



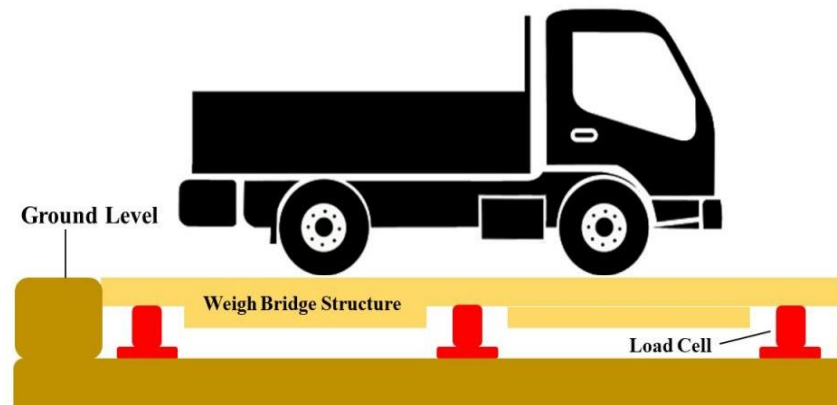
Weigh Bridge

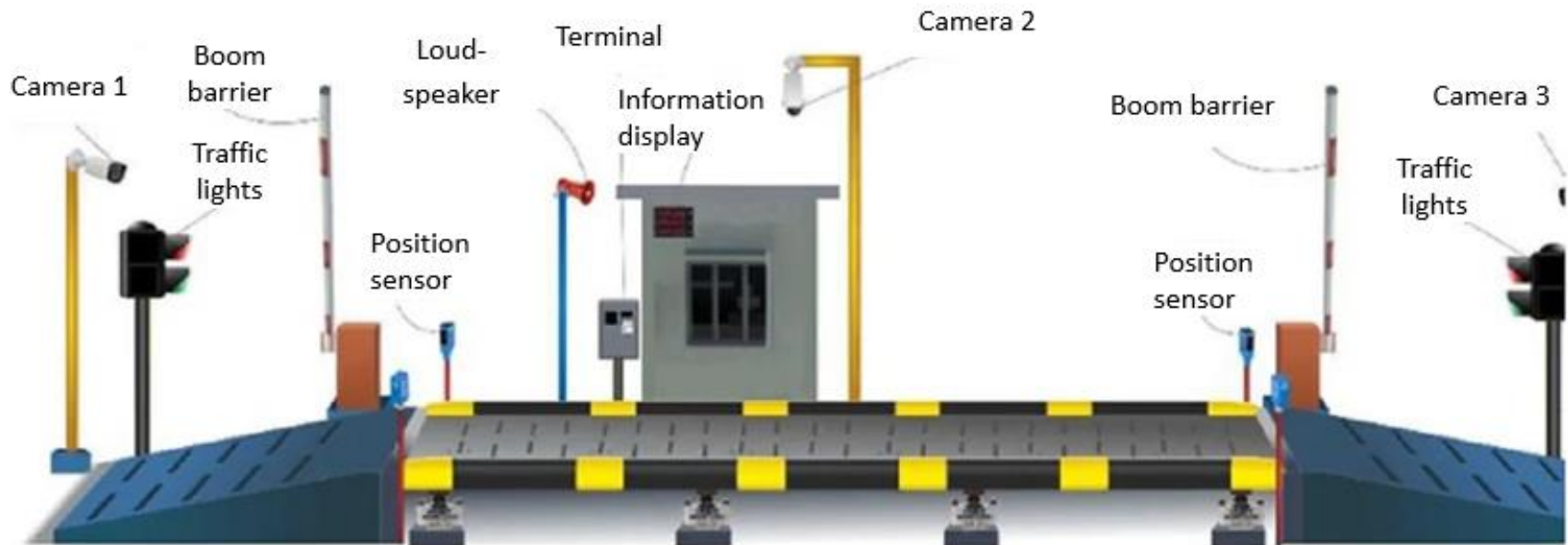
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1. Introduction

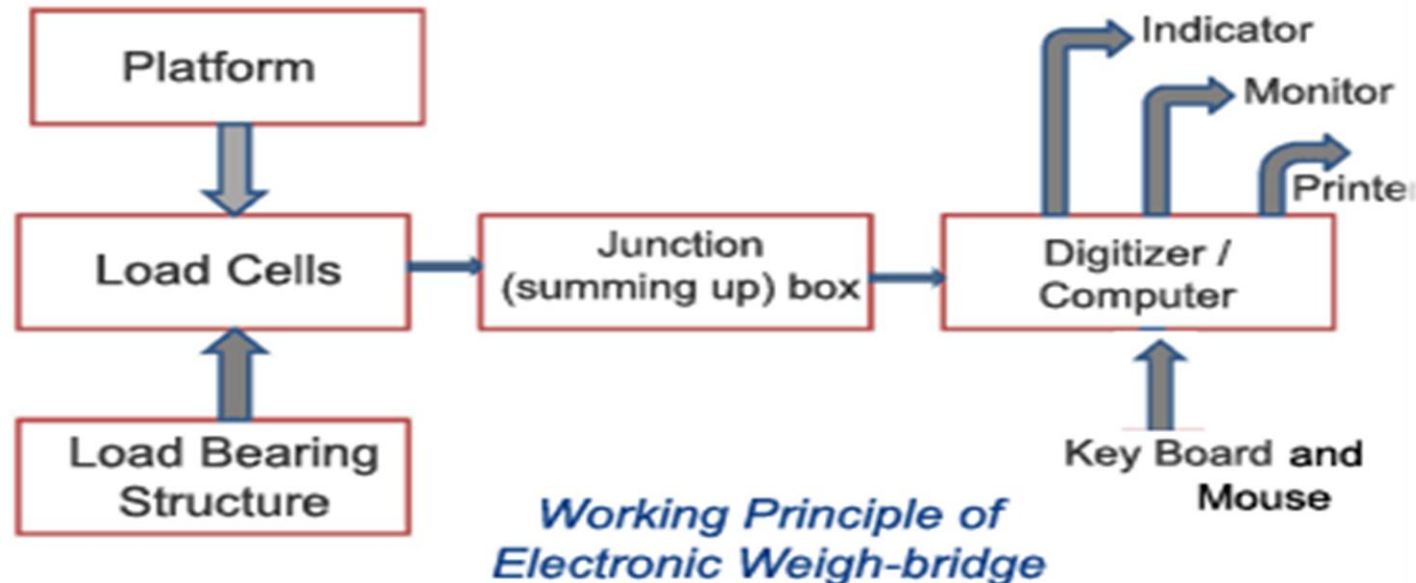
- Weigh bridge, large set of scales, usually mounted permanently on a concrete foundation
- Used to weigh entire rail or road vehicles and their contents which aimed to be sold by weight.
- By weighing the vehicle both empty and when loaded, the load carried by the vehicle can be calculated
- In Dairy Industry, weighing is an essential step in accounting for milk receipts and disposal, making payment for milk etc.
- Used at:-
 - Chemical, Textile, Agro, Food, Dairy, Oil, Pharmaceuticals, Jewelers, Paper, Plastic and packaging industries etc.





2. WORKING PRINCIPLE

- A weigh-bridge is a platform that is supported by weight-sensing elements which produce an output proportional to the load placed on the platform.
- It is treated as a non-automatic weighing instrument and is verified as such.



3. Components Of Weigh Bridge

3.1 Foundation

- These are permanent concrete installations.
- It is the lowest component that interfaces the weighbridge system with ground.
- It should be properly leveled and there should be a provision for adequate drainage to prevent flooding.
- T-rubbers Installations are recommended for weighbridges which fill the gap between deck and foundations. It protects deck against deterioration by preventing dirt from entering the pit.

Pier Foundation



Pit Foundation



Shallow Pier Foundation



Floating Slab Foundation



3. Components Of Weigh Bridge (Cont.)

3.2 Platform

- It is the structure that creates driving force for the trucks.
- The platform may be chequered or plain and should be rigid and sufficiently strong for carrying maximum load.
- The load cells are arranged on both the sides in pairs.
- Ideal construction material for platform can be either Stainless Steel or Concrete.
- Steel is ideal if the weighbridge is likely to be moved while Concrete can offer longevity.



3. Components Of Weigh Bridge (Cont.)

3.3. Load Cell

- A load cell is an electronic device (transducer) that is used to convert the gravitational force into an electrical signal.
- Through a mechanical arrangement, the force deforms a strain gauge. The strain gauge converts the deformation (strain) to electrical signals.
- Load cells come in a range of different sizes, shapes, capacities and performance parameters.
- Load cells can be Analogue, Digital, Compression or Shear Beam Type.



3. Components Of Weigh Bridge (Cont.)

3.4 Terminal Point

It is the control panel for scale which consists of 3 parts:



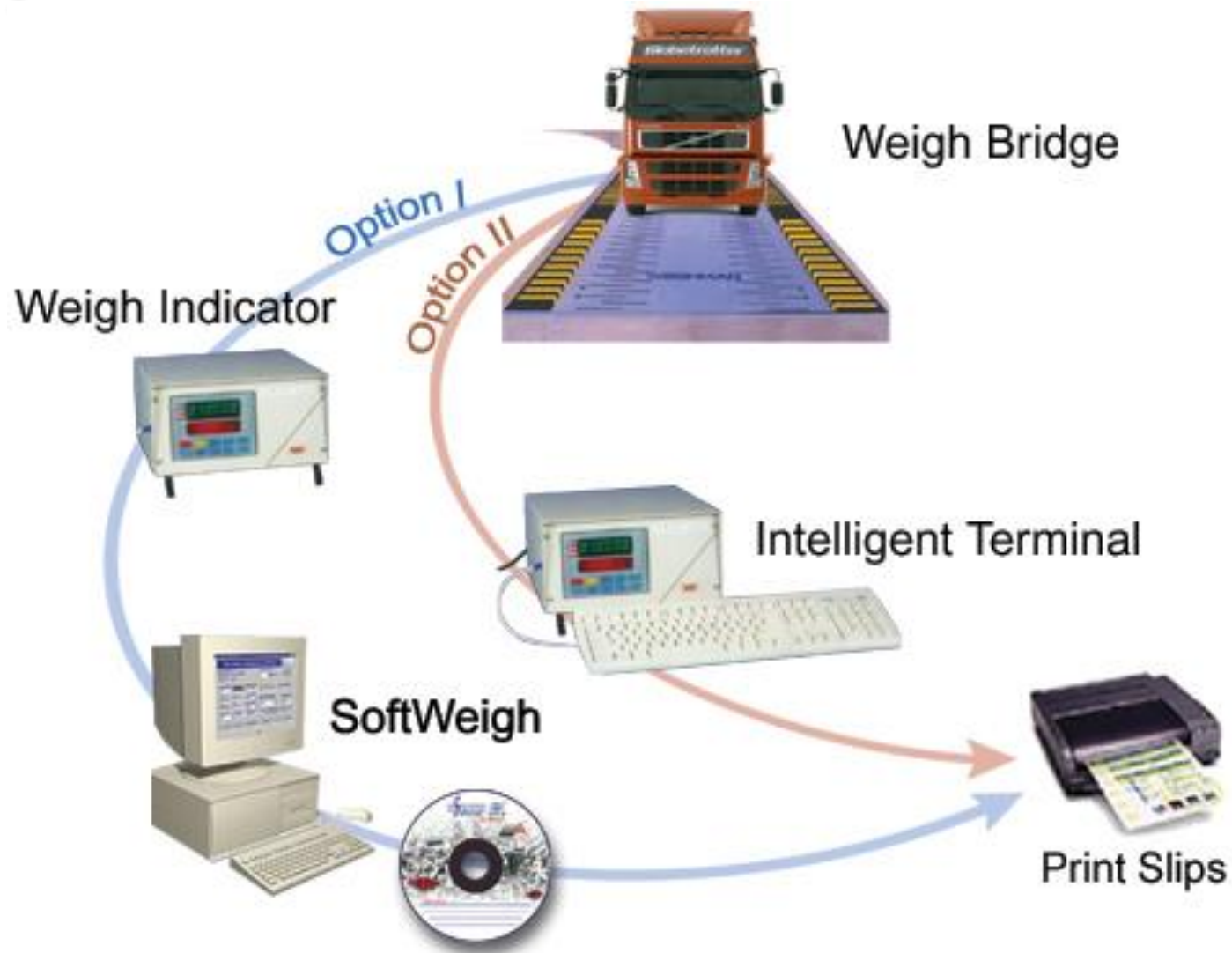
1. Digitizer -The load cells' output is combined in a summation box, which then sends the net value to a digitizer for digital conversion.



2. Display - The Computer is used for entering vehicle data through a keyboard and mouse



3. Printing Unit -The weighing result is recorded directly from the digitizer and sent to the printer for receipt issue. Software options allow data entry and calibration through the keyboard.



3. Components Of Weigh Bridge (Cont.)

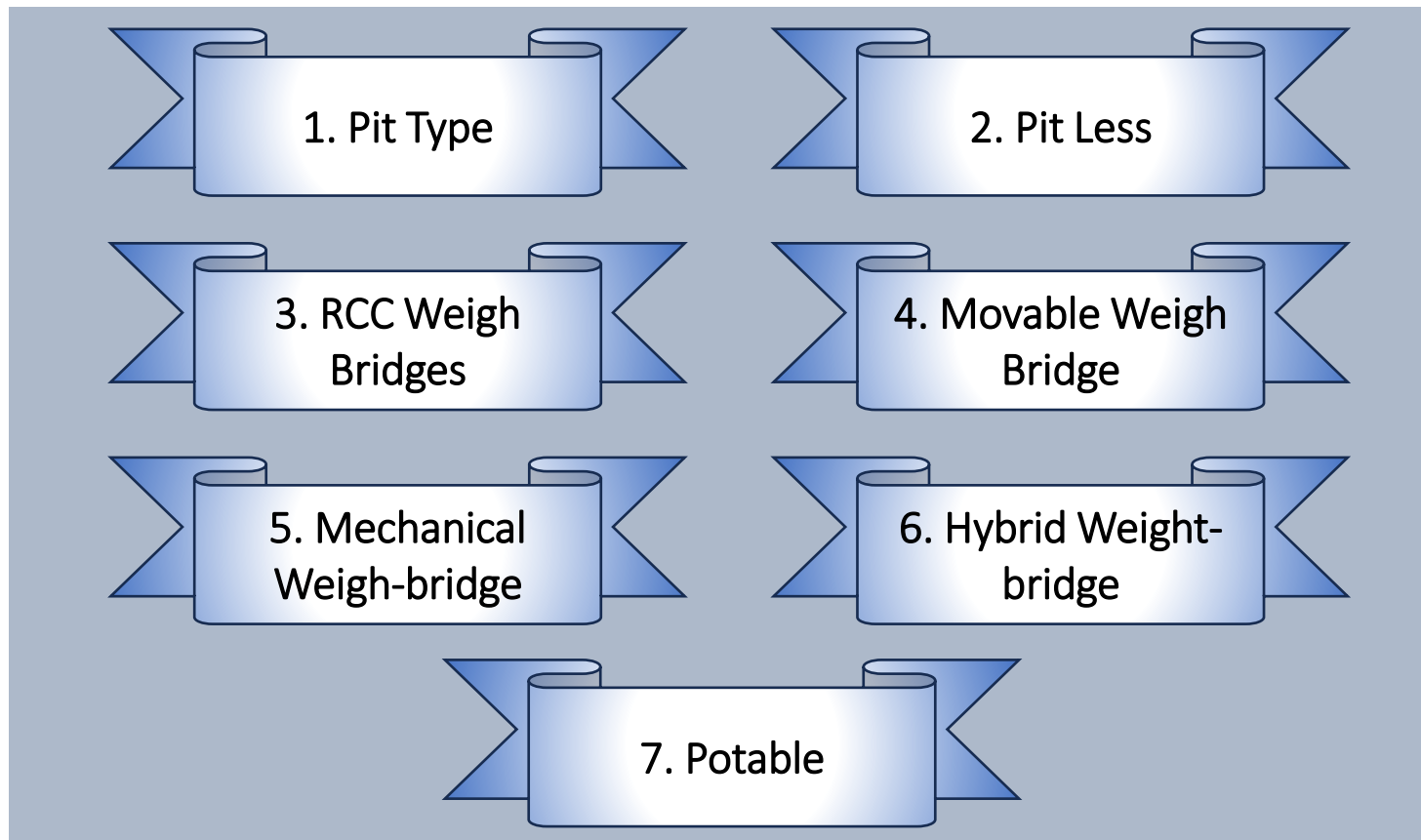
3.5 Cables

- a. **Signal Transferring:** These are used for transmitting signal load cells to terminal.
- b. **Heating Cables:** These are used for melting the snow and ice when the temperature drops below 0 °C. to melt, depending on geographical requirement



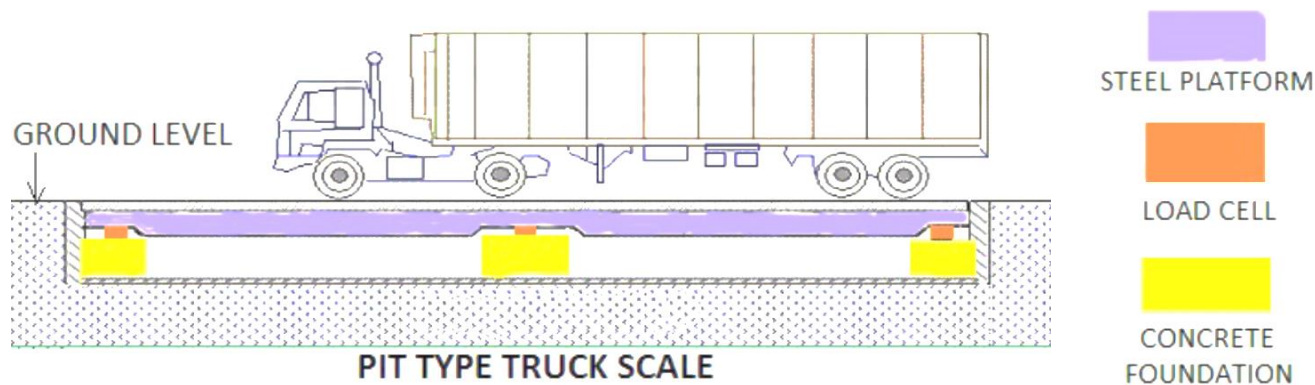
4. Types Of Weigh Bridge

- There are six types of weighbridges i.e., classified depending upon their characteristics.



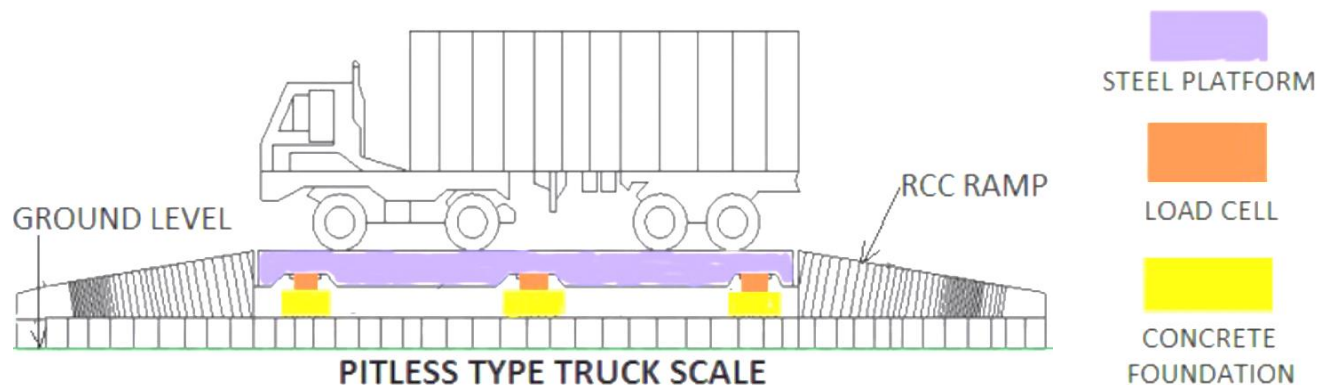
4.1 Pit Type

- Weighbridges are installed in a pit, keeping them flush to the road surface.
- Requires less surface area which makes them ideal for smaller areas.
- Do not require ramps.
- Pit installations can be expensive as initial civil and foundation work are required.
- Requires provision of sump-pumps and manholes for maintenance purposes in order to prevent debris formation and water logging
- Guide-rails not required.



4.2 Pit Less

- This type of weighbridge sits above of the road surface and requires ramps on either end to allow the vehicles to access the platform.
- Installation cost is reduced as amount of civil foundations work is less.
- Requires more space for installation.
- Increase in height of deck shall require longer ramps for vehicles approaching the bridge resulting in overall increase in footprint of weighbridge.
- Require guide rails fixed on the sides of the platform, which help vehicles to be aligned centrally on the bridge.
- Better suited when the bridge requires shifting, or for temporary installations.



4.3 RCC Weigh Bridges

- Concrete weighbridges offer low costs, high strength, and minimal maintenance, requiring no annual painting and a low-cost platform.
- Cost of material required for construction of concrete platform is approximately 40% less than that of steel platform.
- Being a totally RCC structure, there is no rusting of components in concrete platforms hence they are totally maintenance free.



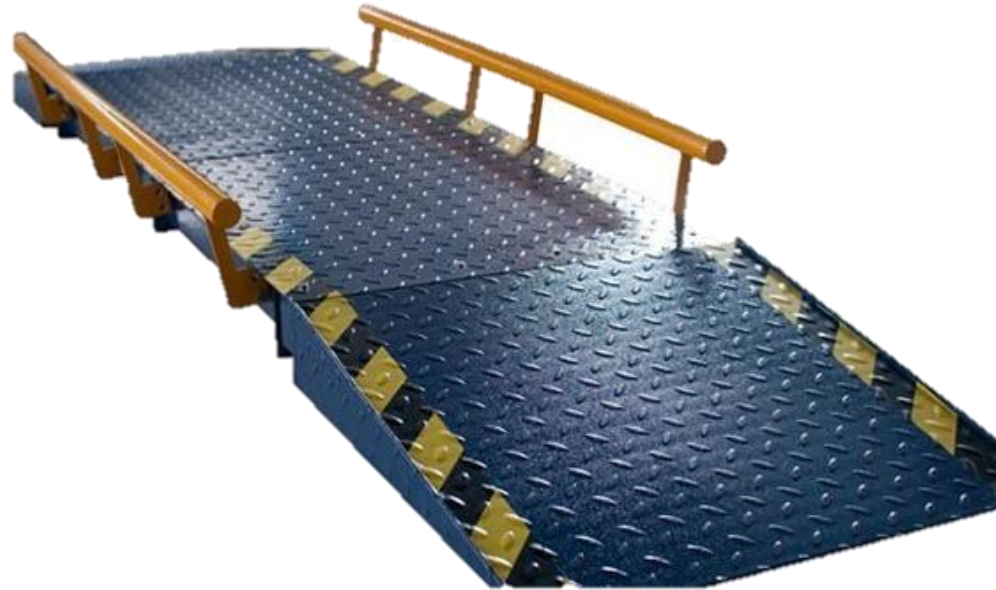
4.4 Movable Weigh Bridge

- Mobile weighbridge needs no foundation, just smooth hard surface on which the load cell plates rest.
- Saves lots of cost and time as these are foundationless weighbridges which can be installed within 2-3 hrs.
- Its modular design renders cost effectiveness which makes it transportation and re-installation friendly.



4.5 Mechanical Weigh-bridge

- Load receptor is supported on a mechanical lever system
- Primary indication of mass is by a mechanical indicator
- May be non-self-indicating (Steel Yard) or self-indicating analogue display (Dial Type).

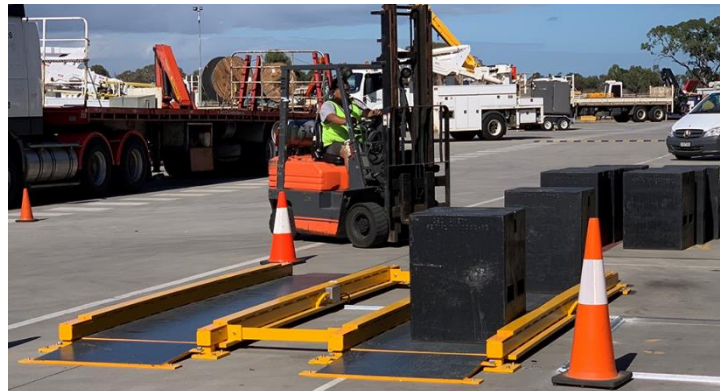


4.6 Hybrid Weight-bridge

- Lever system is used for weighing and the mechanical output is fed to a load cell which converts it into electrical signal for processing.
- Two-way switch allows change over either
 - the output of the lever system is directly connected to the indicator (steel yard or dial) or
 - the output is passed to the digitizer for processing.
- Mechanical and electronic system are verified separately.

4.7 Potable

- These are either statically or dynamically operated which are normally used for screening purposes.
- Can be set up next to any road where there is a suitable surface and an area to pull off and weigh trucks.
- Not to be used for law enforcement purposes but are sufficiently accurate to identify vehicles that are probably overloaded with a high degree of confidence.
- Fairly high accuracy, considerably cheaper than static scales, relatively light, can be set up very rapidly and measure individual wheels, axles, axle units and vehicle/combination mass.



5. Features

- Rugged, Reliable and Accurate.
- Helps in checking and authorising weight documents for invoicing.
- The calibration and testing for each system is carried out prior to delivery.
- It automatically enforces credit control at the weighbridge.
- Easily convert weight documents to invoices.
- Very compact and robust.
- Easy to transport & Install.
- Requirement of less civil work.
- Height of the track scale is less.
- Minimum maintenance.
- Stringent quality inspection.



6. Procedure For Weighing

1. Driver must approach the weighbridge slowly and proceed directly onto the platform without turning or harshly applying brakes.
2. Ensure that vehicle is completely on the platform.
3. As the vehicle (loaded or unloaded) enters the weighbridge port, its gross (or tare) mass must be recorded which must be indicated on the measurement ticket issued from the terminal.
4. Again, the weight of the vehicle (loaded or unloaded) is recorded as the vehicle exits the plant. Tare (or gross) mass shall be included on the measurement ticket as soon as the weighing is completed.
5. By subtracting tare mass from gross mass net mass can be obtained that is recorded in the measurement ticket.



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