Power Generation from Gym Equipment

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***Abstract* - There is the various source of energy or power generation method which humans have developed till now and use in our day-to-day life. There are renewable energy resources, non- renewable energy sources, manpower, animal-powered, etc. with various ideas and techniques are used for power generation. There are promising applications areas for human power in emerging regions where electric power is either not available or not affordable. There is also the untapped potential for harnessing human power for most fitness purposes. The non- conventional energy system is very essential at this time to our nation. Non-conventional energy using pull up, pull down machines is converting mechanical energy into electrical energy. Pull up pull down power is an excellent source of energy,95% of the exertion pull into a pull up pull down power converted into energy, with stored in battery this will give dramatic output, and then exercise is done, and electricity being also produced in the battery.**

INTRODUCTION

In the current scenario of research and development in this generation, we require uninterrupted electricity to the industries, hospitals, colleges, for continuous work which is needed in day-to-day work. At present time technology is being more developed and in technological section, power is exercising on cycle and treadmiller will waste the energy but if we use this energy or generating electricity and also, make devices for generating electricity and will dissipate the device in rural areas and many other areas where electricity is needed. World energy consumption is at an all-time high with the demand continuously increasing. Power Generation from Gym Equipment is a purposed method of ideal condition for and the average person to lift and pull the rod and do the workout. We have designed a 2D model in "AUTOCAD" software and then took it for 3D modeling which we completed in "Solidworks". Later after getting the material and model we continued the process and started with the calculations for the electricity generation and the minimum speed at which it should rotate and for how much time to get the desired amount of electricity. Also generating electrical power is a non-conventional method by simply pull up and pull down. The non-conventional energy system is very essential at this time to our nation. Non-conventional energy using pull-up, pull down is converting mechanical energy into electrical energy.

LITERATURE SURVEY

[A] Gym power generation mechanism
Author: - P.V. Shingare, V.B. Somavanshi, T.P. Tore, V.K. Sonawne
In this paper, to design a renewable energy source, based around a piece of exercise equipment. The energy expended in a typical workout at the gym is usually wasted in the mechanics of the equipment.

[B] Power generation through gym equipment
Author: - Ansari Saddam hussan, Gujja Govardhan, Gund Kumar, Mohd ahmad, Vivek Tiwari
Aim of this paper is to harness mechanical energy of machine and convert it into electrical energy using generator-based system and to use it to power bulbs, cell phones and other small appliances.

[C] Energy harvesting from gym equipment.
Author: - Madhup kumar, Dr. G.S. Mundada

[D] This paper attempt to concentrate on how electrical energy can be generated from gym equipment / exercise equipment. In urban areas people are very much health conscious and spent average one hour's time in gym for their physical
fitness.

[E] Energy generating gymnasium machines for renewable, sustainable, and green energy
Author: - M. Musharraf, Ifrah Saleem, Dr Farhat Iqbal.
In this paper a theoretical model of energy generating gymnasium systems (EGGS)is proposed in this paper

which will contribute its share in a renewable energy sector.

[F] Power generation using gym equipment

Author: - Avish bhandari, Shailesh Itte, Jas Jangipuria, Ramesh harayan

This paper deals with the system which will develop power using gym equipment. We are using human as the power source operating the gym equipment. This equipment is designed to act as an exercise equipment as well as a source of power generation.

[G] Generation of electricity using human energy at gym

Author: - Amar Hebbar

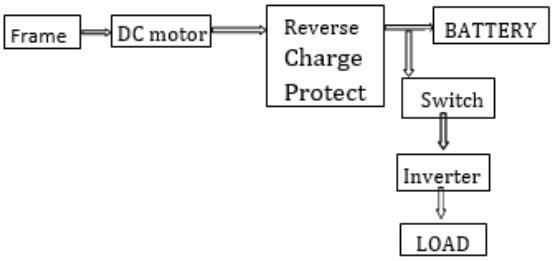
In this paper, in exercise center individuals more often than not perform control and redundant developments. Making utilization of this verticity and reutilizing it utilizing gathers is the idea of a green rec center, it makes sense to utilize the work being continuously applied at the exercise center to help nature. At the point when there was accelerating of the gym equipment, the batteries got charged.

[H] Recovery of useful energy from lost human power in gymnasium

Author: - Bushra chalermithai, Omer Sarfaraz and bahiam ridi

In this paper, the power generated in a typical human powered gym based on the equipment already existing in the market is analyzed. The amount of CO2, emissions saved and the payback period for implementing this gym are estimated. It was found that the energy producing equipment in the gym not only benefit environmentally in the long run.

Block Diagram and system analysis



In the above block diagram, the whole system i.e., lateral pull down and pull-down machine is operated by human being, the overall energy generated during workout on this equipment is converted linear to rotary motion using Rack and Pinion Mechanism. this is when mechanical energy is converted into electrical energy with the help of 500 RPM DC motor using required numerical data. The reverse charge protection device in this system is used for avoiding the back flow of the current/losses that are produced during the motion. Due to this device good amount of energy generation is observed since there are negligible losses. So, the amount of energy that is procured is stored in the battery (12V, having capacity 7AH) for ongoing use. Whereas the energy which is obtain and not required can be stored in the inverter for later use. In this way there is no wastage of energy.

A] COMPONENTS B] SOFTWARE

1. Pully and Rope AUTOCAD
2. Weights SOLIDWORKS
3. Rack and Pinion
4. Frame
5. Motor
6. Alternator
7. Battery

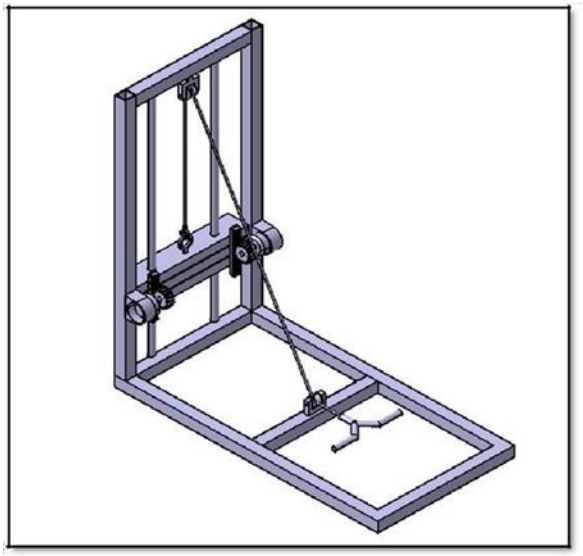


Fig A = 3D cad model for power generation

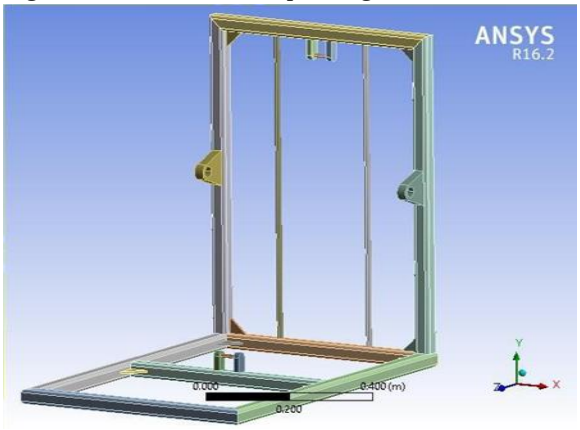


Fig B = Frame Structure Gym equipment or System

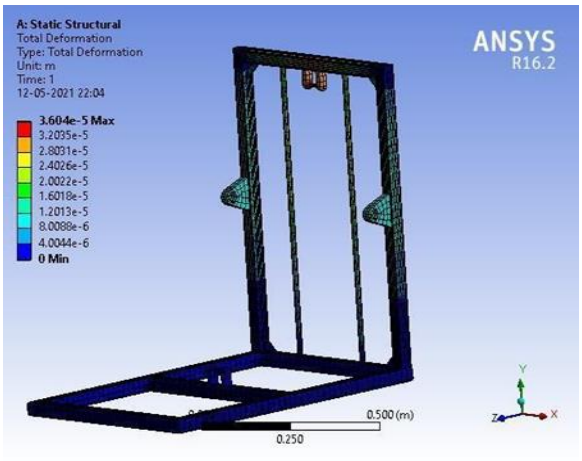


Fig C = Total Deformation

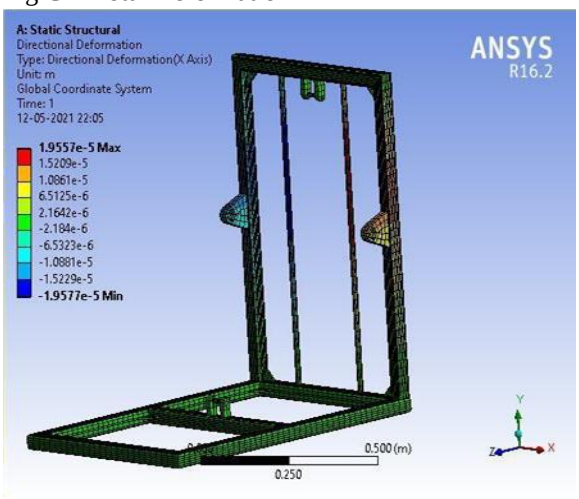


Fig D = Directional Deformation

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CONCLUSION

To conclude for the research that we have conducted we did start from drafting and making models using software, setting soft limits and maximum limits, and calculating the amount of electricity that could be generated. Therefore, after performing the simulation tests, we conclude that the material we choose and the model made using this material gives us a variation of 0.34mm after lifting 100kg weight and subsequently the more weight proportional will be the deviation and deviation of 0.34mm nearly negligible and not all people can lift 100 for much time. Therefore, our model is safe to use if it comes into actual practice. Secondly, about the calculations, going to gym say 100 people per day we will get sufficient amount of electricity per day which is sufficient for the gyms to use and also start the supply of electricity in future, with this side by side if could use an amplifier with greater power we might even be able to charge phones, laptops and, other electronics. Using this kind of electricity will also reduce pollution and will also have a hand in saving fossil fuels. One step closer to saving the environment.

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[6] Generation of electricity using human energy at the gym Amar hebbar
[7] Recovery of useful energy from lost human power in gymnasium Bushra chalermithai, Omer Sarfaraz and bahiam ridi
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