

MEASUREMENT OF DRAFT

- **INSTRUMENTS**
 - **SPRING DYNAMOMETER**
 - **HYDRAULIC DYNAMOMETER**
 - **LOAD CELL**
 - **RING TRANSDUCER**
 - **EXTENDED OCTAGONAL RING TRANSDUCER (EORT)**

Spring dynamometer

While

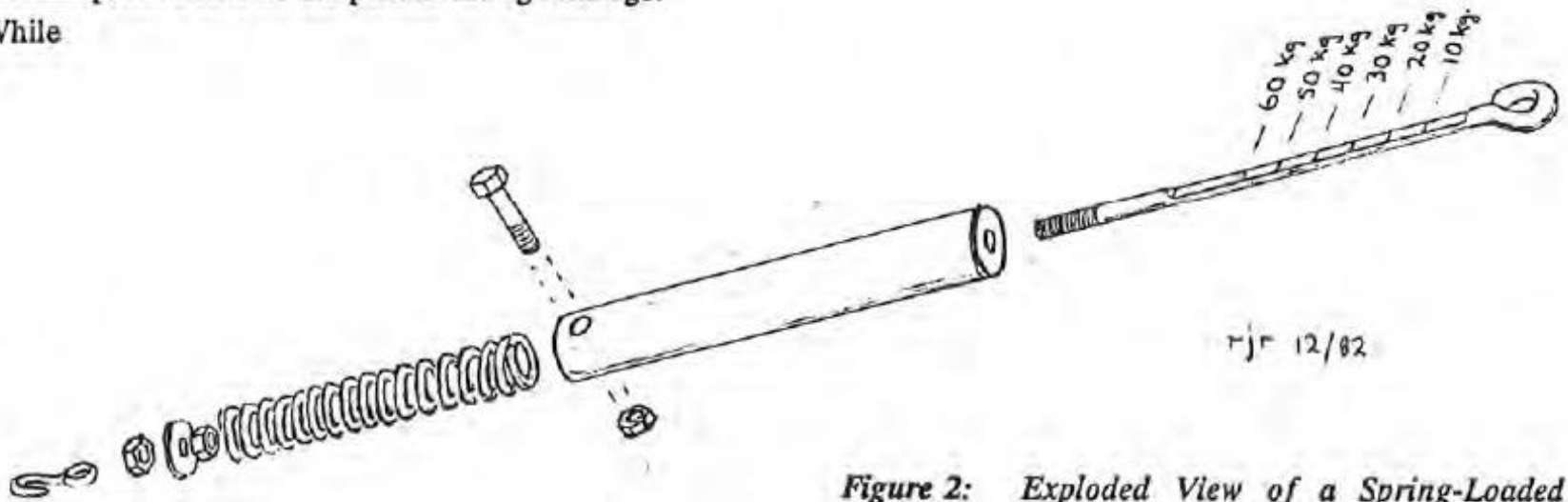
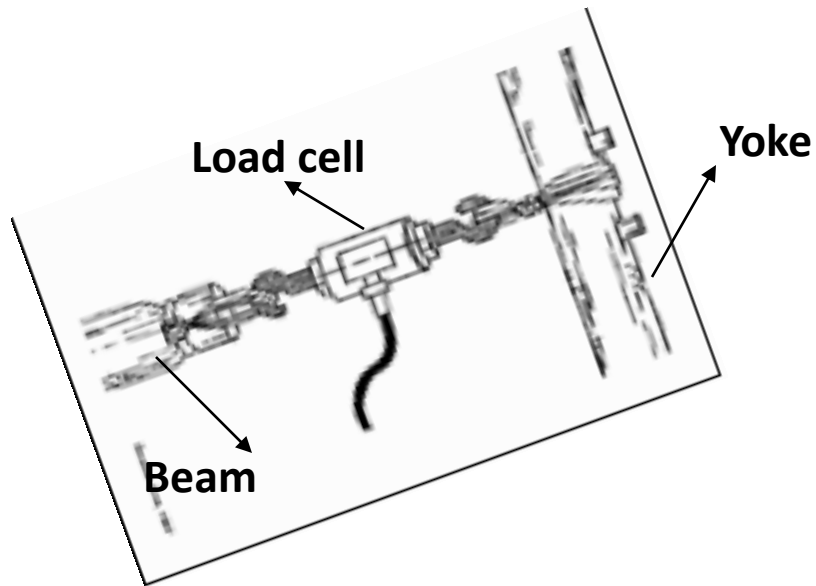


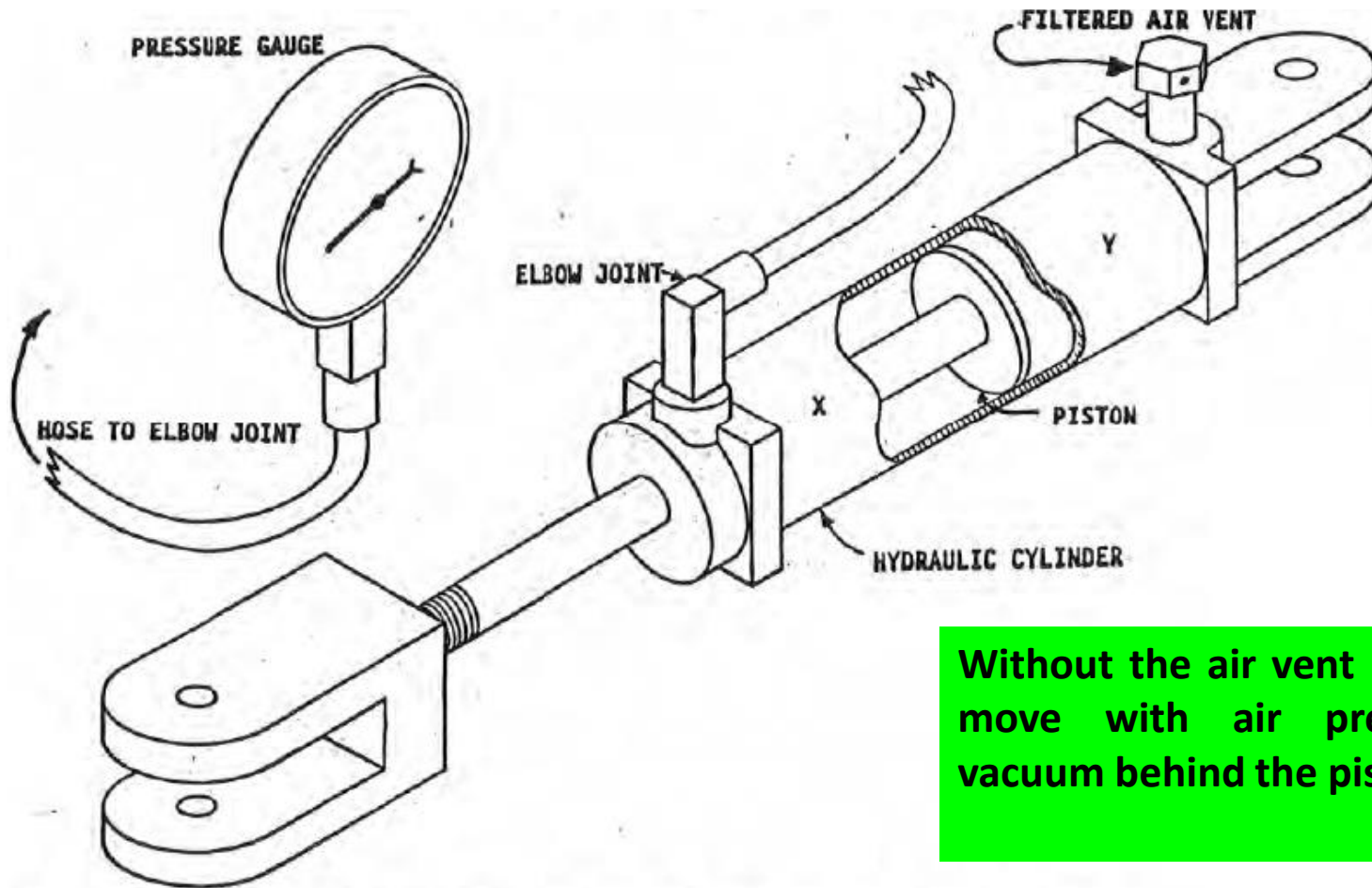
Figure 2: Exploded View of a Spring-Loaded Dynamometer.

Draft measurement in case of B.D Implements



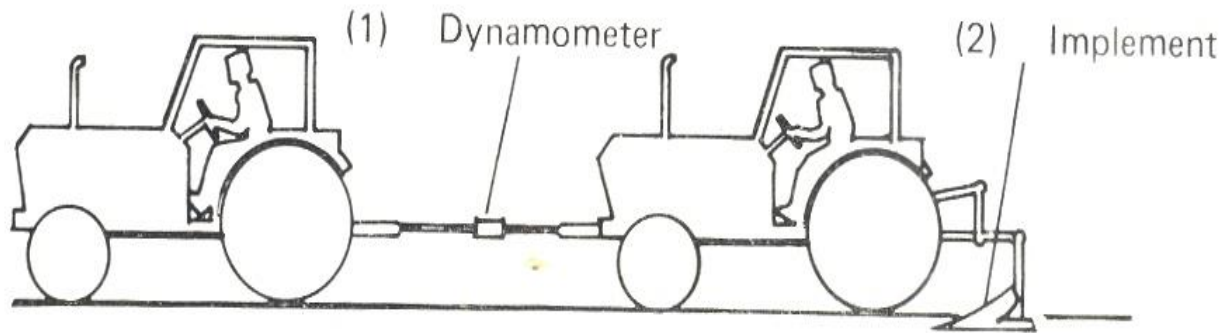
Draft measurement by load cell / load transducer

Hydraulic dynamometer



Without the air vent piston will move with air pressure or vacuum behind the piston

Measurement of draft in tractor drawn implement



5 MEASURING OF DRAFT FOR A TRACTOR-MOUNTED IMPLEMENT

Measure the draft without implement (A)

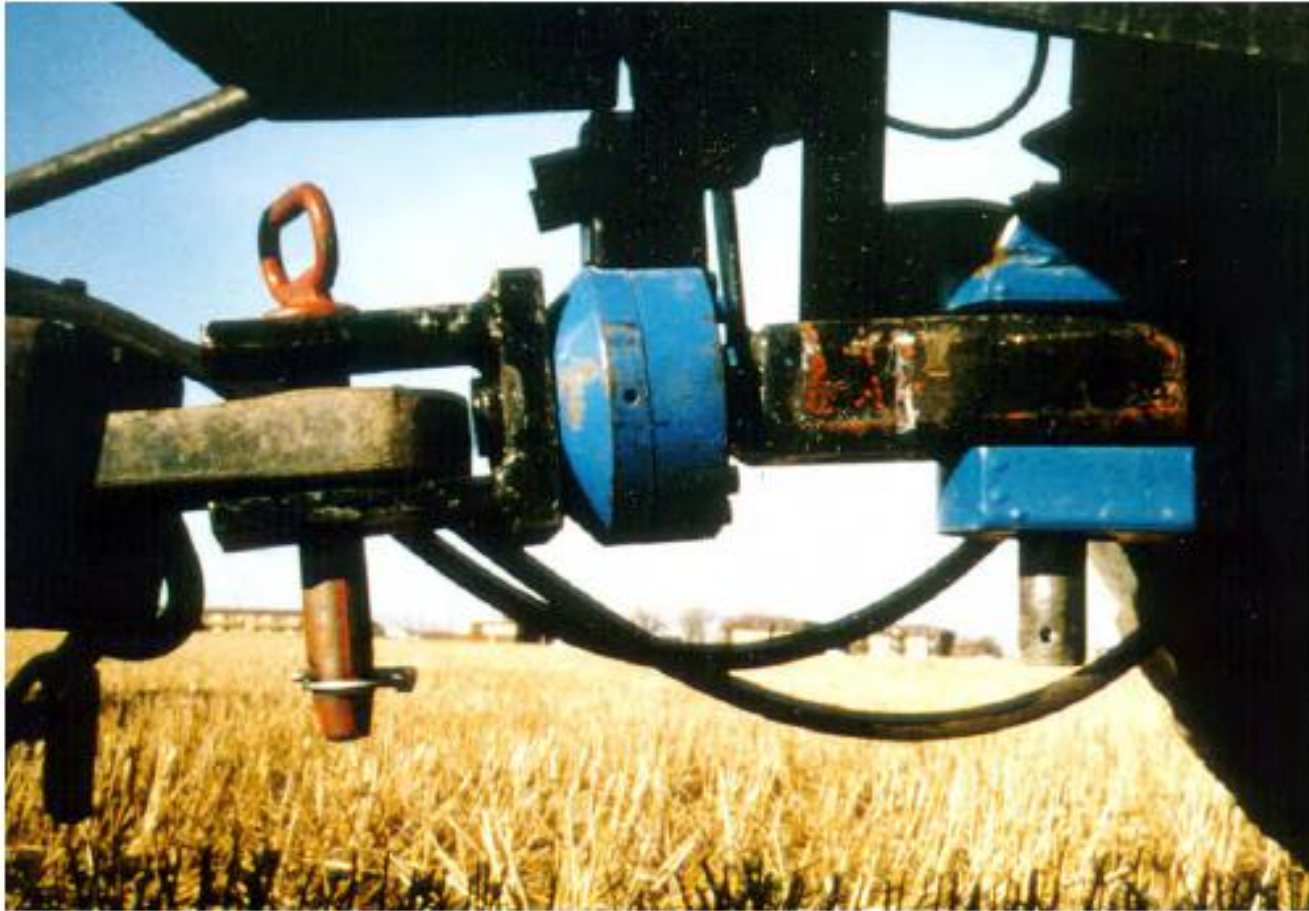
Measure the draft with implement (B)

Draft = B - A

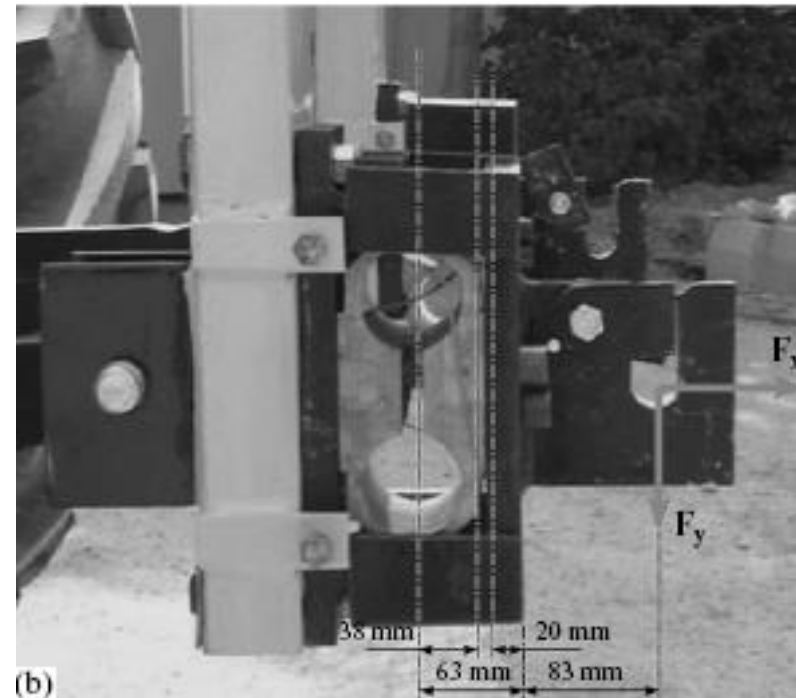
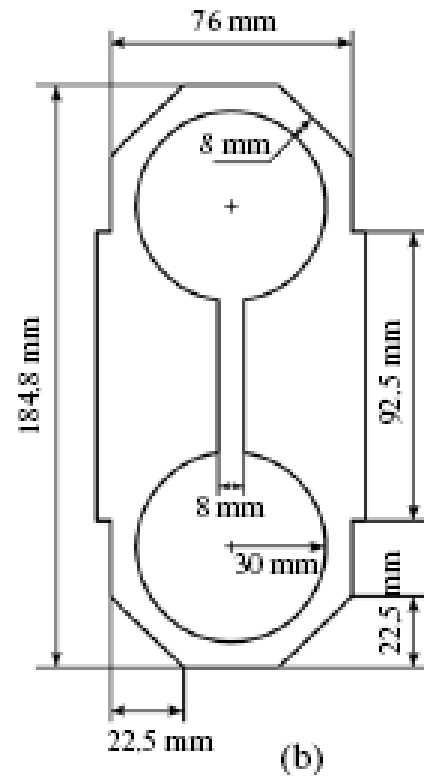
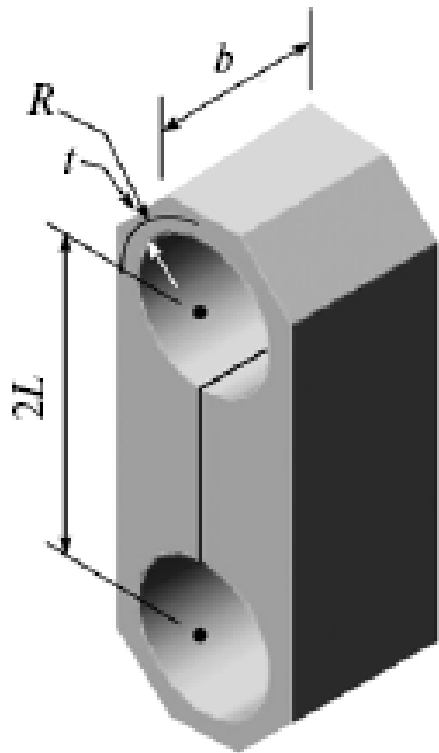
LOAD CELL

- A load cell is a transducer that is used to convert a **force into 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 measures the deformation (strain) as an electrical signal, because the **strain changes the effective electrical resistance of the wire**.
- A load cell usually consists of four strain gauges in a **wheatstone bridge** configuration.
- Load cells of one strain gauge (quarter bridge) or two strain gauges (half bridge) are also available.
- The electrical signal output is in the order of a few millivolts and requires amplification by an amplifier before it can be used.
- The output of the transducer is plugged into an algorithm to calculate the force applied to the transducer.
- A data logger is used to store the data

Draft Measurement System (Load cell) Mounted on a Tractor



Extended octagonal ring transducer



Calibration of the EORT

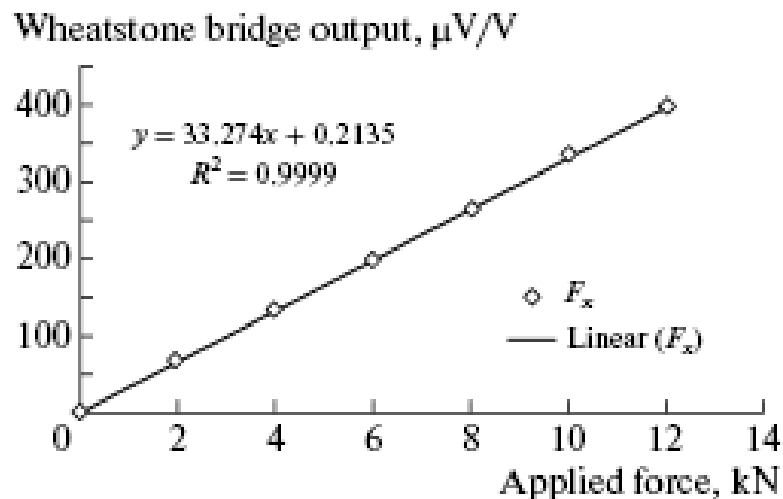


Fig. 6. Calibration curve for horizontal force of the EOR transducer no. 3.

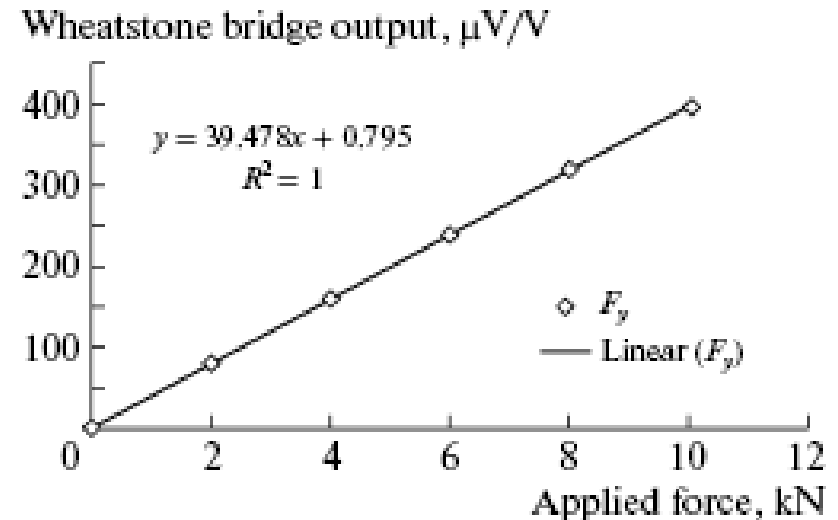


Fig. 7. Calibration curve for vertical force of the EOR transducer no. 3.