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SRM INSTITUTE OF SCIENCE & TECHNOLOGY
CSE AIML-B

Sensors Assignment

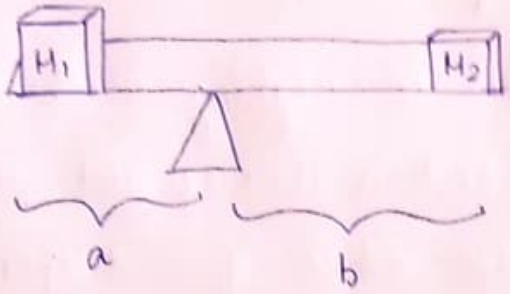
1) Industrial Weighing machine - Linked lever mechanism

Linked lever system in weighing machine is a system of strong section, throughout with hardened steel knife-edges, free suspended from substantial pedestal. Each section is capable of weighing individually. All levers are of the fixed fulcrum type, movement of the weighbridge being confined to the girder and platform structure easy to handle, transport and erection the main load carrying levers comprise seperate components - lever arms and lever bodies.

These are joined by steel bolts, with machined joint facings and steel keys for accurate positive location.

Precise machined slots in the levers together with the shank and nut-fixing, ensure dead accurate knife-edge setting.

$$H_1 \times a = H_2 \times b.$$



The mechanical advantage of a lever can be determined by considering the balance of moments or Torque T, about the fulcrum.

If the distance traveled is greater, the output force is lessened.

$$T_1 = F_1 a$$

$$T_2 = F_2 b.$$

$$T_1 = T_2 \quad \therefore F_1 a = F_2 b.$$

The mechanical advantage of the lever is

$$MA = \frac{F_2}{F_1} = \frac{a}{b}.$$

2) Different designs of weighing systems:

(i) conveyor type

Conveyor scales are integrating weighing devices that use a simple integral calculus summation process to measure a conveyed quantity of material.

Two variables are involved: weight and speed. A weight function measures the weight of a small section of a conveyor. The gross weight on the scale is the weight of the belt, the belt conveyor idler and the material on the belt.

These can be optical, magnetic or other on/off sensing units.

$$\text{Total weight} = \frac{\text{weight}}{\text{unit distance} \times \text{distance}}$$

$$\text{Rate} = \frac{\text{change of total weight}}{\text{time}}$$

$$\text{Belt speed} = \frac{\text{Distance}}{\text{Time}}$$

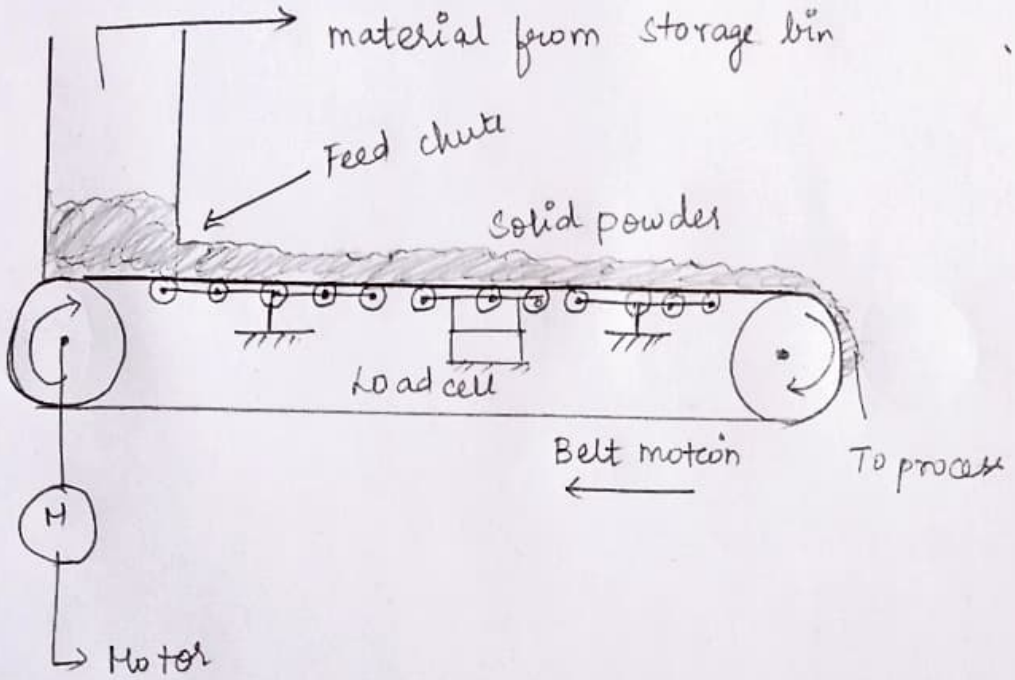
iii) Weigh feeder type:

Weigh feeder is a custom engineered system that finds application in continuous bulk proportioning of solids.

This ~~deep~~ feeder is operated by a closed loop control system enabling feeding at a controlled rate and exercises precise control over rate of flow based on a weight integrator.

components.

- → NWS set point Based weight Transmitter
- → Strain gauge load cells
- → Shaft mounted encoder
- → Stainless steel junction box.
- → Ios switch
- → Robust design weigh platform
- → Remote display and Totaliser
- → GSM modem.
- → complete weigh belt structure with Suitable gear box motor and VFD


material from storage bin
Feed chute
Solid powder
Load cell
Belt motion
To process
M
Motor