Design Modification of Goods Vehicle With Weighing Scale

P. Logeswaran[1], G.Manojkumar[2], S.Thigazhvan[3]
[1]Assistant professor, Dept of Mechanical Engineering
[2, 3]Dept of Mechanical Engineering
[1, 2, 3] Salem College of Engineering and Technology, Salem, Tamilnadu.

Abstract- *The goods vehicle in a wheeled motor vehicle used for transportation of vehicle say they run primarily on roads, its four tires and mainly transport people rather than goods. Medium goods vehicle means any goods carriage once other than a light motor vehicle or a heavy goods vehicle. It mainly used in diesel engine, digital weight gauge in a back of the goods vehicle. It is main think as hand gear method. Using a weight machine, we can easily calculate the weight of the vehicle even when it is moving.*

Keywords- Diesel engine, Load cells, Sensors, Weight gauge

I. INTRODUCTION

Weighing scale devices are to measure the weight of goods. Spring balances or spring scales calculate weight that is the product of mass into gravity (9.807 m/s^2) on the force on a spring, whereas a balance or pair of scales using a balance beam compares masses by balancing the weight due to the mass of an object against the weight of one or more known masses. Some of them can be calibrated to read in units of force (weight) such as Newton's instead of units of mass such as kilograms. The balance or pair of scales using a traditional balance beam to compare masses may read correctly for mass even if moved to a place with different non-zero gravitational field strength. Also the spring balances that are designed with reading of weight (force) in mind, would read correctly for weight in different non-zero gravitational field strength. Scales and balances are widely used in commerce, as pmany products are sold and packaged by mass. Very accurate balances, called analytical balances, are used in scientific fields such as chemistry

A. Types of weighing scale

- Electronic (deep pit type)
- Electronic (pit less type)
- Digital weighing scales
- Rail Weighbridges, etc.,

II. PROBLEM DEFINITION

Before starting to design setup, a general survey about waste materials is carried out. The major problem is that more amounts of waste materials are not reused.

- To the development of the transportation system and lack of correct estimation of the weight of the load on the vehicle it has become a necessity to have a system that can measure the weight of the vehicle every moment.
- The lower gross weight of the vehicle, the centre of gravity moves to the front, which adds to the load on the driving axle.
- Transport the goods vehicle major source of CI engines only.

The survey mainly highlighted the need for a new method of converting them into weighing scales.

III. METHODOLOGY

A. Existing System

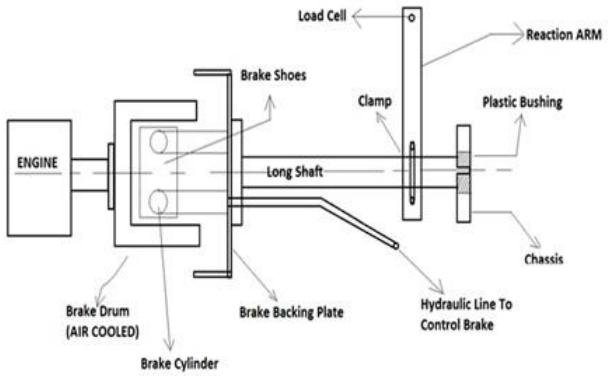

Fig.1 Layout of goods vehicle

Now a day we used only CI engine in goods vehicle. In existing system commonly large amount of load can be used. In vehicle transport the goods from long distance purposes. Load cells can be used only in spring.

In these projects objectives are:

- Reduce material handling costs.
- Reduce congestion that impedes the movement of people or material.
- Reduce hazards to personnel.
- Reduce accidents.
- Utilize available space effectively and efficiently.

In proposed system we have choosen minimum goods (less than 100kg) transport. Load cell installed on the back chassis and axle of the shaft. The load or weight data obtained from the sensor. Motor vehicle means any mechanically propelled vehicle adapted for use upon roads whether the power.

B. Design concept

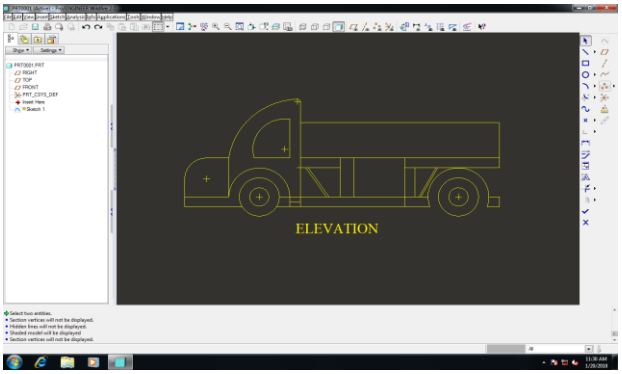

Fig.2 Elevation of Proposed Vehicle Design

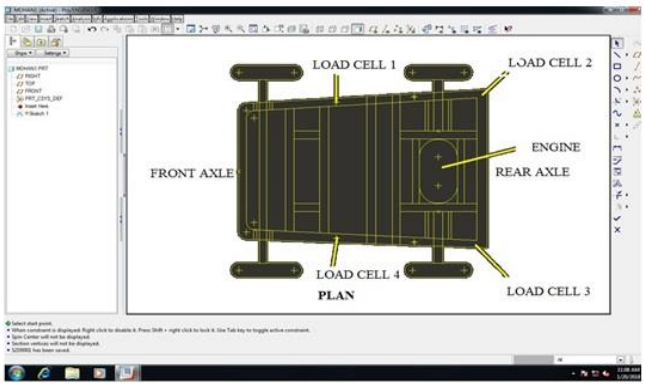

Fig.3 Plan of Proposed Vehicle Design

C. Design of vehicle structure

A structural design project may be divided into three phases, i.e. planning, design and construction Planning. This phase involves consideration of the various requirements and factors affecting the general layout and dimensions of the structure and results in the choice of one or perhaps several alternative types of structure, which offer the best general solution. The primary consideration is the function of the structure.

D. Dimensions of the Vehicle

The goods vehicle dimensions are following,

Length of the vehicle=2133.6mm (7ft)
Height of the vehicle =609.6 (2ft)
Width of the vehicle =914.4mm (3ft)
Carriage length=1219.2mm (4ft)
Carriage Height=304.8mm (1ft)
Carriage width=304.8mm (1ft)
Area of cross section of bar=30mm^2

Fig.4 Frame Structure of Goods Vehicle

E. Measuring Spring Pressure on Weight Sensor

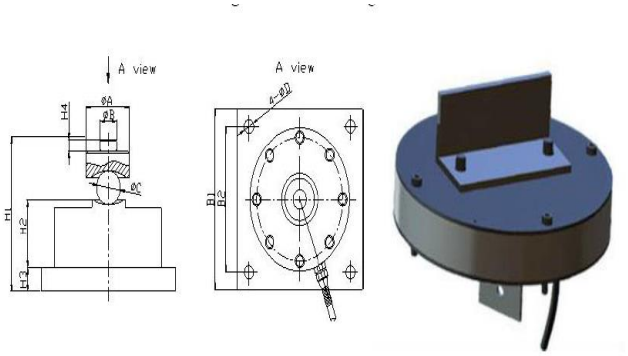

Fig.5 Vehicle weight sensor devices

Components of weight sensors are a base of weight sensor a weight sensor capable of weighing up 100kg, a spring capable of increasing pressure up to 100kg, a ball bearing placed on the spring, a device that converts the system resistance to 1to10volt, the central computer that calculates the voltage and changes it to a weight proportionate with the weight of the vehicle, communication Cables, a data transfer system that provides communication between computer and sensor.

The device specifications are:

- Safe and Nondestructive
- Waterproof and Shock absorber
- Small size
- Easy install on all kind of vehicle
- Accuracy and Precision with minimum error
- The vehicle load at an instant is computed by measuring changes in to vehicle suspension system.
- The changes in the vehicle suspension system are measured by a variation in pressure applied on the load cell in the weigh sensing device at an instant.
- The weight sensing device case a circuit board for measuring a pressure applied on the load cell and converting the applied pressure level into a resistance value.
- The weight sensor device is connected to the AVL system through a wired connection or wireless connection
- The AVL is provided with a monitor to display the vehicle load and the vehicle location data simultaneously.

Table 1 Weight sensor Technical Parameter

Sensitivity	(2.0±0.1%) mV/V
Combined Error	±0.05% F.S
Zero Balance	±1% F.S
Input Resistance	750±5Ω
Rated Output	1.0±0.1 mV /V
Insulation Resistance	≥5000MΩ
Operating Temp. Range	-30 ~ +70
Maximum safe over load	150% F.S
Ultimate Over Load	300% F.S
Element Material	Alloy steel, Stainless Steel

IV. WORKING PRINCIPLE

When a loading the materials weight sensor data on time, in time of sudden change of weight sensor for constant amount of speed shows the occurrence of tension in the suspension system of the vehicle (due to road roughness and puddles).High speed and intense change show high tension and imprudence of driver in paying attention to vehicle during driving on road roughness. Road roughness points could be recognized and could be used over time as a spatial data layer consisted of critical points on the road for all groups of vehicles.

A detailed report from function of weight sensor data is generated from the data saved/stored in the database of the digital format. The aim of designing, the report is to compare general operation and function of fleets in various definable weight ranges for the weight sensor. The report would be designed upon the map and without a map.

In this system architecture for measuring changes in the vehicle suspension system for monitoring changes of vehicle loading weight in various local and time situations and also checking driver`s attitude toward road surface roughness. The system comprises at-least three positioning satellites, one or more load carrying vehicles adopted with a system for measuring changes of suspension system and processing the data in order gain vehicle loading weight. All the data is parsed saved in apposition database of digital technology, so that various reports required for driver and vehicle functions and operation is generated by compounding data related to weight and time. In one panel received data from weight sensor are drowning, so that comparison between simultaneous changes of the weight sensor of the vehicle is possible and easy.

V. RESULTS AND DISCUSSION

Testing and developed in order to verify its overall performance which is the load carrying capacity of the vehicle. Materials were weighed for the testing with different loads placed on the vehicle carriage. The weight sensor developed could meet the requirements of the user being that it is simple, strong, durable, portable and affordable. It will be very useful for the weighing of bulky materials or packed piece in the laboratory. The weighing scale can be obtained locally and it can work for longer period of time.

VI. CONCLUSION

The main objective of having this new design is to improve the stiffness of structure and also optimize the material usage in weighing frame. There are various methods for measuring the weight of the load of the vehicles. Many equipment have been designed for automatic vehicle load monitoring system and navigation monitoring system, but the system which we designed has these qualities, a weight sensing device attached to a base of a vehicle and wherein the weight sensing device is a load cell, a compression spring attached to the weight sensing device and to a suspension spring of the vehicle, a voltage conversion unit attached to the weight sensing device to convert an output resistance of the load cell into a voltage, an automatic vehicle location data and a voltage conversion unit. Finally, safe and nondestructive, waterproof and shock absorber, small size, easy install on all kind of vehicle, accuracy and precision with minimum error, are some advantages of this device that justify the economic value of this device. Hence project may be helpful in

maintaining in the correct order and they can be surveyed within the small goods.

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