© 2016 IJSRSET | Volume 2 | Issue 3 | Print ISSN : 2395-1990 | Online ISSN : 2394-4099
Themed Section: Engineering and Technology

A Review Report on Electromechanical Tricycle with Regenerative Braking System

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ABSTRACT

Electromechanical Tricycle with Regenerative Braking System is a three wheeled, completely encased, weatherproof vehicle, complete with move confine, suspension, safety belts, headlights and trunk space. Where the Electromechanical Tricycle with Regenerative Braking System varies from most other option vitality vehicles, is the rider gives pedal force, which force is expanded approximate Four times by the EMT drive arrangement. EMT runs faster than other cycle by means of pedal alone but If a person is getting exhausted by pedal effort so electric drive is available at the driver wheel, hub motor is attached at the rear side, which run a vehicle by means of battery with economic speed rate. When Electric (battery and hub motor) and mechanical (EMT drive system) both drive system work together so vehicle runs with highway speed is simply above the economic rate. Battery is charge with the conversion of mechanical energy into electrical energy with of regenerative braking system when brakes will apply. There are numerous outlines of human controlled vehicle yet they have a few issues identified with Fuel utilization, riding abilities, human solace, strength, more drag power and so forth. This requires the improvement of EMT, taking care of a portion of the issues in existing. This anticipates depends on making a pedal work electric human effort vehicle.

Keywords: Human controlled vehicle, Energy preservation, security and insurance framework, environment friendly.

I. INTRODUCTION

In a world that is coming up short on fossil powers, collecting human motor vitality will give a prompt answer for different mechanical difficulties and fuel impediments. Likewise reaping renewable wellspring of vitality can likewise be a device behind taking care of the issue. This anticipates manages building up a Human Powered Hybrid Vehicle that utilizes both human energy to drive the vehicle.

For the individuals who like to drive to work by bicycle, however are searching for comparable advantages offered by a vehicles, there might be an answer for you, EMT; Recumbent-Automotive-Human-Transport. It takes pedal energy to a radical new level. [1]

II. METHODS AND MATERIAL

1. Initiation & Problem Formulation

According to **Richard 'Barney' Carlson (2010)**,Six primary factors that impact the fuel consumption and electrical energy consumption of PHEVs were identified from the analysis of 1.8 million miles of PHEV driving and charging data from the Hymotion Prius PHEVs.

The six factors include:

1. Available electrical energy
2. Driver aggressiveness
3. Route type
4. Engine start-up
5. Ambient temperature
6. Accessory utilization.

Through analysis of these six primary impact factors, it was determined that driving at moderate speeds (about 35 kph) in an urban environment without the air conditioner, in a non-aggressive manner, at ambient temperature near 25°C, and after plugging in the vehicle often will result in very low fuel consumption. Because very few drivers actually drive in this manner, continued advances in power train technology, energy storage system technologies, and vehicle architectures are needed to continue improvements in petroleum displacement. [2]

2. Proposed System

After Reading all the papers one idea is conceived clear that firstly it requires to eliminate the fuel in vehicle and furthermore focused towards the vehicle which keep running by pedal, implies helped from human force given by pedal and second thing, give a pace which is approx at parkway run just by pedal yet with any middle person plan it can't be conceivable ,so alternative option is Hybrid framework however without utilization of unit fuel So as to when a pedal combined with motor by method for chain and sprocket, we cover a long separation with expressway speed avoid fuel utilization with more solace, security and less weakness amid run. System is essentially made bike cum bicycle cum auto.

3. Various Subsytems of EMT

The various subsystems of a tricycle includes its frame or chassis, steering, brake, suspension, power train, different safety equipment and other accessories.

FRAME : A frame is the fundamental structure of the case of an engine vehicle. Every other part secure to it; a term for this outline is body-on-casing development.

The fundamental elements of a frame in engine vehicles are:

1. To support the vehicle's body segments and body.
2. To manage static and element loads, without undue redirection or twisting.

These include:

- Weight of the body, travelers, and freight loads.
- Vertical and torsion turning transmitted by going over uneven surfaces.
- Transverse parallel strengths created by street conditions, side wind, and controlling the vehicle.
- Torque from the motor and transmission.
- Sudden effects from crashes.[3]

STEERING : Steering is the accumulation of segments, linkages, and so forth which permit vehicle (auto, bicycle, and bike) to take after the craved course. The fundamental point of steering is to guarantee that the wheels are indicating in the coveted bearings. This is normally accomplished by a progression of linkages, poles, rotates and adapts. One of the crucial ideas is that of caster edge – every wheel is steered with a turn point in front of the wheel; this makes the steering tend to be self-cantering towards the direction of travel.

SUSPENSION : Suspension frameworks fill a double need adding to the vehicle's street holding/taking care of and braking for good dynamic security and driving joy, and keeping vehicle inhabitants agreeable and sensibly very much separated from street commotion, knocks, and vibrations, and so forth. The suspension additionally ensures the vehicle itself and any load or baggage from damage and wear. Suspension is the arrangement of springs, safeguards and linkages that interfaces a vehicle to its haggles relative movement between the two.

4. Regenerative Braking Arrangement

A brake is a mechanical gadget which represses movement, abating or ceasing a moving protest or preventing its movement. The primary motivations behind fitting brakes on a vehicle are as underneath:

- In crises to convey the vehicle to rest in the briefest possible distance.
- To control the vehicle when it is dropping along the slopes.
- To keep the vehicle in the wanted position in the wake of acquiring it complete rest when there is no driver.[3]

Under Regenerative braking alternator and dummy wheel arrangement is simply situated at the rear wheel which is isolated from each other during vehicle run either by pedal or by battery or from both. When we apply a brakes in tricycle a linkage arrangement push a dummy wheel towards the rear wheel and the brakes will apply, but during braking a matured contact

perform a dummy wheel rotate in reverse direction. An alternator acquired such rotation and generate electric energy and which stores in battery and charge it.

III. RESULTS AND DISCUSSION

Drive Train & Velocity Ratio

Drive train or transmission framework is a framework which creates and transmits power from a source (like I.C. motor, electric engine, or human drive) to the wheels with the assistance of various linkages. The force created by the source is transmitted to wheels through chain drive.

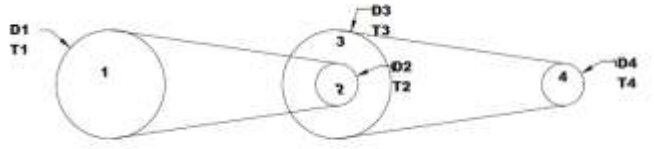

Figure 1. Concept of Drive Train Arrangement in EMT

VELOCITY RATIO

D1 and D3:- Diameter of Sprocket 1 and 3
D2 and D4:- Diameter of Sprocket 2 and 4
T1 and T3 :- Teeth of Sprocket 1 and 3
T2 and T4 :- Teeth of Sprocket 2 and 4

Here, T1 = T3 and T2 = T4
N2 = N3

T1/T2 = N2/N1
N2 = (T1 * N1) / T2

(T1 * N1) / T2 = X
So, N2 = X

Now, T3/T4 = N4/N3
N4 = (T3 * N3) / T4
N4 = (T3 / T4) * X

According to this Drive Arrangement N4 is getting approx 4 times of the Pedaling Effort.

IV. CONCLUSION

EMT has both pedal and throttle helped. Battery is charged from regenerative braking arrangement .Electromechanical Tricycle are environment agreeable in light of the fact that there is no outflow of fuel. EMT is a productive and coordinated vehicle that could securely and viably be utilized for regular transportation. It is exceedingly effective as compared with upright bicycles requiring less energy to overcome air drag at the same rate. Small frontal profile and streamlined body permit it to go at quick speed as compared with the typical bicycle. Adequate security is given to the rider an incorporated wellbeing framework. This style of fairing increases the appeal and attractiveness to touring in a tricycle combined productivity, security and utility make it appropriate to catch an extensive business sector portion in manageable transportation.

At last we simply need to say that this anticipate is not only a task, it's a one stage forward towards the time of Electromechanical vehicle, a time which is Dominated and impacted by the "Become environmentally friendly" idea and that is likewise our prime concern to build up a machine which satisfies the GO GREEN prerequisites. Straightforward, advantageous, cheap, and practical cycle is one of the world's most loved types of transportation. Be that as it may, they're not for everybody. They can be difficult to pedal all over slopes or with substantial burdens, and elderly or crippled individuals may find them difficult to manage. These new cycles have all the comfort of autos with all the straightforward economy of customary cycles.

It will be an altered form of a bicycle which has three wheels, two in front and one in back and has its focal point of gravity lower close to ground and move focus at the middle line of the vehicle to prevent rolling of the vehicle during turning.

V. REFERENCES

[1] Pedal at Highway Speeds with the RAHT Racer, RAHT Racer Kickstarter On 2/26/15, 11:44 PM
[2] Richard ‘Barney’ Carlson, Matthew G. Shirk, and Benjamin M. Geller’s Factors Affecting the Fuel Consumption of Plug-In Hybrid Electric Vehicles, EVS-25 Shenzhen, China, Nov. 5-9, 2010. The 25th World Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exhibition
[3] In the tutorial of http://what-when-how.com /automobile/braking-system-automobile