MODIFICATION OF LOW EFFORT RUN CYCLE

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Abstract— A trend for design customization of bicycle is developing in recent years. During the development phase, a proper surveillance is to be given for the comfort of ride on the bicycle. In this study, the concept is to design the bicycle 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 bicycle 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 bicycle.

Keywords— ***Material used, bicycle frame, riding posture, ride height, frame joints.***

I. INTRODUCTION

A bicycle 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. Its structure consist of two wheels, which are connected by a trellis frame, which is mostly made of material called alloy steel.

Bicycles 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. Bicycles of a rarer types are tandems, low riders, tall bikes, fixed gear, folding models, etc.

The bicycle being the most efficient in biological and mechanical terms. The bicycle is the most efficient in means of transportation in terms of energy a person must expend to travel a given distance, which is designed by human. 99% of the energy produced by the rider is transferred from body to pedals and further transmitted to the wheels.

A new type of bicycle is introduced, which has its high advantageous impact on human life which is called as the elliptical bicycle. Elliptical bikes combine the motion of an indoor elliptical trainer with the outdoor mobility of a traditional bicycle. The Ellipti-GO is the world's first elliptical bicycle. Unsatisfied with the experience of working out in a gym, the cross trainer is a combination of elliptical trainer and with the functionality of a bicycle, the Ellipti-GO line of bikes delivers a high-performance workout experience that close to running outdoors while eliminating the impact.

ElliptiGo co-founder and former Ironman tri-athlete Bryan Pate was inspired to create the world's first elliptical bicycle after injuries plagued him to the point where he could no longer run for fitness.Although he was an experienced cyclist, pate chose instead to use the elliptical trainer to stay fit because it was more comfortable than sitting on a bike.Unsatisfied with the experience of working out in a gym , however, Pate had a vision of creating a product that would allow him to have both the outdoor "running experience" and the low impact workout of the elliptical machine . In 2005, Bryan partnered with EllipticGO co-founder Brentt Teal, a mechanical engineer and ultra-marathoner, to design and develop the world's first elliptical bicycle. Five prototypes and thousands of test miles later,EllipticGO was born.The ElliptiMove is easy to ride and more stable than it looks. Riding an ElliptiMove 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 have found that most people get comfortable within 5 minutes of riding it.

ElliptiMOve is very different from a traditional bicycle. Traditional bicycle usually have a big seat with a backrest whereas the ElliptiMove rider's legs are perpendicular to a big seat with aback rest whereas the EllipticMove has no seat at all.

The traditional bicycle rider pedals with the legs parallel to the ground standing up and pedaling and rider stands for the

whole time. The traditional bicycle rider's visibility is usually limited because they are lower to the ground making it, both hardder to see them and harder for them to see arrond obstacles like cars,busses etc. In contrast,the elliptical rider's visibility is unusually good because their line of sight is elevated. By enabling a seatless cycling experience, the ElliptiGO solves one of the most important and challenging problems facing the road bicycling industry.

II. MATERIAL SELECTION

As per the material survey, the best-suited material is mild steel (MS). The mentioned material was chosen as the material for bicycle frame due to its low density, compatible yield strength, easy of fabrication, cost and ease of availability. This material was chosen for designing the frame by comparing its results with different materials as alloy steel, EN8 etc.

Optional Materials:-

1. Al-6061-magnesium and Silicon Major Alloying Element-density 2.70g/cm3.

2. Al-7005-Zinc-density-2.78g/cm3 depending on the temper, may be slightly stronger

III. MODIFICATION OF MODEL

. The frame is fabricated successfully according to the design specifications. Fabrication techniques included arc welding, bending, cutting, grinding, punching, forging and assembly of various parts required.

Fabrication was carried out in two phases, namely phase-I which included initial spot welding of all the joints for assuring proper shape of the frame and phase-II included complete welding of all the joints in the frame, along with custom paint job and finally the assembly of all the parts.

IV. RESULTS AND CONCLUSIONS

Thus we conclude that ElliptiMove is designed and fabricated with the 80% cost optimization hence satisfying our aim of the project which was to design and fabricate the model while optimizing the cost which is successfully achieved with an added advantage of introducing this concept in the Indian market. ElliptiMove is designed in such a way that we have also achieved weight optimization up to 1 kg. ElliptiMove provides the rider a workout experience while eliminating the impact on the joints of the human body caused during running, bicycling or working on an elliptical trainer in the gym. The comfortable and better ergonomics of ElliptiMove ensures that the rider workouts with ease eliminating the pain caused due to constant cycling during the use conventional bicycle. Thus, we have developed a fitness tool, which allows the rider to work out and simultaneously explore the nature or carry out his daily chores without any problem of injuries or damage to the body. Thus, ElliptiMove emulates the natural running movement, so the rider stands upright, in a very comfortable position and propels the ElliptiMove using a very comfortable motion. The upright riding position drastically improves the rider's ability to see over traffic and obstacles as compared to road cycling. The less aerodynamic upright position makes ElliptiMove riders work harder than cyclists to maintain the same pace, allowing ElliptiMove riders to get their workout done in less time and while covering less distance.

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