

# Treadmill Bicycle

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**Abstract** - This project work modifies a treadmill to better fit the requirements of users. Treadmill bicycle is designed for those humans who love to run outside. Treadmill equipped on bicycle frame and formulates a big innovation named 'TREADMILL BICYCLE'. This bicycle has electronic parts and runs perfectly on human momentum. As the rider walks on the treadmill, the belt butts up against the rear wheel propelling the bike forward. Treadmill bicycle is designed for runners as the ideal treadmill device, this device combines the best exercise running and cycling to deliver a low-impact, high-performance workout outdoors. We believe it is the ideal device for healthy runners. It delivers an exercise experience that is closer to running than anything else available today.

**Key Words:** The Treadmill, Walking Belt, Wheels, Rollers, Bearing, Flywheel, Sprocket.

## 1.INTRODUCTION

The treadmill bicycle is completely a new way of movement completely designed for runners. Typically using a treadmill basically is similar to running, hiking or walking. Think about the last time you were riding a bike over some kind of obstacles such as train tracks, potholes, speed bumps. Possibilities are you stood up on the pedals to improve your balance when crossing the obstacle. Basically, the treadmill bicycle will provide the rider a well-balanced position the entire time. It is a combination of amalgamation of DC motor with different components upgrading your walking speed to a much higher pace. Since it uses no fuel it a very conventional option for people in their busy schedule to take care of their health completely. People with a busy schedule will also be able to take care of their health and physical fitness. Above all, it is not a conventional treadmill to make use of only in closed rooms, person using treadmill bicycle can roam on roads also. This project overcomes the drawback of the conventional treadmill which is stationary which in fact does not provide the jogger to get exposed to the

natural atmosphere. So this proposed methodology provides an ultimate solution by making use of wheels and making the treadmill bicycle a walking cycle.

The major elements in our project are as listed below:

### 1.1 The Treadmill

There are majorly two different types of frame materials with standard treadmills having steel frames and newer and premium treadmills with aluminum frames. Aluminum frames will hold up better if you are preparing on keeping your treadmill for several years or if you are near to the weight capacity of the treadmill. The treadmill rails (also known as bars or grips) should be used for providing stability when you are starting or stopping the treadmill or if your treadmill is well equipped with a grip heart monitor, this is where you will take your heart rate measurements. Rails are not meant to be held the complete time that you are using the treadmill, so be sure that they are in a convenient but also out of the way location. You also want the grips to provide comfort and easy to reach for when you do need them.



## 1.2 Walking Belt

The walking surface of a treadmill comprises of the thin moving belt and a rigid plate held between the two surfaces of that belt so as to provide support when the transverse load of footfalls is applied.

The treadmill belt size is an important characteristic in your treadmill if you are preparing for running or jogging on your treadmill. If you are planning on walking, the belt size is not of much importance. Standard belts run with size 19" wide by 50" long. Although this appears like a good width and length, you must note that the belt goes onto a deck, which includes part of the frame and your console. So even if your belt is 19 x 50, your running space may be 16 by 45. Again, if you are preparing on only walking on your treadmill, this size is ok. However, if you try on running you will want a wider and longer belt, since we have a capability to sway a bit while we run.

The extra width will permit for this swaying without you hitting into the frame and the longer length will permit you to jog with your normal stride without any fear of falling off of your treadmill.



## 1.3 Wheels:

A wheel is a circular component that is made to rotate on an axle bearing. The wheel is one of the major components of the wheel and axle which is one of the six simple machines. Wheels along with the axles, allow heavy objects to be moved easily allowing movement or transportation while supporting a load or performing labor in machines. Wheels are also utilized for other objectives such as a ship's wheel, steering wheel, potter's wheel and flywheel.

A wheel greatly lessens friction by facilitating motion by rolling together with the use of axles. For rotations of the wheel, a moment must be applied to the wheel about its axis, either by way of gravity or by the application of another external force or torque.

The outline is the "outer edge of a wheel will be holding the tire." It will construct the outer circular design of the wheel on which the inside edge of the tire is mounted on vehicles such as automobiles. For example, on a bicycle wheel, the periphery is a large hoop attached to the outer ends of the spokes of the wheel that holds the tire and tube.



## 1.4 Rollers:

Bicycle rollers are a type of bicycle trainer that make it feasible to ride a bicycle indoors without moving forward. However, dissimilar to other types of bicycle trainers, rollers do not confine to the bicycle frame, and the rider must balance him or herself on the rollers while training. Bicycle rollers normally comprise of three cylinders, drums, or "rollers" (two for the rear wheel and one for the front wheel), on top of which the bicycle runs. A belt joins one of the rear rollers to the front roller, causing the front wheel of the bicycle to spin when the bicycle is pedaled. The spacing of bicycle rollers can normally be adjusted to match the bicycle's wheelbase. Generally, the front roller is adapted to be slightly ahead of the hub of the front wheel.



## 1.5 Bearing:

A bearing is machine element which holds another moving machine element. The moving machine element called as a

journal. Bearing allows a relative motion between the contact surfaces of the members while transferring the load. A certain amount of power is wasted in removing frictional resistance. So as to reduce frictional resistance and wear and to carry away the heat generated, a lubricant may be utilized. The lubricant used is often a mineral oil refined from petroleum. The bearing block is provided to hold the bearings. It is made up from cast iron. All the bearings are fabricated on the machine frame.



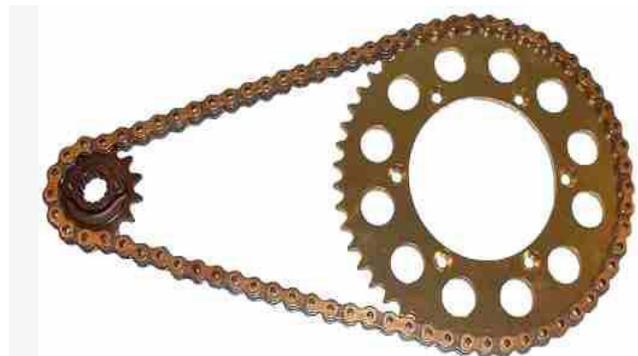
**1.6 Fly wheel:**

A flywheel is a rotating mechanical device that is used to accumulate rotational energy. Flywheels have an inertia called the moment of inertia and thus withstand changes in rotational speed. The amount of energy present in a flywheel is proportional to the square of its rotational speed. Energy is transmitted to a flywheel by the application of a torque to it, thereby improving its rotational speed, and hence its accumulated energy. Conversely, a flywheel releases stored energy by implementing torque to a mechanical load, thereby reducing the flywheel's rotational speed.



**1.7 Sprocket:**

A sprocket or sprocket wheel is a profiled wheel which has teeth, cogs, or even sprockets that mesh with a chain, track or other perforated or indented material. The name 'sprocket' applies usually to any wheel upon which radial projections retain a chain passing over it. It is different from a gear in that sprockets are never conjugated together directly, and differs from a pulley, in that sprockets which has teeth and pulleys are smooth.



**2. WORKING PRINCIPLE:**

When we walk or run on the walking surface it gives rotation to rear wheel of bicycle and treadmill bicycle is moving forward. The walking surface of a treadmill consists of the thin moving belt and a rigid plate placed between the two surfaces of that belt in order to provide backing when the transverse load of footfalls is applied. The original and unmodified treadmill used a sheet of 0.75 inches pressed particle board as a support plate. This was attached to the frame of the treadmill at four points with wood screws placed near the four corners of the sheet. While resting on the rails in a lowered position, the plate received vertical support from small metal risers at the mounting points and from two rubber pads placed under the longest edge of the surface midway between the hard mounting points. According to the manual provided with the treadmill, the design intent behind this flexible multi-point mounting system was to reduce the overall stiffness of the plate by providing less support than that provided by direct attachment to two solid rails. In actual practice, the thickness and stiffness of the particle board surface were more than required to remove all discernable deflection from the system. Users were unable to distinguish the difference in stiffness when additional aluminum supports were inserted between the sheet and the rails, in order to remove the compliant effect of the rubber supports. We concluded that modifications would be necessary to achieve an ideally compliant walking surface capable of reducing the impact forces related with walking and running. Additionally, the bottom face of the particle board sheet held two outwardly angled metal brackets. These were oriented such that the belt would slide over them consecutively when the system was active.

This had the effect of automatically maintaining alignment of the belt by forming a restoring force in the event which will be belt traveled away from a centered position on its rollers. When we start using the treadmill then the rear wheel starts moving and hence the flywheel gets momentum. So once the flywheel gets momentum the bicycle will keep moving due the moment gained by flywheel. Also, we have coupled a dynamo with the rear wheel using gear arrangement. So whenever the treadmill is in use the dynamo will generate power which can be stored in a battery.



### 3. CONCLUSIONS

This system can be efficiently used anywhere whether it is outdoor or indoor. This utilizes highly fuel-saving technology which is a major requirement of this era. In the future, it can be used as an indoor locomotive device infrastructure with large roof span i.e. malls, warehouse, open markets, large office spaces, etc. By using such product pedestrian cops can protect themselves from getting exhausted. Pedestrians in large campuses can take benefit from this product the same way. We can replace cycle as an energy efficient vehicle for those who cannot drive a cycle.

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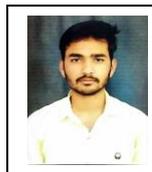
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