



# **SNS COLLEGE OF TECHNOLOGY**

**Coimbatore-35**  
**An Autonomous Institution**



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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF AGRICULTURE ENGINEERING**

### **19AGB301-FARM TRACTORS**

III YEAR V SEM

**Topic : *ERGONOMICS OF A TRACTOR***

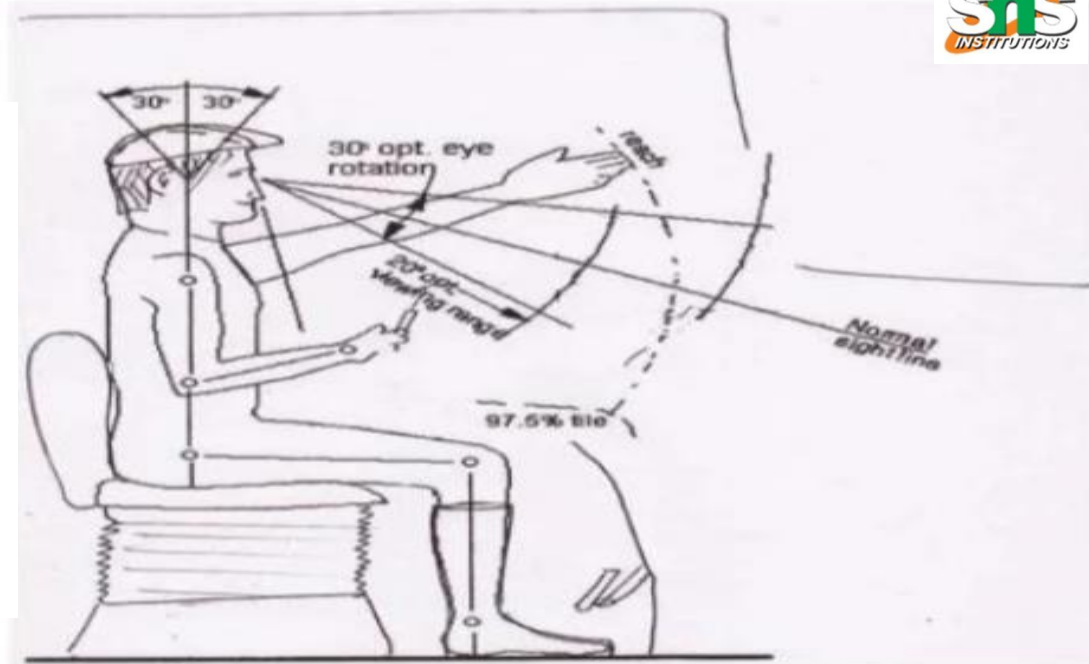


# INTRODUCTION

- Ergonomics is the field of study that examines human behavior, psychological and physiological capabilities and can design and modify established work environment to maximize, the productivity worker's comfort and overall efficiency.
  - Modern agricultural industry is inclined towards high speed, power and efficient agricultural tractor.
  - The nature of tasks on a tractor necessitates a number of actions to be performed by the operator, which puts varying physiological demands on the body.
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RE232770 – semi-active suspension assembly





# Measurement of steering angle.

A Workplace design measurement of tractor includes the measurements of steering angle and it is done by using 'Bevel protector' a bevel protector is a circular or semicircular tool for measuring an angle or a circle. The utilized are usually degrees. Bevel protector has one or two swinging arm which can be used to help measure the angle. Also bevel protector is a graduated circular protector having a pivoted arm, used for measuring or marking of lines.

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# Force Limits for Actuating Various Controls.



- As the pedals are moved laterally from the middle of the leg, the force executable decreases and the discomfort increases .  
The Indian standard IS: 10703-1992 specifies the limits for actuating forces for the various controls.
- Measurements of various controls are essential for the operator comfort and check standard and actual are equal.



# Electrical Load Cell .

- An electrical load cell is a device (Transducer) that is used for convert a force in the electrical signal. This conversion is indirect and happens in two stages. Through a mechanical arrangement, the force being sensed deforms a strain gauge. The Strain gauge converts deformation (strain) to electric signal





# Push-Pull Gauge .



- A push pull gauge is a device also used for the force measurements it is used for the force measurements of gear shifting lever in the case of push pull the controls. Push pull gauge has a limit of 30 kgf.



# Measurement of Vibration Transmitted in Tractor.



- Comfort in farm machinery units requires the absence of unpleasant intrusions. Vibration is the principle cause of discomfort in tractors. The vibration level is dependent primarily on factor such as driving surface, speed, the RPM of the engine, the type of seat, the kind of tires and the construction of the machine. After measurements of vibration on seat and controls check whether it is in limit or not. Vibration analyzer is used for measure vibration of improved tractor





# conclusion



1. The tractor after ergonomic modifications was measured and tested for compliance with the Budni recommendations for tractor workspace design, and was found to be OK.
2. The tractor operators in the survey found that modified tractor is safe and comfortable for driving.
3. The forces were measured by load cell and push-pull gauge were found to be within the physiological force limits specified by the standards IS: 10703-1992.
4. The vibrations measured by hand analyzer after modification was found to be within limits specified by the standard ISO 2041: 1990, ISO 6007.

**THANK YOU**