Anti-Lift Protection Method and System for Tractors

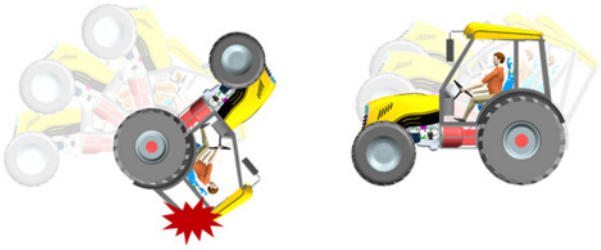
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Abstract

Statement of the Problem: A Tractor is a vehicle specifically designed to deliver a high tractive effort at slow speeds to be used for a variety of operations from tillage to haulage under extreme conditions. For haulage it may work on a farm road or on a concrete road, on levelled surface or on steep slopes. Also for tillage it may work on field that may or may not be levelled. Agricultural implements may be towed behind or mounted on the tractor, and the tractor may also provide a source of power if the implement is mechanised. Whatever the case may be, one of the most important considerations is to provide hazard free operation to the driver. This is possible when a tractor is stable during a static as well as a dynamic situation. Harbarta (1971) investigated to achieve longitudinal stability and manoeuvrability of the tractor and emphasized that the load of the front axle in static condition on plane ground should be at least 25% of the instantaneous weight of the tractor. Rearward overturning takes place when dynamic front wheel reaction is reduced to a threshold amount which can be due to excessive drawbar loading, decreases soil reaction against the front wheels, tractor is operated on a steep slope etc. The purpose of this invention is to give driver additional safety measure against the overturning of Tractor. Methodology & Theoretical Orientation: If the angle of the vehicle could be measured and before reaching the "Point of no return" the torque can be controlled as precautionary measure to avoid further lifting and overturning of the tractor. To address this issue a method and system (Electronic control unit) has been designed and developed, later on by using this developed device a study was conducted on scale down model of tractor to understand the working of whole system Findings: Farm tractor accidents are estimated to claim many lives annually throughout the world. McClure and Benson (1961) reported that 67% of overturnings were to the side and 33% were to the rear. They also reported that rearward overturnings are more likely to be fatal than the sideways overturnings. Conclusion & Significance: This invention is based on overturning of tractors creates new pathways for improving safety of drivers working in extreme conditions.

Without Anti Lift Protection **With Anti Lift Protection**



Recent Publications

1. Harbarta F. (1971). Determination in relation to safety of operation of the minimal load on the front axle of a tractor with implements attached. J. Agric. Eng. Res. 16(2):126-140.
2. Koch J.A., Buchele W.F. & Marley S.J. (1970). Verification of a mathematical model to predict tractor tipping behavior. Trans. ASAE 13(l):67-72,76.
3. McClure W.R. & Benson J.L. (1961). An analysis of 212 fatal Ohio farm tractor accidents. ASAE Paper No 61-129, ASAE, St. Joseph, Mich.
4. Dennis J. Murphy, Professor, (Revised 2/2014) Tractor Stability and Instability. Agricultural Safety and Health
5. Kumar A. & Pandey K.P. (2012). A device to measure dynamic front wheel reaction to safeguard rearward overturning of agricultural tractors program in visual basic for predicting haulage and field performance of 2WD tractors. J. Comput. Electron. Agric. 87:152-158.



Parminder Singh is senior technical lead at MBRDI. He is graduated in Mechanical engineering in 2007 from Punjabi University, Punjab. He has got 10 years of Automotive Industry experience in Product Design & Development. His new invention based on overturning of tractors creates new pathways for improving safety of drivers working in extreme conditions. He has invented this model after years of experience in research & development and which has been patented in India in the year of 2015 with patent number 1877/CHE/2015.

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