



MODIFICATIONS AND REPAIRS IN EXISTING VELOMOBILE PROJECT

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Abstract: This article discusses future transport emphasizing the aerodynamic cycles called Velomobiles. Along with bicycles and e-bikes, velomobiles are low energy transport which could displace cars as our commonly owned vehicles.

Discussed in the light of emerging 3d printing, solar and structural battery technologies which could allow them and other cycles to be more useful and go further for less energy.

Development and use of these technologies in velomobiles would benefit transport

Options and the technologies themselves, allowing beneficial and practical demonstrations in practical machines. Velomobiles using new technologies could be simpler and more relatable than cars and aeroplanes using the same technologies.

The article aims to promote velomobiles and emerging solar, battery, and 3d printing technologies through their use in velomobiles. It highlights Australian researchers and manufacturers. Discussion includes the author's electric leaning trike which has timber panels replaceable by panels containing batteries or solar cells.

Index Terms – Mechanical Engineering, Automobile Engineering, Design Engineering

I. INTRODUCTION

Velomobile, velo, or bicycle car is a human-powered vehicle (HPV) enclosed for aerodynamic advantage and/or protection from weather and collisions. They are similar to recumbent bicycles, pedal go-karts and tricycles, but with a full fairing (aerodynamic or weather protective shell). A fairing may be added to a non-faired cycle, or the fairing may be an integral part of the structure, monocoque like that of an airplane. The term velomobile can be thought of as similar in scope to the cycle (pedal vehicle) world as the term automobile is to the automotive world. They are similar to recumbent bicycles, pedal go-karts and tricycles, but with a full fairing (aerodynamic or weather protective shell). A fairing may be added to a non-faired cycle, or the fairing may be an integral part of the structure,

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2. COMPONENTS

1 Chain Sprocket:

Chain drive is a way of transmitting mechanical power from one place to another. It is often used to convey power to the wheels of a vehicle, particularly bicycles and motorcycles. It is also used in a wide variety of machines besides vehicles.



Figure 1: Chain sprocket

2 Electric Motor:

An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate force in the form of torque applied on the motor's shaft.

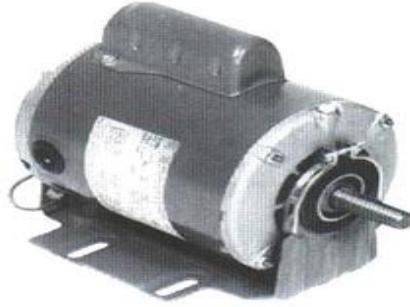


Figure 2: Electric Motor

3 Handle bar:

For most utility bike usage, the most convenient handlebar shapes are the "North Road" shape as used on traditional British bikes, or the "parallel" shape also used in the Netherlands. Combined with a short stem, these can transform the seating position on a bike.

The traditional quill type handlebar stem is most common on utility bicycles. It offers a greater ease of adjustment without having to buy new parts, and it's also more straightforward to achieve higher handlebar positions. We offer stems with a height up to 300 mm, in both modern and traditional shap

4 Disc Brake:

All bicycle brakes are designed to push a friction-creating brake pad against a braking surface on the revolving wheel by way of a hand-operated lever. A disc brake focuses forces on a smaller rotor, situated towards the center of the wheel.



Figure 3 Disc Brake

5 Battery:

A battery is a device consisting of one or more electrochemical cells with external connections for powering electrical devices such as flashlights, mobile phones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode.



Figure 4: Battery

6 Wheels:

Wheels are very important for all sorts of cycles. They can cause a lot of trouble. Everyone who has ridden a bike has experienced flat tires. Pneumatic tires were first developed for cycles to improve comfort and reduce rolling friction. Tires and inner tubes has been part of the bicycle wheel for over a century. During rubber became scarce and some wheels were made using steel springs as replacement



Figure 5 Wheels

7 Bearings:

The bearings serve to reduce friction and allow for smoother rotation. This cuts down on the amount of energy consumption. This is the single most important function of bearings all moving parts of automobiles require bearings to function. Bearings enhance the performance of the vehicles, bear heavy loads, and reduce friction. Some major sub-systems where bearings are used are engines, gearboxes, transmissions, wheels, steering, electrical motors, pumps etc.



Figure 6 Bearings

Types of bearings

- 1 Deep Groove Ball Bearings. The deep groove ball bearing is the most common bearing found in a motorcycle.
- 2 Tapered Roller Bearings. Similar to deep groove ball bearings, tapered roller bearings have inner and outer ring raceways.
- 3 Needle Roller Bearings.
- 4 Thrust Bearings.
- 5 Thrust Ball Bearings
- 6 Spherical Roller Bearings.
- 7 Cylindrical Roller Bearings
- 8 Needle Roller Bearings

3. BASIC DESIGN OF MODEL

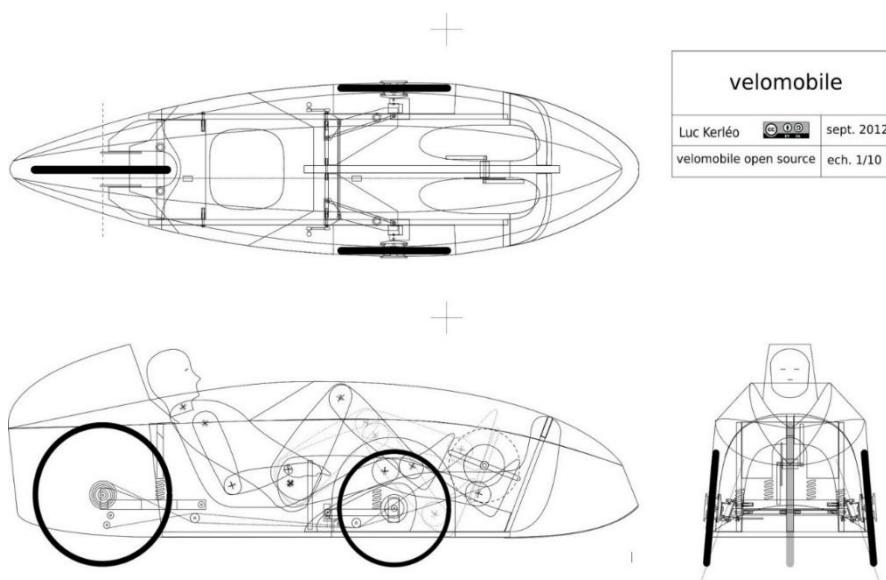


Figure 7 Basic design of velomobile

4: STEP BY STEP PROCEDURE OF REPAIRING

Dismantle procedure

1 Tyre remove:

First of all the velomobile structure is placed horizontally on ground then jacking up in the air then removes the nut by using correct no spanner then checking the puncher of all wheel



Figure 8 Tyre

2 Remove the breaking system

Before removes the tyre dismantle the caliper assembly form disc brake by using the Allen key to dismantle the wheel from the structure. Then remove the tyre & dismantle the complete breaking system.



Figure 9 Breaking system

3 Remove the chain sprocket and bearing

Before removing the chain sprocket & bearing we need to disassemble the seat then only we can remove the mounting of the bearing and then we replace the old bearing with the new one as well as we unlock the manual drive sprocket and aligning with the main sprocket



Figure 10 chain sprocket bearing

4 After dismantle the complete project

After removing all the components like wheel, chain sprocket, Bearing, Breaking system, Handle bar now the velomobile is almost dismantled



Figure 11 dismantled the complete project

Assemble procedure

1 Assemble the chain sprocket and bearing

After complete dismantle process we are starts installing new bearing then we tighten the nut bolts of electric motor as well as we removes the bend of handle bar by using the bench vise and tighten all the components using correct tools



Figure 12 assemble the chain sprocket and bearing

2 Assemble the breaking system and wheel

At the end we install the handle bar and then install the wheel. As well as we assemble the calliper assembly with the disc break and adjust the breaking system

Then we inspect the all the component of the velomobile structure and observe carefully if there is any loose component we tighten by using the correct spanners



Figure 12 assemble the breaking system and wheel

5: Final Model



Fig 13 Final project

CONCLUSION

After completion of this project, we successful to

Achieve following points

1. After completion of this project we experience the more stable ride on velomobile as compared before.
2. Due to some repairs we experience the overall efficiency was increased
3. After completion of velomobile project we also experience the wheel alignment and body was quit good as compared before.
4. Our project was not emit the harmful gasses in the atmosphere so it eco-friendly project as well as it reduces the human effort

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