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Abstract

The tractor is one of the essentials of the farmer and the production on the farm depends largely on the tractor and its safety provided by the OEM (Original Equipmetns Manufacturer). This study examines movements produced by Agricultural Tractors under various degrees of reduction vibration through the variable speed of the tractor. The digital vibration meter VB-08301HA was used to measure the movement made by the tractor. The tractor vibration rates on the plane of the seat resting plate at the X, Y, and Z directions were measured at speed (m / s²) at 1350, 1600 and 1850 rpm on the tractor using the integrated spring cables with the collar, the coil spring is a condensed tool used to conserve energy and then release it, absorb shock, or conserve energy between contact points. And the metal coil springs are made by firing the wire around the old one - the cylinder is used to build cylindrical coil springs. As a result, a small degree of vibration in the longitudinal direction (2.49 m / s²) has been found using the spring coil tendency. In the lateral direction, a maximum reduction in vibration was achieved under the use of a collar-mounted coil icon on the inclined floor of the tractor and seat base (2.93 m / s²). In vertical direction, vibration rates were obtained under the use of spring (6.52 m / s²). As a review of the downward vibration of the books it is very sensitive to the operator. Therefore the use of a flexible coil in the collar is very important to control the vibration of the tractor seat is recommended.

Keywords: Tractor Transmission, Driver's Life, Coil spring, Collar for spring coil, better stability, Seat comfort level

1.Introduction :

The tractor seat is one of the most important component or assembly with regard to the human machine system and the convenience of the tractor operator ,In tractor there is no suspension systems like Automotive ,the only suspension is very much available at Seat which not only gives comfort to tractor operator but also improve ergonomics if the seat is properly designed and this seat is directly related with the tractor performance as the tractor operator works hours and hours in farms in seasons . After this, field surveys and lab tests are carried out with known tractors and tractor chairs, respectively, mostly referring to the seat size. The size of the seat panel and backrest were measured and analyzed, according to BIS recommendations. The results highlighted that the width of the seat panel was found to be 11%, the seat height was found to be 15.5% excessive, no extra adjustment and backrest width was found to be 20.5% less. This can cause discomfort for the junior and senior percentile tractor workers. Based on the design specifications for the installation of different tractor chairs - a standard service plate was developed i.e. This plate can serve as a basis for providing solvent recovery. Also, this provision can be very useful for the testing of different tractor seats, subject to the constraints of the availability of different tractor designs during the inspection or inspection work. The study also highlighted that current tractor seats require minor adjustments / improvements to the positioning of the sections as BIS compliments. Development of a standard seat base plate may be a step forward in the direction of long-term tractor suspension. The information thus obtained can be used to build chairs, set workplaces and transform with agricultural engineers to find a better working environment.

Agricultural tractor is most exposed to vibrations caused by various heavy elements, motors, and earth profile imbalances. The effects of a tractor driver's vibration on a frequency of up to 2 Hz cause neurological problems, such as: Hearing disorders, ear problems, fatigue, headache, nausea, vomiting, inactivity, weakness, and vertigo. The study showed a decrease in the lumbar spine with prolonged exposure to total body vibration (Tiemessen et al., 2011) that the tractor operators are subject to vibration in all three directions, but can tolerate more severe longitudinal vibrations and more direct direction. The termination is essentially of two types: sinusoidal and random. Sinusoidal vibration is the most common in nature and can be predicted. Random vibration is uncommon and unexpected. This test was performed to determine the flexural strength of the various coil coil to reduce the rigidity of the tractor seat. In that case, four different types of coil tenders were used along with all the accessories and roof components.

Observation of vibration rates in terms of acceleration (m / s^2) was recorded at different RPM locations. 1350, 1600 and 1850 RPM. The effect of spring performance on lowering vibration levels at different locations in RPM Literature Review Janeway's (1975) study showed that the vibration movement of the wheel tractor is vertical and that the driver is very sensitive to this vibration. The effect of long and winding roads depends on the type of work done by the tractor. The efficiency and speed of agricultural tractors have increased so that movement is higher, and tractors tend to contain higher power sources causing new vibration problems (Seradio et al., 2007). McLauchlan, (2006) stated that in the quantitative analysis of vibration problems we encounter one of three possible parameters of the vibration rate. The first is immigration and the other two are stocks and accelerators. Cvetanovic et al., (2013) examined the level of total body vibration and found that tractor drivers were exposed to exposure to adverse effects leading to health-related problems. Dupuis and Christ et al., (1966) reported two types of health problems that were clearly shown to originate from prolonged tractor work: abdominal cramping and spinal cord disorders, the percentage of spinal cord injury drivers increased from 72.5 to 78.9%. Petrovich et al., (2005) stated that many levels of vibration that occur in a complex system such as a tractor are transmitted to the operator in three basic ways in the seat, where the entire body of the user is pulled. Goglia et al., (2006) noted that agricultural tractors are exposed to whole body shock and shock. All body vibration is usually transmitted by the chair, floor and feet and the arm. Influence of Vibration on frequencies from 2 to 80 Hz causes: vascular alterations, disturbances in the digestive system, changes in the urinary and genetic system (Zehsaz et al., 2011). Matthews (1973) argued that performing tasks that require the strength or accuracy of muscle control may indicate a decrease from vibration. He pointed out that a vibration between 3.5 and 6.0 Hz could have an impact on awareness of subjects involved in bored monitoring activities. Tendon and Nakra (1992) argue that vibration in a time domain can be measured with a parameter such as the overall RMS level, crest factor, population and kurtosis. Of these, kurtosis is the most effective. Seidel (1993) pointed out that prolonged exposure to the entire body may contribute to disorders of female reproductive disorders (menstrual disorders, menstrual disorders) and pregnancy disorders (abortion, childbirth). Rottensteiner et al., (2013) used an analysis of variance (ANOVA) of the PASW Statistics 18 package to compare vibration and noise data during various operating mode and to prepare and evaluate the effect of chipper model, set type, and wood materials, on operator disclosure -

vibration and noise. However the above number of research paper and work not very much useful in effective suspension system. And there is not only scope to research in this area but also tremendous potential to work.

2.Field Survey

Field Survey for the various tractors tested and observed the condition of seat assy. The Active seat technology helps deliver an extremely difficult ride. This existing seat is very much discomfort and provide fatigue to the tractor operator. Most of the seat is observed failure in two years of its operation.



Fig.No.1.Field Survey of Tractor Seat

3. Materials and Methods

Tractor Selection: One tractor selected from one of the respected OEM manufacturers of Units of Vibration Measurement: Estimates vibration rates for recording velocity and acceleration in mm / s and m / s^2 , respectively. Application Vibration Meter: Vibration meter is used to measure vibration rates in unit of velocity and velocity. The Vibration VB-08301HA meters are located in a Quality Standard lab used to measure different Vibration levels. Vibration Measurement on Tractors: Vibration rate observations are recorded in three cases i.e. horizontal front left (X) direction, horizontal side (Y) direction and top left to (Z) direction. Recognition was taken at different engine speeds with different special vibration. viz. 1350, 1600 and 1850 RPM in the bottom seat of the tractor in the shape of the stand. Consumption of Different Coil Coils: Broad Coil Spring Source, Tray ribbed spring assy, spring cork and natural Thin ribbed Coil Spring Coil Spring Coil Spring with collar was used to place under the Transor-1 seat the idea of reducing the magnitude of vibration levels.

4. Results and Discussion :

The graphs show the Vibration Ratio at 1350 RPM Engine Speed: At 1350 RPM, the fastest acceleration values (m / s^2) in the wide-angle natural line Joined with Coil Spring with steel, short-shaped natural coil Spring with collar , cacao spring, natural dried faeces Coil Spring with neoprene collar Fitted Coil Spring with missing sheet and without long side spring found to be 2.44, 3.19, 2.65, 1.89 and 5.83 m / s^2 , respectively. In the same way the directions obtained are found as 2.99, 2.53, 5.41, 3.61 and 5.50 m / s^2 respectively, and the Vertical index is found to be 6.10, 6.54, 4.96, 5.98 and 11.15 m / s^2 , respectively. The graphs show that Vibration Ratio at 1600 RPM tractor engine speed: At 1600RPM, average acceleration values (m / s^2) in natural Coil Spring coil spring with collar, short Coil Spring type black, Coil Spring with neoprene collar Inserted coil Spring with no spring in the longitudinal direction is found to be 3.38, 3.30, 3.98, 3.79 and 5.18 m / s^2 , respectively. In the same way the directions obtained are 2.64, 5.28, 4.54, 2.76, and 5.36 m / s^2 respectively, and the vertical accuracy index is found to be 7.31, 9.46, 9.05, 8.11 and 14.68 m / s^2 , respectively. The graphs show the Vibration Measurement Speed of the 1850 RPM Railway Engine: At 1850RPM, average acceleration values (m / s^2) in natural

ribbed composite Coiled Spring Coil, small coated maize Coil Spring with collar, spring cork, coiled natural coil spring for coil Spring with neoprene collar Coil Spring coil with and without spring on long side is found to be 3.40, 4.29, 2.76, 2.79 and 4.76 m / s², respectively. Similarly the lateral direction is found to be 3.13, 3.53, 3.11, 3.51, 7.53 m / s², and the upward direction index is found to be 8.24, 7.99, 5.55, 7.03 and 15.94 m / s², respectively. Comparison of differential vibration differential effects From the table below 1 found that a decrease in the percent (%) of the longitudinal direction due to the use of vibration springs: - Studies show that the maximum reduction of vibration as compared to the spring with percent percent in the seat was seen at 1350, 1600 and 1850M -average minimum coil

SAE9254 with neoprene Included Coil Spring with collar (67.6%), natural coil resistant Coil Spring with collar exclamation r and neoprene Included Coil Spring with collar (46.1%) and (51.7%) respectively long. From the table below 2 found that percent (%) reduced lateral direction due to the use of a vibrating spring: - Studies show that the maximum reduction in vibration as compared to the spring in percentages in the seat was seen at 1350, 1600 and 1850 RPM in the compressed natural O-line. -Coil Spring with collar spring (61.82%), natural thickness line Combined with Coil Spring with special spring (50.75%) and cacao spring (58.70%) respectively. From the table below 3 found that a decrease in percent (%) of vertical displacement due to the use of vibration sources: The readings show that the maximum reduction of vibration as compared to the spring in percentages in the seat was seen at 1350, 1600 and 1850 RP in cacao (55,52%), the coiled natural environment of Coil Spring with a special spring (50.20%) and cacao spring (65.18%) respectively.

Table.1 Percent (%) reduction in longitudinal direction due to application of Thin Inclined coil spring with collar SAE9259

RPM	Thick Coil Spring SAE9254	Thin Coil Spring SAE9259	Average coil spring SAE9254	Thin Inclined coil spring with collar SAE9259
1600	58.1	45.3	54.5	67.6
1850	34.7	36.3	23.2	46.1
2000	28.6	9.9	42	41.4
Average	40.5	30.5	39.9	51.7

Steel alloys are the most commonly used materials in the spring. The most popular alloys include high-carbon (such as musical string used for guitar strings), low-carbon-low-carbon, chic silicon, chrome vanadium, and stainless steel.

The strength of a fruit-bearing fruit is the ability to focus on the material to withstand the forward bend or twist and return to its original shape without damage. The spring metal alloys incorporate silicone into their structure and are strong and cold wrapped after casting to improve the strength of the fruit. Spring metal products are often frozen in wire or punched from flat surfaces. Common uses include saws, tape measures, water springs, and suspension equipment.

The spring steel alloys feature the unique feature of being able to withstand twisted or bent forces without deviation. Products made of these metals can be bent, pressed, extended, or twisted continuously, and will return to their original shape without any hassle. This feature is described as high yield strength and is the result of the precise design and toughness of the metal alloy. The spring boots of medium to high alloys are generally of high carbon content of 0.5 to 1.0 percent. Other alloy additives usually include manganese and silicone containing silicone that are an important component in high yield strength.

Table.2 Percent (%) reduction in lateral direction due to application of Thick Coil Spring

SAE9254

RPM	Thick Coil Spring SAE9254	Thin Coil Spring SAE9259	Average coil spring SAE9254	Thin Inclined coil spring with collar SAE9259
1600	61.82	54.00	1.64	34.36
1850	50.75	1.49	15.30	48.51
2000	58.43	53.12	58.70	53.36
Average	57.0	53.1	25.2	45.4

Current suspension system designs require light and compact coil springs. Using a new spring microalloyed coil spring, the SAE 9259 Modified can effectively cope with the high pressure experienced by these snails. The performance of spring at high levels of stress and strain was measured and compared with those found in the four spring commercials used in North America and Japan. Of the ten high-performance springs (1080 MPa), SAE 9259, SAE 9259 Modified,

SAE 9254, and SAE 9254 modified springs with the same stress properties, or better than conventional SAE 5160 springs, however they are 15 percent easier.

Table.3 Percent (%) reduction in vertical direction due to application of Average coil spring

SAE9254

RPM	Thick Coil Spring SAE9254	Thin Coil Spring SAE9259	Average coil spring SAE9254	Thin Inclined coil spring with collar SAE9259
1600	45.29	41.35	55.52	46.37
1850	50.20	35.56	38.35	44.75
2000	47.99	49.87	65.18	55.90
Average	47.8	42.3	53.0	49.0



Fig.No.2 Seat Position in tractor with a modified mechanism

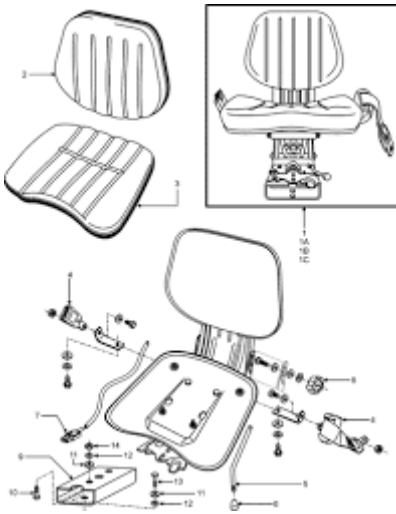


Fig.No.3.Exploded view of tractor components with child parts



Fig.No.4. Inclined coil spring with collar



Fig.No.5.. Position of Coil Spring with collar with adjuster



Fig.6 Position of while fitting Inclined Coil Spring with collar and adjuster

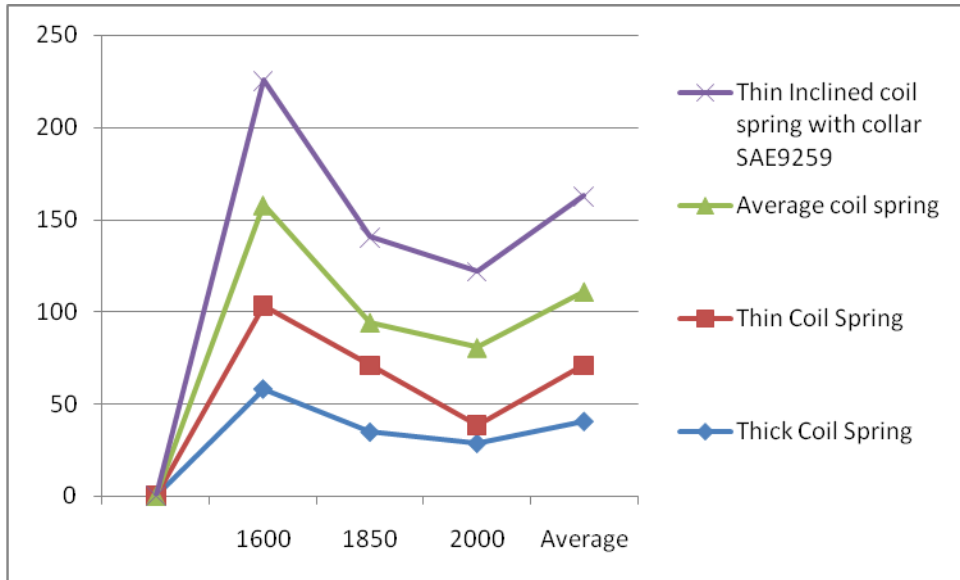


Fig.No.7. Percent (%) reduction in longitudinal direction due to application of Thin Inclined coil spring with collar SAE9259

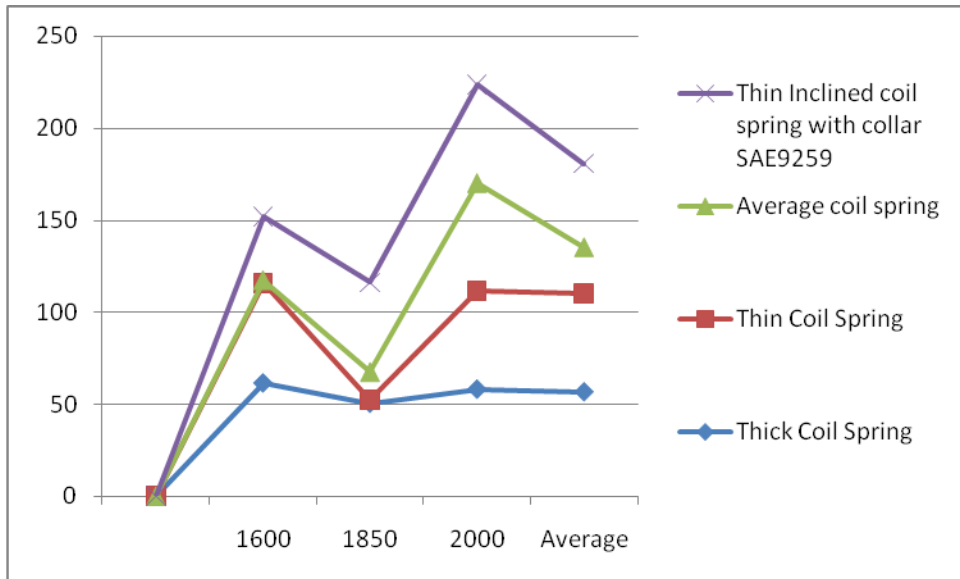


Fig.No.8. Percent (%) reduction in lateral direction due to application of Thick Coil Spring SAE9254

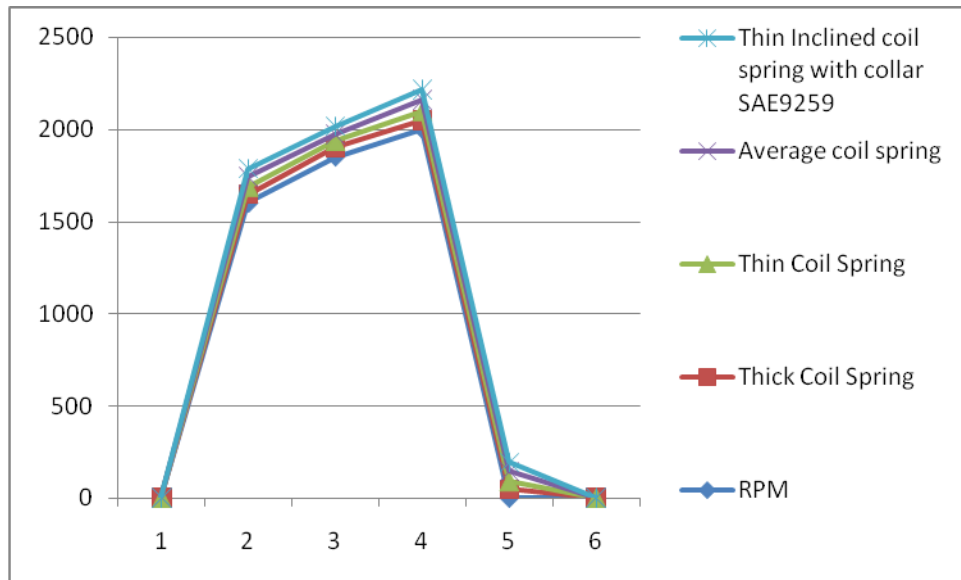


Fig.NO.9. Percent (%) reduction in vertical direction due to application of Average coil spring SAE9254

5. Conclusion :

In the long-range direction, a significant reduction in vibration rates can be found under the Thin Installed spring coil with SAE9259. In the lateral direction, the maximum reduction in vibration can be found under Thick Coil Spring, SAE9254. In vertical direction, the maximum reduction in vibration rates can be achieved under the average spring coil, SAE9254. As found in the literature, vertical vibration rates are more harmful compared to longitudinal and lateral sounds. Therefore, the use of the average coil in spring SAE9254 is recommended.

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