experience by natural surroundings
- This cycle is pollution free and does not require any fuel.

1.2 Objectives

- To design out outdoor elliptical exercise cycle.
- To design interactive display to show calories consumed.
- Develop cost effective cycle.
- Testing and analysis of cycle.

1.3 Scope

In this project, we present an approach that solves the problem by offloading the low-level cognitive requirements from a biker to her cycle. To support this approach, we enhance a standard cycle with sensing and computational capabilities to create a Cyber-Physical cycle system. The core goal of this system is to provide accurate and timely detection of rear approaching vehicles to alert the biker of the pending encounter, through the cross-cutting application of mobile sensing, computer vision, and audio processing techniques. Most of the people use fitness equipment's for workouts and to stay fit, however as the fitness equipment's are placed in closed/confined spaces, unfortunately the user ends up working out in an artificial environment and misses the opportunity to explore the nature.

2 LITERATURE REVIEW

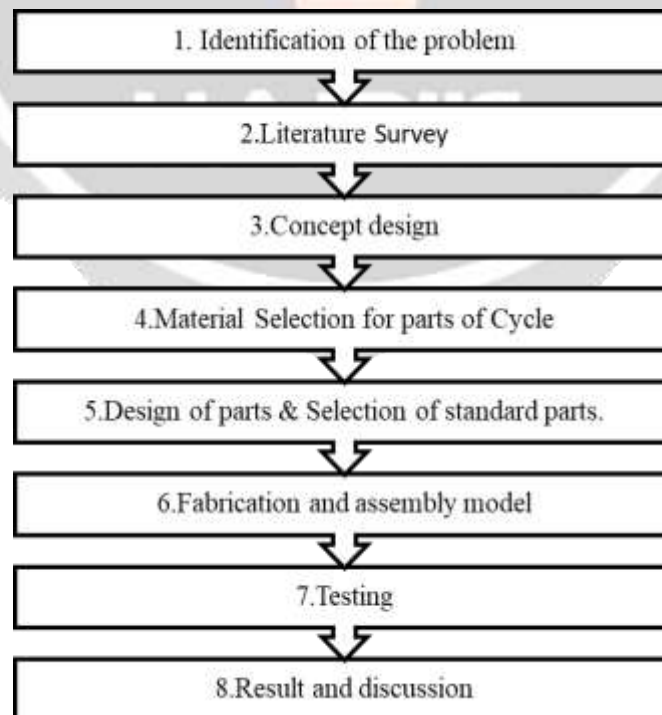
Dr Swapnali Ravikiran Kisan et al, Treadmill Bicycle is one type of bicycle in which a man walks on the treadmill and then treadmill moves backward. This motion of treadmill actuates the electric motor and motor rotates the shaft of rare wheel using chain drive and battery. The motion of treadmill bicycle is depend upon the human efforts so it is also called as walking bicycle. In multipurpose treadmill bicycle we are going to attach a reciprocating pump for pumping the water. Reciprocating pump pressurise water. Multipurpose treadmill bicycle consists the parts like wheels, treadmill, battery, dc motor, chain drive, reciprocating pump. [1]

L. Schwab. "Experimental validation of the lateral dynamics of a bicycle on a treadmill." Treadmill Bicycle treadmill bicycle can be used in place of regular bike at cheaper cost and without use of fuel. The treadmill bicycle will prove to be a future vehicle as no fuel is used for travelling through this and it is pollution free. The treadmill which is used for walking helps to keep us fit as exercise is also one of the important tasks for a person to be fit and healthy for day to day life. Treadmill is cheaper than the normal bike which also makes it efficient and in this treadmill bicycle we can use reciprocating pump for giving water to plants and gardens as well as this can be used for transportation purpose also. [2]

V. R. Gandhewar et al, In ancient days the concept of treadmill was invented for generating mechanical energy with the help of animals such as horses, dogs, etc. The first treadmill was introduced by the Roman Empire for heavy loading like conveyor belts which we use in industries. Some of these inventions required electric power for initial torque. After studying the history of treadmill bicycles we get an idea to develop a new concept of treadmill which will be manually operated so that no external energy source is required to run the treadmill bicycle. Our main objective while developing this concept is 'A Treadmill with more outputs in less time along with surface cleaning'. There has been a great deal of research on this treadmill bicycle fabrication. The origin and use of the treadmill bicycle system began from several years ago and developed throughout the new concept revolution. At the late first century AD the Roman Empire introduced the first treadmill, as they needed to lift heavy weights they incorporated this new invention. [3]

Prof. P. R. Gajbhiye et al, Exercise is inevitable to keep health in good status. In this project we study the treadmill exercise outdoors and their effect on health. Also we enlisted the advantages and disadvantages of treadmill cycle exercise. One of the most popular types of home as well as outdoor exercise equipment is the treadmill cycle, which provides a straightforward, efficient aerobic workout. For many, treadmills are a good choice to begin a new exercise routine because walking is well tolerated by most individuals regardless of fitness level and for most back conditions. As strength and endurance are developed, the treadmill bicycle can be used for jogging or for interval training. [4]

3. METHODOLOGY



4. DESIGN

4.1 2D Drawing:

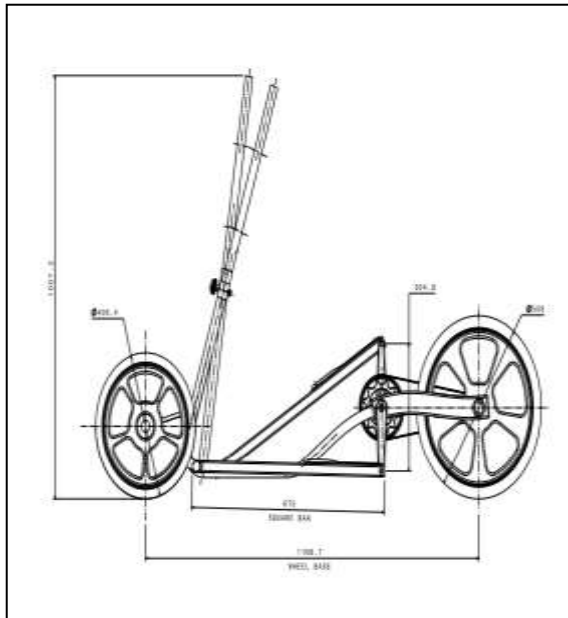


Fig-1: Side View (CAD)

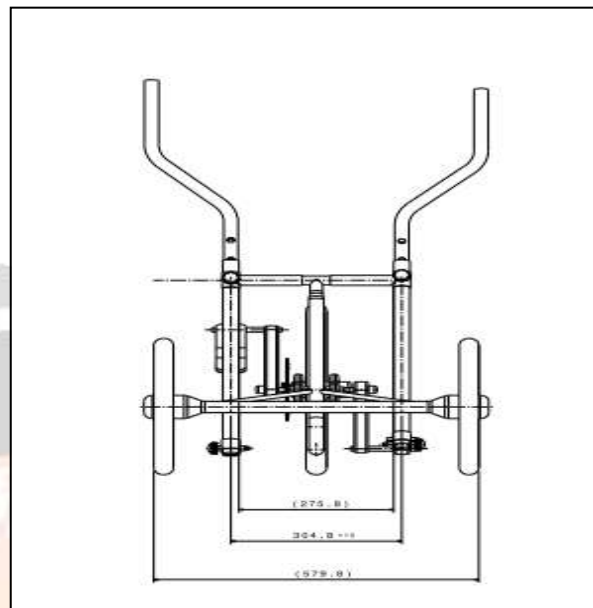


Fig-2: Front View (CAD)

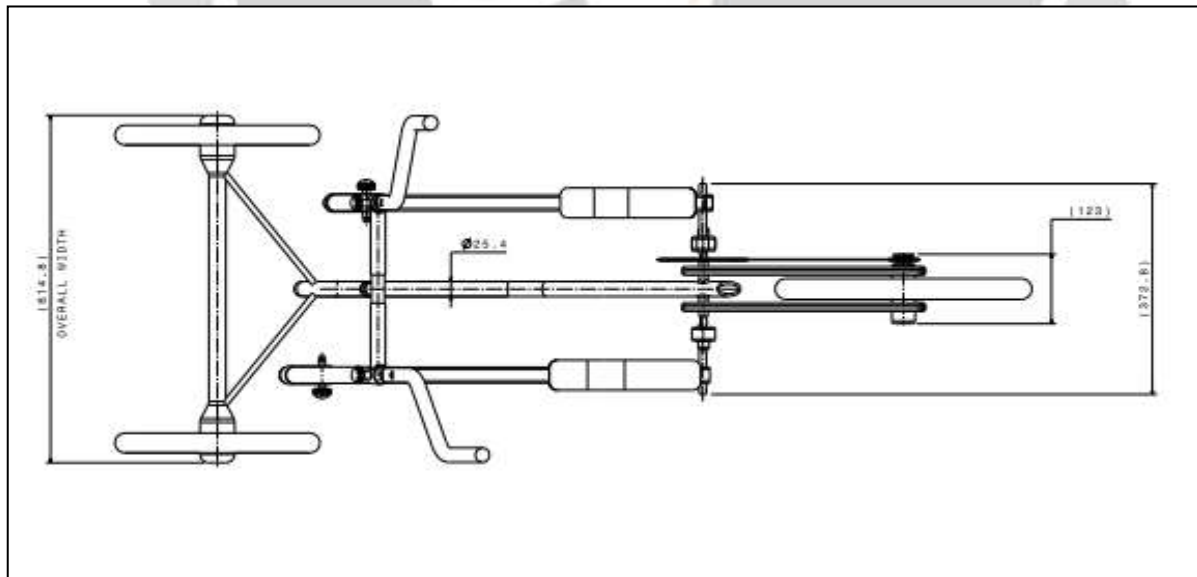


Fig-3: Top View (CAD)

4.2 3D Modeling



Fig-4: 3D View (Solidworks)



Fig-5: Side 3D View (Solidworks)



Fig-6: 3D Right View (Solidworks)



Fig-7: 3D Left View (Solidworks)

Table no. 4.1- Cost Estimation Report

Sr. No.	Name of component/operation	Qty.	Rate per Piece(Rs.)	Total (Rs.)
1	Chain wheel set	1	250	250
2	Free wheel	1	40	40
3	Chain	1	55	55
4	Tyre(20")	2	135	270
5	Ring (20")	2	170	340
7	Handle set	1	150	150
9	Brake cable	1	50	50
11	Bottom axle	1	40	40
12	bearing (1/8)	4	10	40
13	Fork set	1	60	60
14	Bottom	1	50	50
15	Brake Clamp	1	120	120
16	Rollers	4	90	360
17	MS Pipe (round) 1 inch	3 ft		360
18	MS Pipe (square) 1 inch	15ft		450
19	Bending Operation (pipe)	15ft		2100
20	Fabrication charges	-	-	3000
21	Custom Paint Job	-	-	500
22	Miscellaneous Charges	-	-	500
	TOTAL			9610/-

4.3 Advantages

Reduced cardiovascular disease, weight control, Reduced stress, improved strength, improved lung function, Low impact, It's cheap. It's sociable.

4.4 Limitations

1. It is Seat less Cycle, we have to drive it in standing position and because of this we cannot drive it to long distances.
2. As wheels are small high speed is restricted.
3. It is totally manually operated
4. Not fit for long distance and hilly areas travelling

4.5 Applications

1. Fitness and gym,
2. Those who are interested in evening walks.
3. Automobile application.
4. Two wheeler Application.
5. Light vehicle.

FUTURE SCOPE

In India, there is lots of scope for bringing innovations that already exist in other parts of the bicycling world. Few of them:

1. Internal hub gearing
2. Shaft drives
3. Concealed brakes (no more wires jutting out)
4. Automatic gears (yes, for bicycles - detects the change in force of pedaling and switches gears automatically to a more comfortable cadence)
5. Folding bicycles (there are few stores that sell some outdated models, but prices are in the range of INR 20K - INR 50K which is pretty absurd. Lots of scope to manufacture these locally or increase import efficiencies. BSA had a Foldman model long time back, but quality wasn't up to the mark nor was the market ready for it then)
6. Motorised / hybrid technology.

CONCLUSION

The Outdoor Elliptical Cycle is basically a combination of an ordinary bicycle and an indoor elliptical cycle that is used for workout. This project gives the user an elliptical training motion by combining it with the practicality of a regular bike. This cycle delivers a high performance workout that mimics the outdoor running action by eliminating the impact on knees of the user. It provides the most convenient, fun and efficient way of cardiovascular workout. The pedaling action will occur in an elliptical pattern rather than a circular one in that of a normal bicycle. This basically helps in targeting the different muscles of our legs.

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