



DESIGN & FABRICATION OF QUADRICYCLE

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Abstract: For saving the fuel and electricity, vehicle which can be ecofriendly we design and develop human power quad cycle capable of carrying four people. It is four wheel human powered land vehicle. The problem of energy saving is, at present, more and more important. Nowadays we are heading towards the energy crisis as depletions of fossil fuel is at very high rate, there is need of specific technology which maybe in some way to help conserve much of energy possible. This pedal cycle allows in the rear steer accommodating up to four riders, Quadricycles are a relatively new class of small fuel efficient vehicles used in rural or urban area. This cycle can be worked on the four bar chain mechanism; it is a suitable compact model to overcome traffic and parking problems. There will be no gasoline required, zero emission, cheaper in maintain, less wear and tear, four wheel stability, provide exercise, more comfortable.

Keywords: four-wheel human power land vehicle, safety, zero emission, environment friendly.

I. INTRODUCTION

A quadricycle is a four-wheeled human-powered land vehicle. It is also referred to as a quadracycle, quadcycle, pedal car or four-wheeled bicycle amongst other terms. Quadricycles have been in use since 1853 and have grown into several families of vehicles for a variety of purposes, including tourist rentals, pedal taxis, private touring, mountain and industrial use.

The earliest recorded pedal-powered quadricycle was exhibited in 1853 at the Exhibition of the Industry of All Nations World's Fair held in New York City. This was about the same time that two-wheeled bicycles started to become popular.

Quadricycles were one solution to the problem of low-speed stability in early cycles and were typically multi-seat models. Both tandem (in line) and sociable (side-by-side) seating configurations were used.

Quad cycle is a four-wheeled human power land vehicle. To design and develop a human power quad cycle capable of carrying four people. Quadricycles are a relatively new class of small fuel-efficient vehicles it is used in rural or urban areas. It is also referred to as a quadracycle, quadcycle, pedal car or four wheeled bicycle. It is used into several purposes, including tourist rentals, pedal taxi, private touring, mountain and industrial use. It is light weight four-wheeled vehicle, and compact in design so less wear and tear and overcome traffic problems in urban mobility.

The speed of four-wheel human power land vehicle is up to 25 to 35 km/h. new class of vehicles, quadricycles may be seen as an ecological and flexible alternative to motorbikes or city from representing totally new class of vehicles, they can be considered a deep transformation of an historical mean of transportation accordingly to new needs and functionalities. Quadricycle offer significantly lower levels of safety and security compared to several other kinds of vehicles that play on the same roads.

II. PROBLEM STATEMENT

In big campuses, industrial areas & zoos where the area is too big, it is difficult for the outsiders to cover all areas especially parents, aged persons.

This makes us to think & enable to move forward to design simple quadricycle that can be able to carry more than four members inside college campus areas, various zoo units & industrial units, plants, etc.

The project consists of four wheels with simple in design like bicycle but have four pedals to reduce the effort on each person.

III. OBJECTIVES

1. To design & fabricate quadricycle.
2. To carry minimum four members from one place to other place.
3. To provide simple handling & cycling mechanism to run the quadricycle.
4. To provide physical exercise indirectly.
5. To provide competitive features quadricycle compared to market price.

IV. WORKING PRINCIPLE, CONCEPTUAL DESIGN AND SELECTION OF PARTS

1. Working principle of quadricycle

Four-wheel human power land vehicle works on a simple bicycle chain mechanism. It consists four paddle which is used to ride four people together, which is less effort during ride to the vehicle, and easy to drive. Due to light in weight and compact design less wear and tear occurs, and required less maintenance and repair.

2. Conceptual drawings

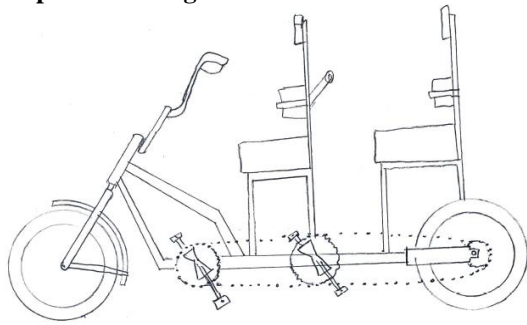


Fig 1.

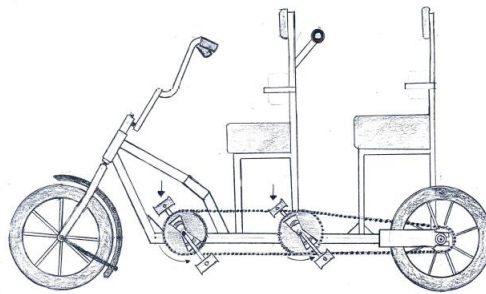


Fig 2.

3. Selection of conceptual; drawing among the best

In the above two conceptual drawings relatively best one with suitable features of with most near satisfying objectives of our project have been selected. The selected conceptual drawing is first one also there may be slight variation in final model features without changing major features which are going to be fabricate

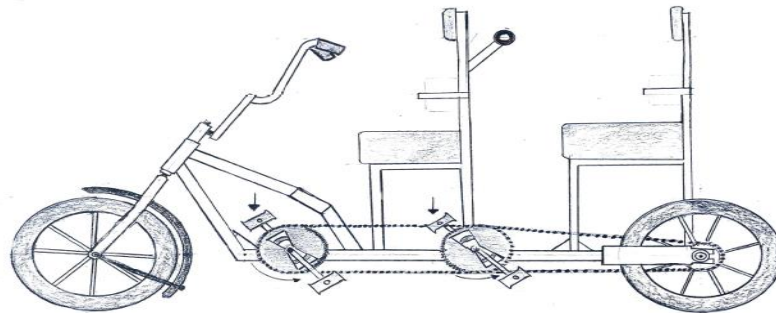
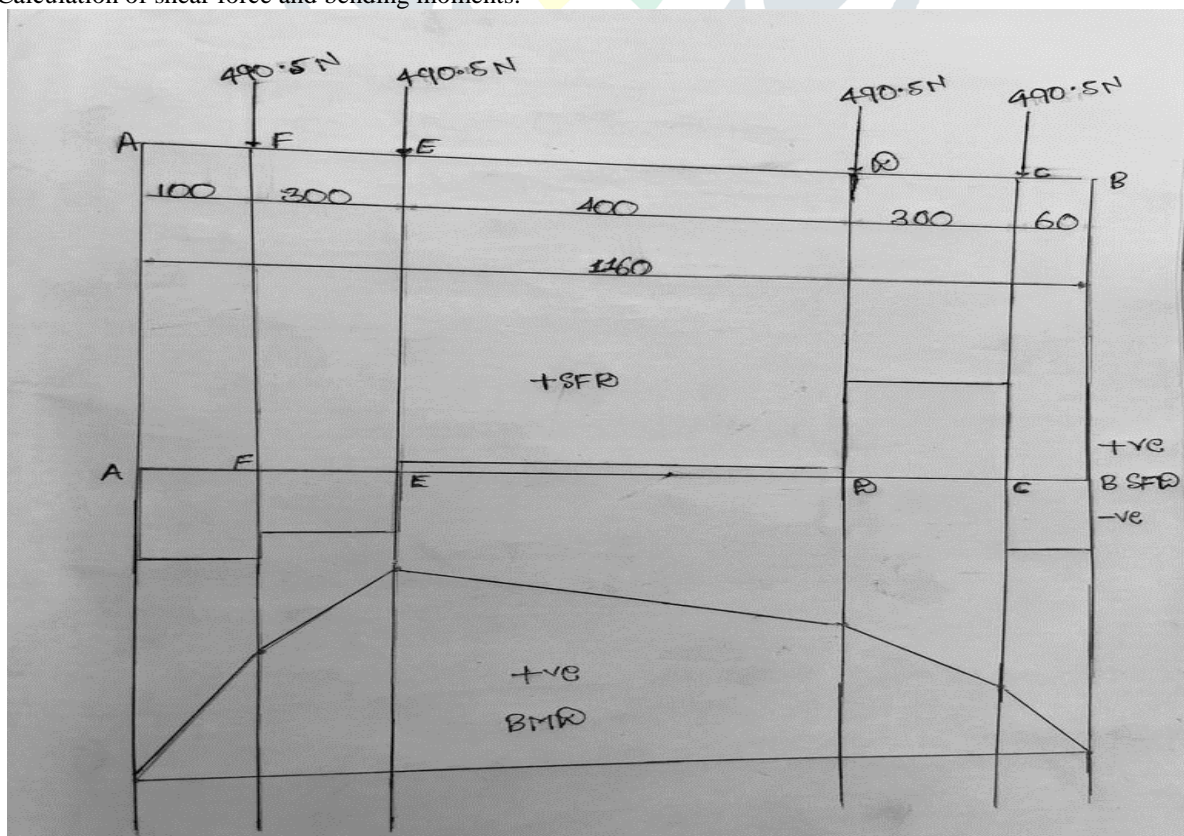


Fig 3.

V. Design of quadra cycle

Calculation of shear force and bending moments.



$$\begin{aligned} \sum M_A &= 0 \\ RB * 1160 - 490.5 * 1100 - 490.5 * 800 - 490.5 * 400 - 490.5 * 100 + KA * 0 &= 0 \\ RB * 1160 - 1177200 &= 0 \\ RB &= 1177200 / 1160 \\ RB &= 1014.827 \text{ N} \\ \sum V &= 0 \\ RA + RB - 490.5 - 490.5 - 490.5 - 490.5 &= 0 \\ RA + 1014.827 - 1962 &= 0 \\ RA &= 1962 - 1014.827 \\ RA &= 947.17 \text{ N} \\ \text{Shear Force} \\ \text{SF at B} &= 1014.827 \text{ N} \\ \text{SF at C} &= 1014.827 - 490.5 = 524.327 \text{ N} \\ \text{SF at D} &= 1014.827 - 490.5 - 490.5 = 33.827 \text{ N} \\ \text{SF at E} &= 1014.827 - 490.5 - 490.5 - 490.5 = -456.673 \text{ N} \\ \text{SF at F} &= 1014.827 - 490.5 - 490.5 - 490.5 - 490.5 = -947.173 \text{ N} \\ \text{SF at A} &= 1014.827 - 490.5 - 490.5 - 490.5 - 490.5 + 947.17 = 0 \\ \text{Bending Moment } F * L \text{ N-MM} \\ \text{BM at B} &= 0 \\ \text{BM at C} &= 1014.827 * 60 - 490.5 * 0 = 60889.6 \text{ N} \\ \text{BM at C} &= 1014.827 * 60 - 490.5 * 0 = 60889.6 \text{ N} \\ \text{BM at D} &= 1014.827 * 360 - 490.5 * 300 - 490.5 * 0 = 218187.72 \\ \text{BM at E} &= 1014.827 * 760 - 490.5 * 700 - 490.5 * 400 - 490.5 * 0 = 231718.52 \text{ N} \\ \text{BM at F} &= 1014.827 * 1060 - 490.5 * 100 - 490.5 * 700 - 490.5 * 300 = 94716.62 \text{ N} \\ \text{BM at A} &= 1014.827 * 1160 - 490.5 * 1160 - 490.5 * 800 - 490.5 * 400 - 490.5 * 100 + 947.17 * 0 = 0 \end{aligned}$$

VI. Fabrication



Fig 1. Chassis



Fig 2. Grinding operation on chassis



Fig 3. Welding operation

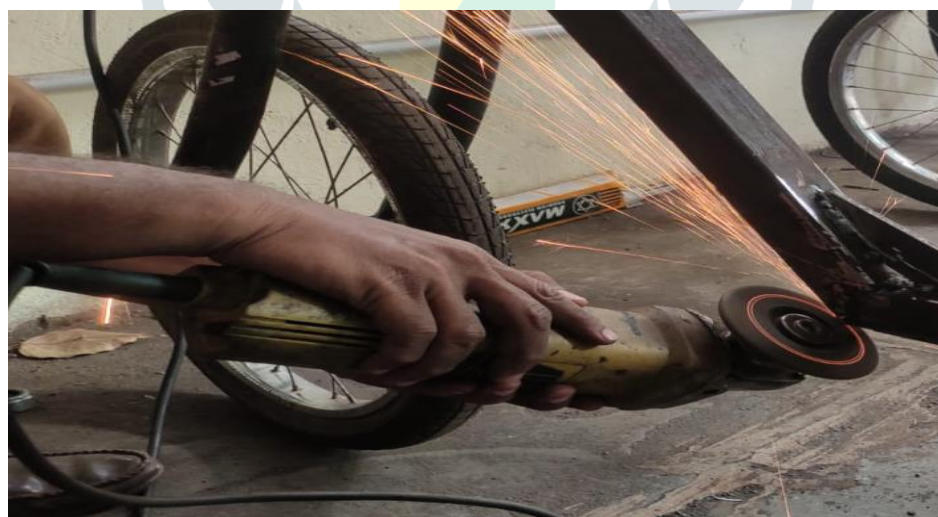


Fig 5. Finishing operation on chassis



Fig 6. Chain sprocket assembly

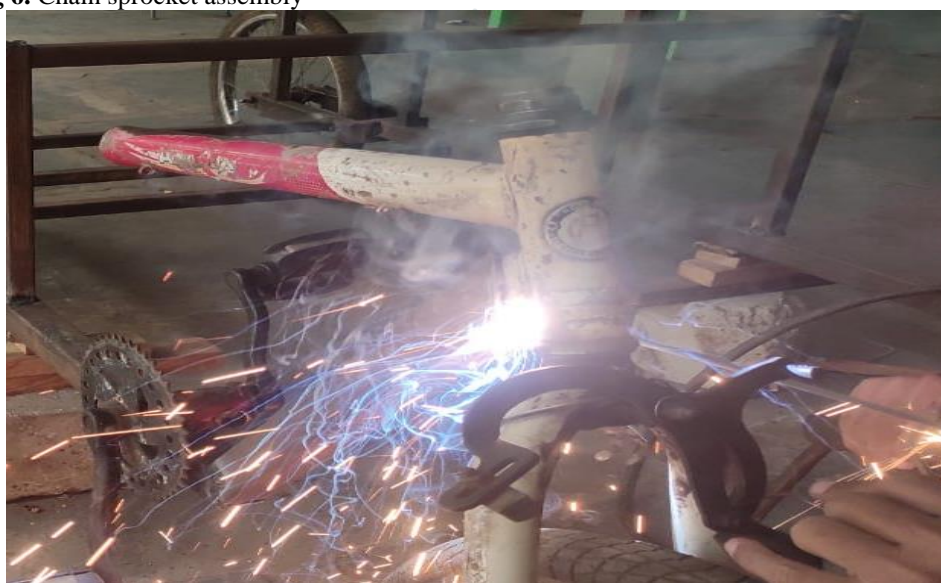


Fig 7. Stiffening operation on chassis by welding



Fig 8. Final Model

VII. RESULTS AND DISCUSSION

1. Discussion and conclusion

Discussion

- a. It helps to protect from serious diseases such as stroke, heart attack some cancers, diabetes.
- b. Cycling is easy to fit into your daily routine by riding to the shops, park, school or work.
- c. The noise & environmental pollution makes the sound “GREEN

2. Conclusion

- a. World people are simultaneously dealing with the air pollution, global warming and energy demand.
- b. Heavy quadricycles could represent a prominent solution, especially for small mobility used in residential area.
- c. These vehicles are considered as design for very limited operating environments.
- d. And they are currently prohibited from entry in several countries because they do not provide evidence to pass minimum safety requirements.
- e. The idea is that allowing these vehicles on roads, it will come at the expense of safety standards without a better interest for citizens.

VIII. FUTURE SCOPE

The present quadracycle is provided with manual features, can be implemented in such a way that by providing solar operated features to the same.

IX. ACKNOWLEDGEMENT

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