

“Vehicular Overload Detection and Protection”

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Abstract: The growth of every country's economy is measured by the growth of its transport infrastructure. With the gradual development of economy, the scale of transportation industry continues to expand. The problem of overload in the vehicle transport has emerged. Therefore, how simple and conveniently to know the vehicle load and how to effectively limit overload has become a key issue. Vehicle load control system integration device can detect conveniently vehicle load to prevent overloading of vehicle and improve vehicle safety and it can effectively reduce heavy work of the vehicle load testing station and improve work efficiency in transport sector.

Keywords: Overloading, Road safety, Vehicle protection

I. Introduction

The present work focus on prevention of damage of roads and prevent vehicle damage. Roads now-a-days play a very important role in every part of world.

The value lies in providing safe and convenient travel for the users. As the device is working in the loading process, it can ensure to prevent vehicle overloading; in the process of driving, the drivers don't have to worry about being fined due to overload syndrome; ensure the personal safety of driving. At the same time the system is designed to save the national highway maintenance fees and to ensure the safety of people's lives and property; it can solve the problem of the damage of highway bridges, can also travel to provide a more humanized service life for the people and for the country's economic construction contribute a strength. To sense the overloading effect well in advance there has to be a technology which focus on the calculation of the pay load and compares with the legal limits

1.1 Overload and Road Safety:

The safety issues and the cost issues are to be identified based on overloading and hence the National department of transport has incorporated a campaign against overloading in its Road Safety strategy.

Overloading of commercial vehicles has a major impact on the life expectancy of road networks. The cost of premature road failure and repairs is a major burden on many governments particularly in developing countries where this problem diverts vital funding that could otherwise be spent on health and education. The overloading problems should be controlled or else the extra expenses will be borne by the people which will result in extra wages to be paid in terms of overloading penalty, extra fuel consumption charges and also the trucks carrying goods beyond the permitted load will end up paying 10 times higher the toll charges. This imposes a serious problem on both economical aspects and also upon maintenance of roads.

Overloading is a safety hazard that leads to unnecessary loss of life and also the rapid deterioration of our roads, resulting in increased maintenance and transportation costs. In India the midst of building national highways under the NHDP(NATIONAL HIGHWAY DEVELOPMENT PROGRAMME) entails huge investment ,which will last for at least 10-12 years. However even a 10% overloading of goods carriage in excess of prescribe weight can reduce the life of roads and highways by 35%.

1.2 Overloading a Vehicle will pose the following risks:

Different vehicles have different maximum weights for which they are designed .Hence if this maximum weight exceeds than it is difficult to stop the vehicle and thus the vehicle becomes less stable .Effectiveness to stop the vehicle decreases due to overheating of breaks which will result in harder breaking mechanism as the vehicle is heavier. The parts of the vehicle are of great concern and overloading will incur major loss or reduction in their effective usage and will decrease the efficiency of the vehicles. As the overloading is illegal the insurance covered by it becomes invalid. Overloaded vehicles produce higher kinetic energy, resulting in greater impact forces and damages to other vehicles or to the infrastructure. The other common problems on National highways is overloading of trucks beyond the specified height and length limits. In 2014 these two causes have resulted in 36,543 deaths.

In a significant judgment on November 9, 2005, the supreme court said the issuance of gold cards/tokens under notifications issued by 9 state government, allowing overloading of trucks in excess of prescribed weight limits, after payment of fixed charges, was a violation of motor vehicle act 1988, and central motor vehicle rule 1989 and should not only be stopped immediately but also the over loaded cargo should be offloaded at the point of penalty the cost of which has to be borne by the transporter. This all causes a major uncertainty, does need a solution to prevent the risks.

1.3. Objective of the Project:

The aim of this project is to identify the effectiveness of using overload system in enhancing the operations in enforcing vehicle weight limit regulations. Specifically, this project attempts to quantify the effect of overloaded vehicle and protect the system and infrastructure of the roads.

II. Procedure

In this project, the feasibility of vehicle load control system through the strain gauge load cell installed in the vehicle, the single-chip microcontroller receives the information transmitted by the weight sensors and calculates the total weight of the vehicle load; if overweight, the single-chip microcontroller will send commands to the vehicle system to prevent the start of the system.

III. Working

The load sensor that is placed on the chassis collects, the vehicle load information accurately and reliably and transit the real-time information to the computer processor efficiently and safely using the single-chip microcontroller the information can be received in the form of variety of amplified signals by load sensors in harsh environment, calculates the total load and then transmit the data to the LED. According to different vehicle load, the single-chip microcontroller will choose whether to send instruction to the ignition system.

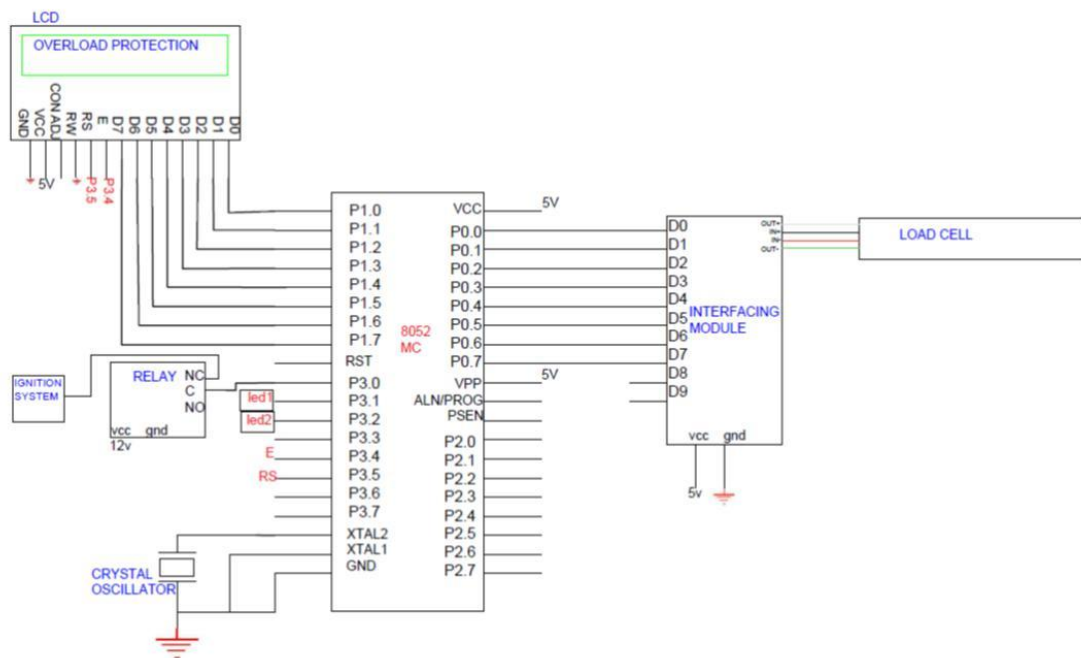


Fig. 1 Circuit diagram for overload protection system

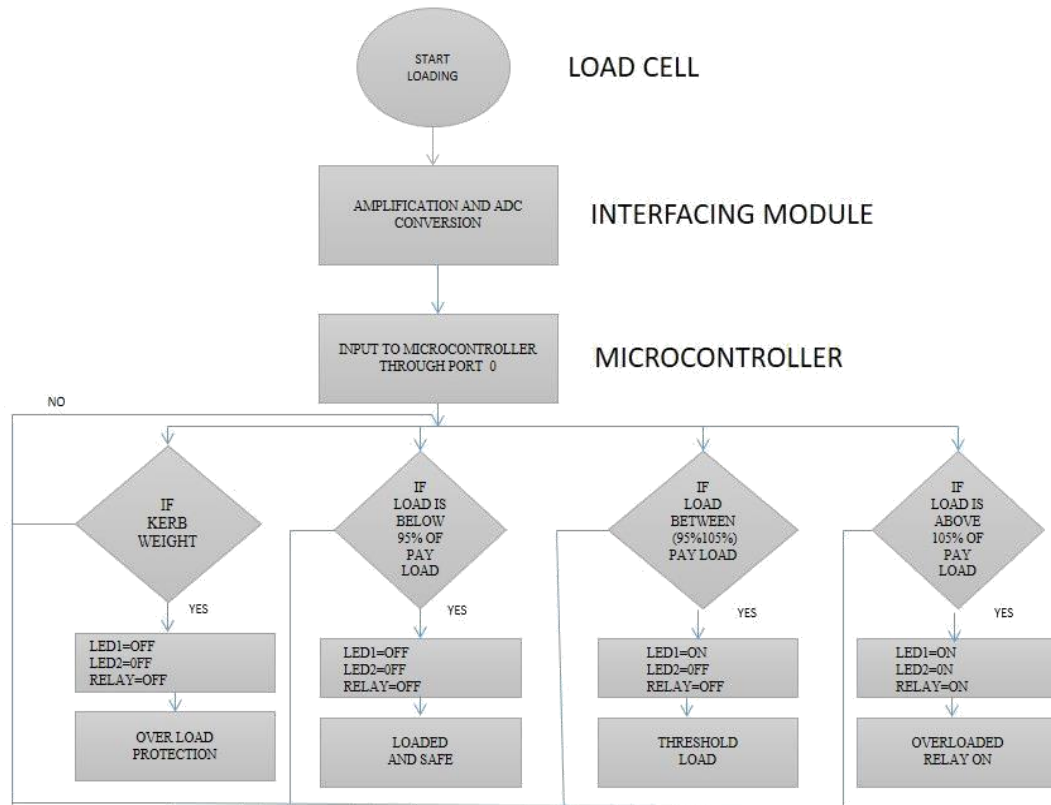


Fig. 2 Flowchart for the system :

The design of the vehicle consists of Gross Vehicle Weight(GVW) and Kerb Weight specifications which is given to the load system. It calculates

$$PL = GVW - KW$$

Then, compares the applied load with the calculated pay load.

CASE 1:

If the applied load is up to 95%of pay load then it can be considered as SAFE LOAD.

CASE 2:

If the applied load is between 95% to 105% it is taken as THRESHOLD and the signal is sent to LED, the LED glows indicating the safe limit ended and is also displayed on the LCD.

CASE 3:

If the applied load exceed the threshold then the signal is passed to the LED , LCD and Relay.

The relay gets operated and supply is disconnected to the ignition system.

IV. Conclusion

Overloading prevention system is a useful tool to contribute towards more compliance with mass regulation. It could help to reduce the number of overload trucks and contribute to the more efficient and effective use of roadways. A reduction in overload trucks is also conducive to a reduction in crashes and serious damage to people's lives and property. New applications of these systems are expected both for traffic and heavy vehicle regulation enforcement. Therefore this system is simple and convenient to know the vehicle load and solve the problem of vehicle overloading effectively

V. Acknowledgements

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