The Initiative For Fuel Saving In Earthmoving Machineries

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Abstract: Earthmoving machinery works for almost 20Hrs to 22Hrs a day in mining sectors. Every contractors most fuel consumption in machines. They calculate fuel consumption as Liters/Hr.(7) The factor fuel consumption plays important role in profitability of contractors. Our aim for doing this project is to reduce fuel consumption of earthmoving machinery. When machine is idle during machine operation due to unavailability of trucks for more than 3 or 4 minutes. It means engine is running and machine is not doing any work for more than 3 or 4 minutes. In above mentioned condition, many times it observed that operators never shut off the engine and continue to run the engine (9) which results in wastage of fuel and energy. Our project will ensure to shut off the engine in above mentioned condition. Our system will receive signal from machine controller that machine is idle and if the idle signal will remain continue for 3 minutes, our system will give signal for shut off the engine.(5) This process is automated and is highly reliable for improving fuel consumption & avoids energy losses.

Keywords:. Tata Hitachi 450-Zaxis, fuel saving, reduce maintenance cost

I. INTRODUCTION

The project is about fuel saving in earthmoving machinery at Durgapur open cast coalmine Chandrapur. In this type of live project we have installed controller unit basically, our project had been done on excavator TATA-HITACHI Z-AXIS 470H. As we had find out the problem at coalmine site when machine is idle during machine operation due to unavailability of trucks for more than 3or 4 minutes. It means engine is running and machine is not doing any work for more than 3or 4 minutes. So, to troubleshoot this problem we have installed a Pressure Sensor, Five Terminal Relay, 800-XA Timer Unit, Tee Adaptor for Sensor Fitment. Earthmoving machinery works for almost 20Hrs to 22Hrs a day in mining sectors. Every contractors most concerned about the fuel consumption in machines. They calculate fuel consumption as Liters/Hr. The factor fuel consumption plays important role in profitability of contractors.

Our aim for doing this project is to reduce fuel consumption of earthmoving machine. Today, we are faced with the dual challenges of the environmental pollution and a severe energy crisis. The need of the hour is to develop newer, environmental friendly technologies to generate clean energy. This paper introduces system

simulation techniques that are important in reducing the fuel consumption of hydraulic excavators. The techniques introduced first are a non-linear dynamic analysis technique for a system in which a strongly non-linear hydraulic system is coupled with a linkage system and a technique for evaluating of the engine fuel consumption of a hydraulic excavator during a loading and unloading operation in which the power for the hydraulic pump is loaded on the engine in real time. Ground transportation consumes 26.5% of the world energy in 2016 (8). In 2014, 3.1 billion gallons of wasted fuel and 6.9 billion hours of extra time are caused by congestion. Vehicle trip planning as well as routing based on traffic information is predicted fuel consumption which can save fuel and travel time, the potential of which has not been deeply explored (8).

I. Literature Reviews:-

1. OSA: A Vanet application focused on fuel saving and reduction of CO2 emissions
AVO: unaaplicaciónpararedes Vanetenfocada en el ahorro de gasoline y la reduction de emisiones

With the growth in the number of vehicles moving through the streets, high vehicular flow has become a mobility and public health problem for governmental institutions and people since time of travel, gasoline consumption, and greenhouse gas [GHG] emissions have suffered an important increase. Hereby, policies and actions are required to reduce the impact of this increase. In this study reportl, which was develop by us is an application for the simulation of Vehicular Ad hoc Networks [VANET] using two software applications: SUMO and OMNeT++. The application we developed optimizes fuel usage and reduces greenhouse gas emissions; showing that vehicles following a preset speed (previously studied), gasoline consumption and GHG emissions present a considerable decrease compared to vehicles not running at that speed.

2.cfd investigation of a novel fuel-saving device for articulated tractor-trailer combinations V. Malviya, R. Mishra* and J. Fieldhouse University of Huddersfield, Queensgate, Huddersfield, HD1 3DH, United Kingdom Enhancing the aerodynamic efficiency of commercial vehicles is gaining increasing importance as it helps to reduce both overall fuel consumption as well as emissions. This paper investigates the advantages which is offered by a novel fuel-saving device for such transport vehicles. This device uses a moving surface to impart additional kinetic energy to flow near the roof surface. The additional momentum in the flow modifies the flow field, thereby significantly reducing pressure drag. Distribution of drag shows that the front and rear faces of the semi-trailer and the tractor cab are the dominant contributors to drag. The overall reduction in drag has been quantified by the distribution of pressure on the surface as well as the individual contribution to drag by each surface of the vehicle.

4. Selection of mining equipment for use in Indian mines based on their vibration hazard potential
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Vibration exposure of operators of heavy earth moving machineries [HEMM] and epidemiological surveys conducted in India

and abroad show increased prevalence of musculoskeletal disorders (MSD) related to whole body vibration (WBV) exposure in the course of mining operations. Whole Body Vibration (WBV) exposure of 157 HEMMS in eight opencast mines in various parts of nation was evaluated through measurement of the magnitude of vibration and corresponding daily exposure durations according to the guidelines in ISO 2631-1:1997 WBV standard. The dominant axis of vibration depended upon type of equipment and also work-practices. Health risk to the operators was evaluated based on their daily hours of usage (1.4 to 7.5 hours) and respective vibration magnitudes (0.21 to 1.82 ms-2).It was observed that 42 (27%) of them showed minimal or no health risk whereas 83 (53%) equipment showed moderate health risk to their operators in the prevailing working conditions. 32 (20%) equipment showed high probability of adverse effect on the heath of their operators. Backhoes and shovels showed minimal or no health risk to operators. Hence for selection of other equipment, suppliers may be asked to provide vibration data describing the test condition so as to assess their suitability for safe use in mines. Alternatively, as Directorate General of Mines Safety (DGMS) has prescribed, vibration survey of these machineries must be conducted before their introduction in a specific mine and only that equipment should be procured and deployed which transmits vibration within safe limits to their operators.

5.Development of a Machine-road Simulator for Performance Investigation of Height Measuring Sensors in Earth Moving Machinery

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Automation in industry of conventional machinery has generally been enhanced by intelligent control systems due to utility and efficiency rising, ease of use, profitability and upgrading according to market demand. A broad variety of industrial merchandise are now supplied by computerized control systems of earth moving processes to be performed by construction and agriculture field vehicle such as Grader, Back hoe, Tractor and Scraper machines. The main job is controlling such devices consists of the topography surveying, cutting and filling of elevated and spotted low area, and these actions fundamentally depend on machine ability in elevation and thickness measurement and control.

An apparatus was designed and manufactured, as the primary part of this research, for performance investigating of thickness and height control unit such as laser and ultrasonic based transducers. An endless conveyor in the place of of field or road, a carrier of control unit as the vehicle body and a programmable moving probe designed analogy to machine actuator or blades. The result reveals the capability of this procedure for experimental recognition of sensors' behavior and improvement of field machine control system. Inspection, calibration and response diagnosis of elevation control system in combination with machine function can also be evaluated by some extra development of this system.

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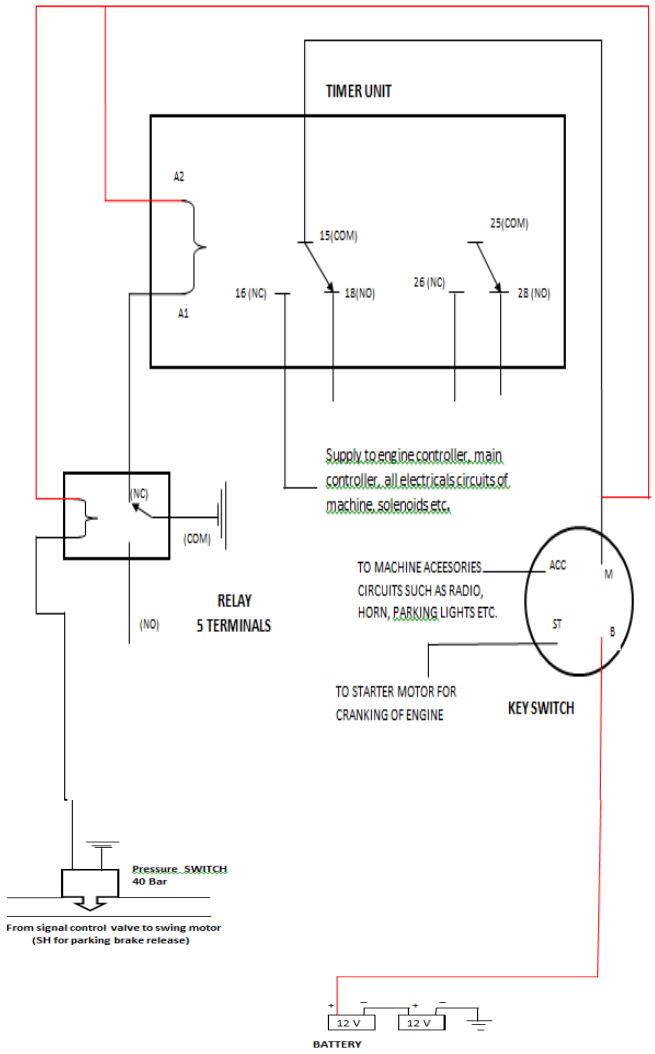
6.Reviewing in-vehicle systems to improve fuel efficiency and road safety Atiyeh Vaezipour, Andry Rakotonirainy, Narelle Haworth Centre for Accident Research Road Safety, Queensland University of Technology, 130 Victoria Park Road, Queensland 4059, Australia

Road transport plays a significant role in various industries and mobility services around the globe and has a vital impact on our daily lives. However it also has serious impacts on both public health and the environment.

Eco-driving systems within the area of HMI. This can promote new research aimed at enhancing our understanding of the relationship between eco-driving and safety from the human factors viewpoint. This provides a foundation for developing innovative, persuasive and acceptable in-vehicle HMI systems to improve fuel efficiency and road safety.

Data show that the reported fuel economy for a given vehicle can vary by plus or minus 20% across a large population of drivers. Some of this variation results from differences in temperatures and road conditions encountered, but differing driver behavior also accounts for some of this spread. It stands to reason that if more efficient driving habits was adopted by drivers universally, then the spread in fuel economy results for any given vehicle would shift to higher values.

Methodology:-



In coal mines an excavator is works 20 to 22 hrs. Daily in mines including the time when excavator not loading the dumpers. Due to continuous running of excavator fuel consumption occurs, so requirement of fuel and load on the engine is increase. To overcome that problem we planning to install a device which eliminates that problem by shut off the engine automatically, we mounting timer in a cabin which pass input signal from machine controller unit to the engine, for stop the engine when machine is idle. When machine is idle during machine operation due to

unavailability of trucks for more than 3 minutes. It means engine is running and machine is not doing any work or lever is not actuated for more than 3 minutes.

Whenever lever is operated the pressurised fluid flows from pilot line, pressure sensor sense the pressure of fluid and at the same time coil in five terminal relay gets energize. Common terminal (CMM) gets connected to normally open (NO) terminal and after that, timer unit gets off.

When lever is not operated and fluid is not flowing from pilot lines at that time pressure switch does not sense the pressure, and coil is not energize then common terminal (CMM) is connected to normally closed terminal (NC),the Coil of timer unit will get energized and common terminal(CMM) of timer unit will be connect to normally open terminal(NO)after 3 minutes, and breaks the connection of machine .

II. CONCLUSION

The technology of The Initiative for Fuel Saving in Earthmoving Machineries used for the development of an energy-saving type of hydraulic excavator has been outlined in this paper. The requirement of fuel-saving type hydraulic excavators will continue to increase; however, it is difficult to achieve any significant improvement solely by improving the current power system losses by using the equipment like pressure sensor ,5-terminal relay valve and timer unit. By using all this equipment we will develop new systems. To carry out this purpose, of system evaluation technique we reduce the fuel consumption in Earthmoving Machineries. We will continue to strive for further energy saving and contribute to the protection of the global environment.

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