Smart Highway

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***Abstract*:-** Heavy transport is the last transport sector remains dependency over fossil fuel which makes it a leading source green house emission . Due to the expected growth in demand for transport the estimate that global emission from road freight transport will grow from 1.36 to 2.4 co2 by 2050. Now world want electric vehicle to reduce pollution . So have to develop and design new technologies regarding transportation system . In this smart highway project we designed for heavy vehicle transportation system . Heavy vehicle move safely without imbalance of electric overhead lines. In this project we use special light weight design steel rail wheel as front wheel which will move on track rail and back rubber tube wheel as back wheel and electric overhead lines as energy source.

INTRODUCTION:-

In this project we use electric overhead line for electric heavy vehicle and steel rail wheel as front wheel and Rubber tube wheel as back wheel .The back wheel connect with ac motor .So a special road with track rail and overhead line and special light weight design steel rail wheel also required. The front steel wheel move on track rail and back rubber wheel move on road.

CONTRUCTION AND DESIGN :-we will make a special road with overhead line electric supply ,special light weight design rail wheel, parking charging system with overhead line .This design for heavy vehicle transportation .We will use steel rail wheel as front wheel and rubber tube wheel as back wheel . During move on track rail we use steel wheel as front wheel .Otherwise use rubber tube wheel as front wheel when move on plain road . During the use of front tube wheel we do not use overhead line for electricity. We use battery as energy sources .Back rubber tube wheel connected with 3 phase ac motor. Front wheels are not connected with electric supply.

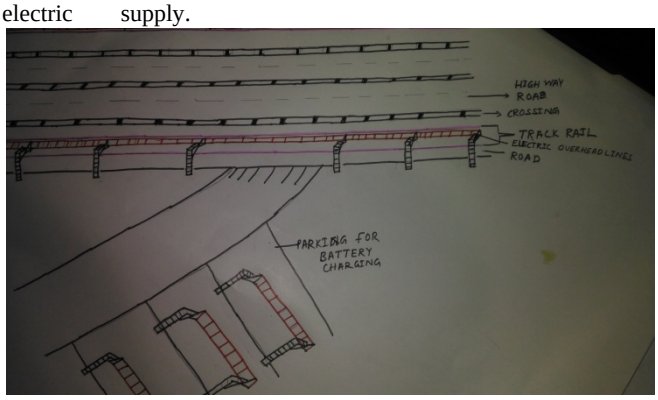

Fig1Highway with electric overheadline and electric charging parking of electric overheadline

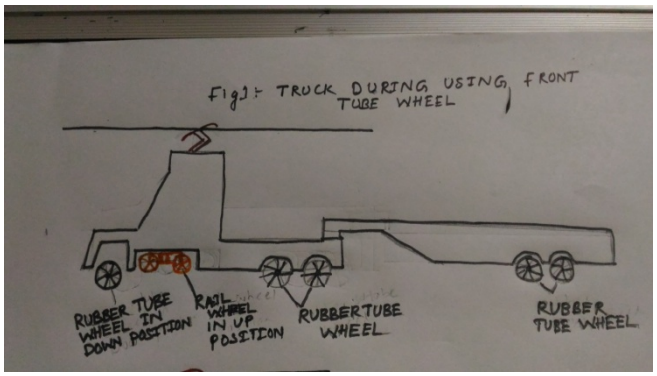

Fig2:-During front rail wheel up and front tube wheel down position

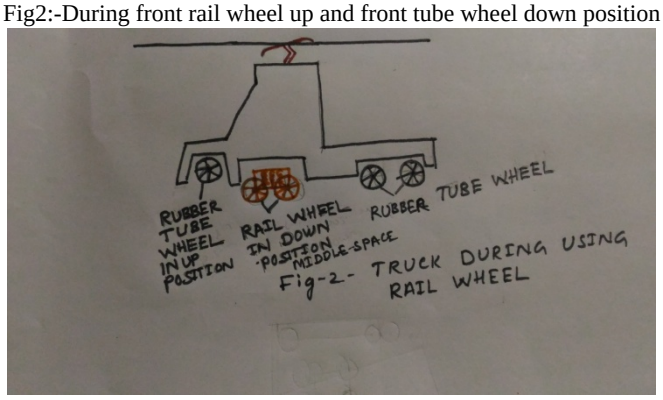

Fig3:-During front rail wheel down and front tube wheel up position

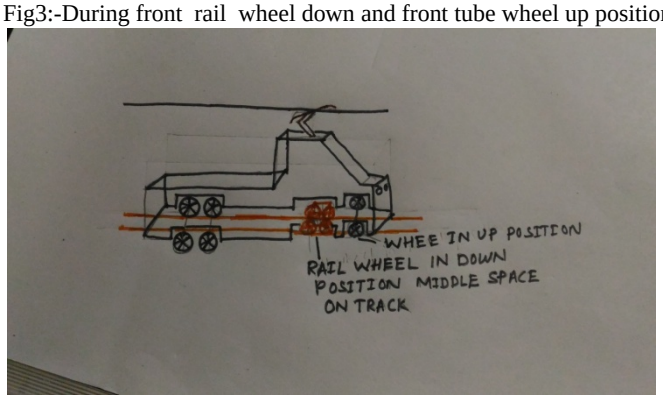

Fig4:-During front rail on track rail

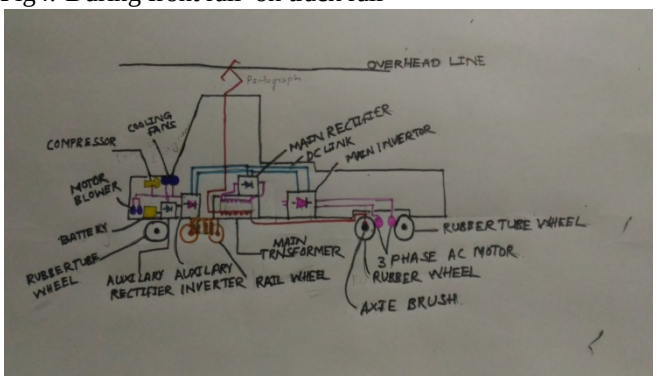

Fig5:-Different parts of vahicle

Steps during movement on track rail
1)first the front steel wheel down on track rail and front rubber tube wheel will up.
2)Then vehicle connect with overhead lines.
3)Then starts moving.
Steps during movement on plane road
1)steel wheel will up and front tube wheel will down
2)vehicle disconnect with overhead lines
3)Use battery as energy sources.

Front wheels aren't perfect cylinders. They're beveled to make them wider on the inside. This means that when the steel rail wheel shifts left or right on the track, the diameter of the wheels can change. But because the wheels are connected by an a xle, they still spin at the same rate. Effectively, this means that the wheels will travel different distances per revolution.

The wheel bevels are specifically designed so that when the steel front rail wheel goes around a corner it stays on the tracks. The wheels that have to travel a greater distance have a greater diameter, and everything stays aligned. The end result is a rail wheel stays on the tracks

Some Parts Of Electric Heavy Vahicle:-

Battery

Heavy vehicle are provided with a battery to provide start up current and for supplying essential circuits, such as emergency lighting, when the line supply fails. The battery is usually connected across the DC control supply circuit.

Converter

Generic term for any solid state electronic system for converting alternating current to direct current or vice versa. Where an AC supply has to be converted to DC it is called a rectifier and where DC is converted to AC it is called an inverter.

Cooling Fans

To keep the electronic power systems cool, the electric vehicle equipped with an air management system, electronically controlled to keep all systems operating at the correct temperature. The fans are powered by an auxiliary inverter producing 3-phase AC at about 400 volts.

Thyristor

A type of diode with a controlling gate which allows current to pass through it when the gate is energized. The gate is closed by the current being applied to the thyristor in the reverse direction. Thyristors (also referred to as choppers) are used for traction power control in place of resistance control systems. A GTO (Gate Turn Off) thyristor is a development in which current is turned off is by applying a pulse of current to the gate.

DC Link

Used on modern electronic power systems between the single phase rectifier and the 3-phase inverter. It is easier to convert the single phase AC from the overhead line to the 3-phase required for the motors by rectifying it to DC and then inverting the DC to 3-phase AC.

Rectifier

A converter consisting of thyristors and diodes which is used to convert AC to DC. A modern locomotive will usually have at least two, a "Main Rectifier" for the power circuits and one or more for the auxiliary circuits.

SEPEX

Short form of Separate Excitement of traction motors where the armature and field coils of an electric motor are fed with independently controlled current. This has been made much more useful since the introduction of thyristor control where motor control can be much more precise.

Synchronous Motor

Traction motor where the field coils are mounted on the drive shaft and the armature coils in the housing, the inverse of normal practice.

Tap Changer

Camshaft operated set of switches used on AC electric vehicle to control the voltage taken off the main transformer for traction motor power. Superseded by thyristor control.

Transformer-A set of windings with a magnetic core used to step down or step up a voltage from one level to another. The voltage differences are determined by the proportion of windings on the input side compared with the proportion on the output side. An essential requirement for electric vehicle using AC power, where the line voltage has to be stepped down before use on the vehicle .

Transistor

The original electronic solid state device capable of controlling the amount of current flowing as well as switching it on and off.

ADVANTAGES:-

1)Good for environment to reduce pollution

2)Reduce transportation cost

3)Reduce maintenance cost

4) Health benefits

5)Good for our energy security

Disadvantage:-

1) Truck will run only in good condition road

2) No turning is takes place during movement on track rail from track rail to direct road..

Conclusion:-

This modification is very good for electric heavy transport system and track rail used for balancing the vehicle and overhead line friction .

REFERENCES

1) http://www.railway-technical.com
2) https://www.siemens.com/in/en/home.html

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