

THE WALKING BICYCLE

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ABSTRACT

This paper deals with conversion of a conventional bicycle into treadmill bicycle. In this bicycle the frame of the bicycle is completely modified and the treadmill is placed in between the two wheels, on which user will walk. As the user walks or runs on the treadmill the belt moves to the rear by which we can get the motion of wheel and bicycle runs. The Walking Bicycle is a new way of moving. It is a fun and Eco- Friendly way of transport in affordable price. The idea behind this bicycle is how we can use treadmill outside the Gym. We aspired to build The walking bicycle that is faster than walking and easier to ride than a conventional bicycle. In this Walking bicycle the frame of the bicycle is completely modified ie. the cycling pedals are replaced with a treadmill. When you are walking on the treadmill, you push the treadmill backward with your feet and you move forward.

Keywords:- Pollution Free Bike, Tread Mill, Walking Bike, Sprocket, Chain, Treadmill Belt, Gear

I. INTRODUCTION

Exercise is advised for health promotion, and prophylaxis for many cardiovascular diseases and also for rehabilitation after an episode of disease. Among the exercises aerobic exercises are appropriate for these purposes. To do aerobic exercise many methods are available for example: running, jogging, walking, cycling and others. Among different modes of exercises in the modern busy life, the cycling and treadmill exercises are the commonest to perform as indoor aerobic exercises. In motor driven treadmill exercise which is similarly to walking or jogging or running depending upon the speed of the treadmill is becoming more familiar to all. Thus we made an innovation to take that treadmill in park. This is nothing but having a walk in a park.

II.LITERATURE REVIEW

Dr.Ravikiran Kisan, "Treadmill and Bicycle Ergometer Exercise Cardiovascular Response comparison" Global Journal of Medical research Volume 12, Issue 5, Version 1.0, June 2012, page no. 23-26 studied that Exercise is inevitable to keep health in good status. There are few scientific studies to show the differences between different types of exercises in health and disease. In our study we compared the treadmill exercise and bicycle ergometer exercise and their effect on maximum heart rate attained, systolic blood pressure and diastolic blood pressure in twenty one healthy volunteer aged between eighteen to twenty years. We recorded this subject's blood pressure before exercise and after exercise; heart rate before exercise, during exercise and after exercise. Also we enlisted the advantages and disadvantages of treadmill exercise and bicycle ergometer exercise, so that these two types of exercise can be appropriately used for health promotion, diagnosis of diseases and for rehabilitation of the individuals. From this observation we can conclude that treadmill is more

preferable than bicycle. As while doing exercise of treadmill the heart rate of normal human being increase up to **162 bit/min** and in case of bicycle it is up to **130bit/min**. speeding up the heartbeat allows blood to flow quicker and more efficiently to the muscles that need the nutrients and oxygen it carries. Furthermore, in the long term, raising your heartbeat through exercise has many beneficial effects on health.

Dr. Amanda Willis (Bachelor of Science in health science and doctoral degree in physical therapy at the University of central Arkansas) had studied that people tend to burn more calories on a treadmill than a bike. This is because on a treadmill you are weight-bearing and you are more likely to move your arms and torso. This in turn means more muscle activation and more calories burned. On recumbent bikes, the upper body is usually inactive. Bikes that are upright with moving arm handles do get the arms and torso moving, but they still don't offer the benefits of full weight-bearing as provided by the treadmill. This is not to say that you couldn't burn as many calories on a bike; you will just have to work a little harder by turning up the intensity level on the bike.^[8]

Biking Cycling offers efficient, low-impact exercise for millions of Americans. It is a good cardiovascular exercise that strengthens leg muscles as well as the stabilizing muscles of the core. The repetitive knee motion, without constant impact, is especially good for arthritic knees because it encourages the production and flushing of fluids through the joint, lubricating it and washing away waste products. Cycling while seated is relatively non-weight bearing and it does little to promote bone density, so a weight-bearing activity should be added to your total fitness program. Helmets are essential for both experienced and inexperienced riders to reduce the risk of serious head injury in the event of a crash.

Prof. Shivaji Bhandarkar “Vehicular Pollution, their effects on human health and mitigation measures” Volume 1 Issue 2, June 2013 page no. 33-40 had studied emission from vehicles especially automobiles is responsible for about two third of air pollution in the urban area. The major pollutants emitted by motor vehicles including CO, NO_x, Sulphur Oxides, (SO), HC, Lead (Pb) and suspended Design and fabrication of treadmill bicycle particulate matter (SPM), have damaging effects on both human health and ecology. The internal combustion engines need a mixture of air and fuel to burn and produce energy to propel the vehicle. These burnt gases which come out of the exhaust are responsible for pollution. In petrol engines, the gases comprise a mixture of un-burnt hydrocarbons (HC), Carbon Monoxide (CO) and Oxides of Nitrogen (NO_x). If these gases are in excess quantities, vehicular pollution is caused. Emissions of Diesel vehicles are the concentration of CO and un-burnt HC in the diesel exhaust are rather low, both of which are compensated by high concentration of NO_x and CO₂. There are smoke particles and oxygenated HC, including aldehydes and odor-producing compounds. This paper initially presents various types of pollution emitted by vehicles, their effect on human health and mitigation measures by the use of various new technologies of Automobile Engineering and Alternative fuels. Air pollution is one of the serious environmental concerns of the urban Asian cities including India, where majority of the population is exposed to poor air quality. The health related problems such as respiratory diseases, risk of developing cancers and other serious ailments, etc. due to poor air quality are known

and well documented. Besides the health effects, air pollution also contributes to tremendous economic losses, especially in the sense of financial resources that are required to give medical assistance to the affected people. The poor are often the most affected segment of the population as they can't access adequate measures to protect themselves from air pollution. The pollution level can be minimized by the use of innovative and technical methods as well as the alternative fuels. If so, the health ailments caused by these pollutants can be reduced significantly.

1.1 Problem Statement

In our day to day life we see that many people's use bikes cars as a source of transportation. This results in environmental pollution and fuel consumption. In manual treadmill the motion of the treadmill is rough to overcome this we use a motor to rotate the rotors. Batteries which are widely used in automobile sector is not rechargeable thus when they disposed create pollution. To improve all above phenomenon we take initiative by designing something which would help to reduce these harmful phenomenon's.

1.2 Objective

Due to heavy busy schedule people are not able to give attention to their health and physical fitness. As it uses no fuel so it saves energy simultaneously it can be used as treadmill and Bicycle.

- Pollution control.
- Useful for exercise purpose.
- To reduce the use of non-renewable energy sources.

1.3 Scope

While going to gym it can be used for warm up purpose. In gym we at first do workout on treadmill which consumes a little time. If we do this work out on the way to gym from home then our time can be saved. The bike is suited for all people. Next generation will be benefited by this product as there might be fuel crises in future so by making further advancement this product can become a part of their daily life. In most of the IIT's campus, commercial motor bikes are not allowed. So for going over long distance within campus, student face issues while travelling on conventional bicycle as it requires more efforts. In this treadmill bicycle by using an amplifier we can attain higher speed with less efforts.

III.WORKING

Figure shows the Catia model of walking Bike. For the movement of the walking bike sprockets mechanism is provided. Walking bike is a combination of treadmill and cycle. Tread belt is fixed with a frame which consist of supportive rollers and two main rollers at extreme ends for movement of the belt. On the extreme last roller sprocket is fitted.

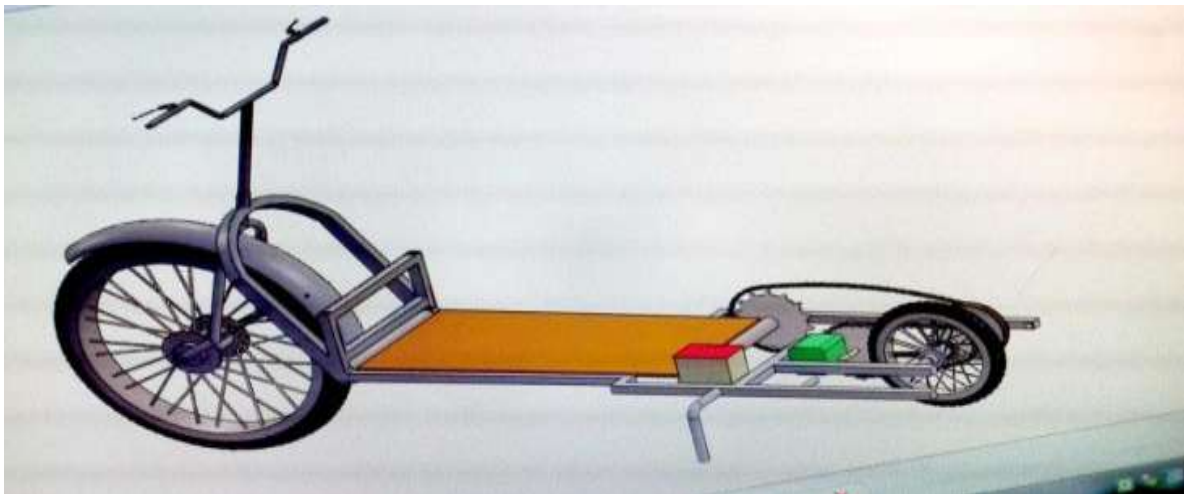
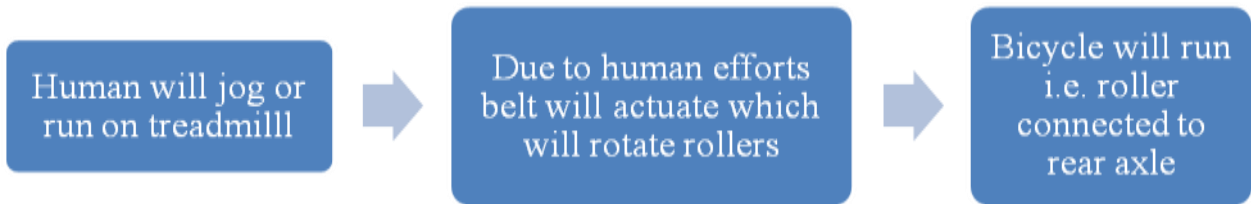


Fig. Schematic diagram of walking bicycle

Sprocket fitted on rear roller is attached to the motor sprocket by means of chain drive. Motor drives the cycle and smoothen the movement of the treadmill belt. Motor drives the cycle by transferring the motion by means of idler which is used to move wheel in forward direction. Cycle wheel consists of a sprocket and on the same shaft of the idler another sprocket is fitted. Cycle wheel sprocket is attached with chain drive to this sprocket. Motor which drives this whole mechanism is driven by means of battery placed at the carriage on top portion of rear wheel.

Selected Components

The components we selected were brake, belt, bearings, suspension, motor, wheels. First of all we studied functional requirements of each component stated above. Then we selected particular type of material for each component based on their functional requirements. We performed various calculations to find out dimensions and capabilities of each component.

IV. DESIGNED AND STANDARD COMPONENTS

Designed Components

Chassis

Fork

Axle of Bicycle
 Axle of Treadmill
 Bicycle Handle
 Treadmill Roller
 Treadmill Side-Frame

Standard Components

Brake, Belt, Bearing, Wheels

Sr No	Component	Type / Material
1	Motor	Brushless DC Motor
2	Bearing	Deep Groove Ball Bearing
3	Belt	Polyvinyl Chloride + Nylon
4	Brake – Front– Rear	Disk - Drum
5	Suspension	Telescopic Fork Suspension
6	Tyre	Rubber

ADVANTEGES

It can be used for transport to near places.
 It works without fuel and helps to save non renewable sources.
 It minimizes pollution hence its ecofriendly vehicle .

V.FUTURE SCOPE

Automated treadmill that relies on sonar to track It tracks how you’re moving on the belt. For example, if you start picking up your pace and move toward the front, then the belt will pick up its speed. Drop back for a breather and the belt will slow down. Treadmill uses a sonar range finder, placed behind the treadmill and aimed for the middle of the runner’s back, to measure the distance between the runner and the device. Based on how far up you are on the treadmill—or far back—the sonar can send signals to a computer that adjusts the speed on the treadmill.

Battery charging by using solar panel This is an ecofriendly way of battery charging. It just requires initial investment. Due to this considerable amount of non-renewable energy can be saved. But it cannot be used in overcast conditions. This is a minor disadvantage.

Treadmill bicycle with speedometer A speedometer can be installed on treadmill bicycle by which we can know the speed at which the treadmill bicycle is moving. It is similar to what is used in motorbikes. Speed would be generally displayed or indicated in km/hr.

Treadmill bicycle with heartbeat sensor A heart beat sensor can be installed on treadmill bicycle which will sense the heart beat rate of rider. If heart beat crosses a pre-determined value then treadmill bicycle will slow down. It is very much useful for person with weak heart. It is also useful for senior citizens and children.

VI.CONCLUSION

We developed a branch and bound approach which is coupled with quick, effective bounds to optimize the “Walking Bike” which serves the purpose of exercise and travelling and also reduce the use of non-renewable energy resources. The design of control architecture was an important aspect of study because a strong interaction between the many different parts was needed. We know that the “Walking Bike” cannot be used on roads due to some drawbacks. But we will correct the drawbacks in the cycle & will be used on road. So we are satisfied with our project.

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