On-Board Mass Systems and their Information

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Heavy Vehicle Mass Measurement

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Knowing the loaded weight of heavy vehicles is important to:

- Operating at safe load limits
- Maximise payload
- Avoid fines for overloading.

Drivers can determine the loaded weight of their vehicle either by driving on to an **in-ground scale**, or using **on-board scales**.

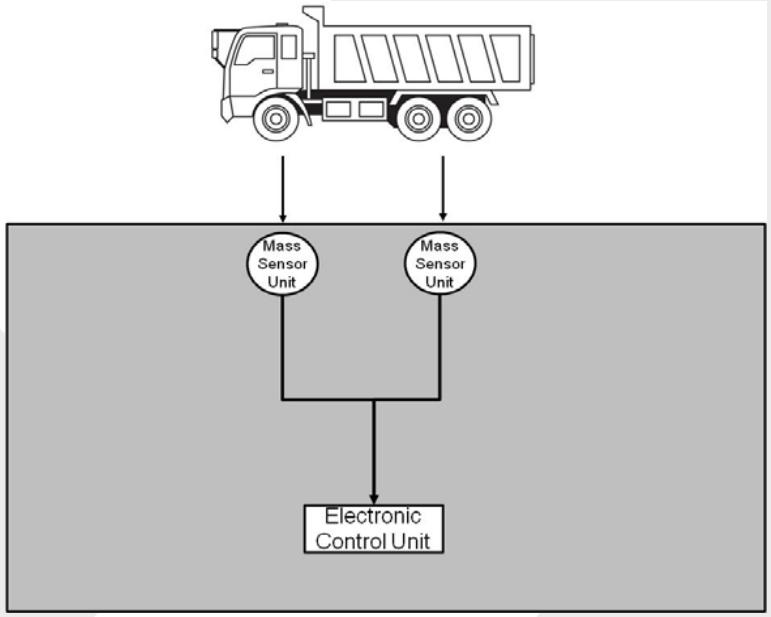
On-board scales or On-Board Mass (OBM) Systems provide unique advantages that underpin productivity and safety gains.

OBM Systems explained

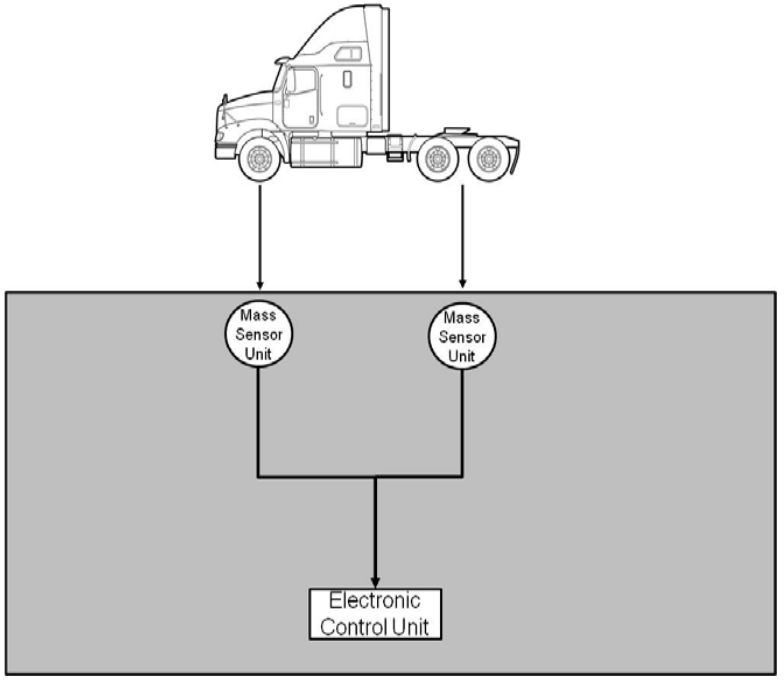
OBM Systems in the market use different technology and have differing functionality but generally comprise:

- an Electronic Control Unit (ECU)
- Mass Sensor Units (MSUs) and
- Documentation associated with installation, calibration, operation and maintenance

OBM Systems explained

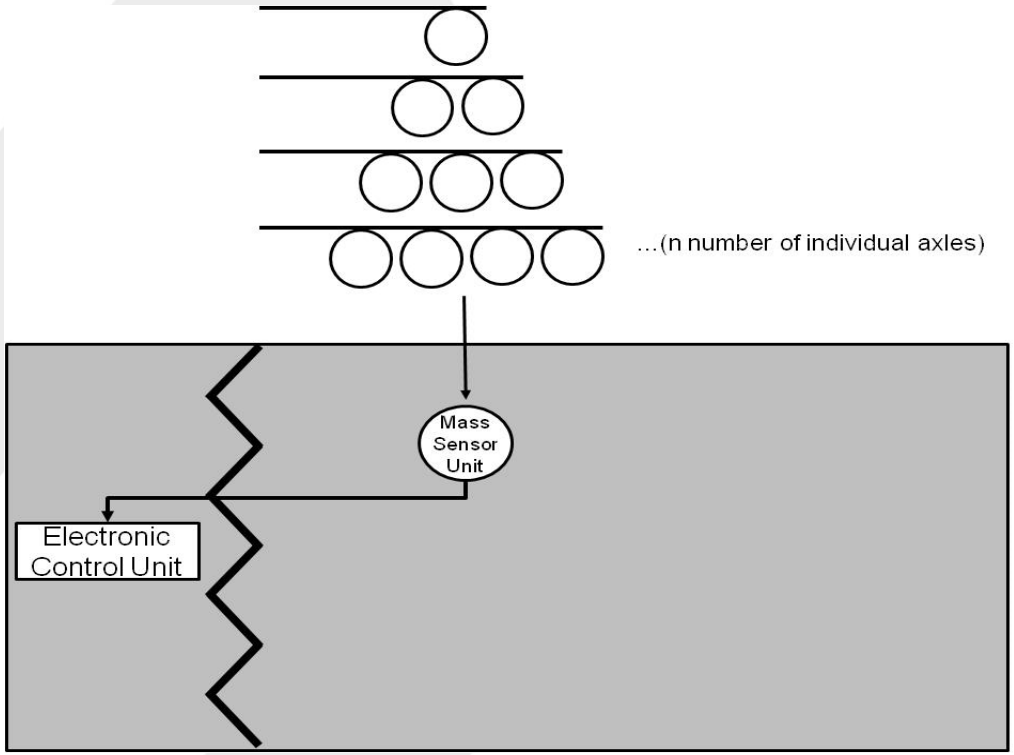


OBM System in a Typical Rigid Vehicle Environment



OBM System in a Typical Prime Mover Environment

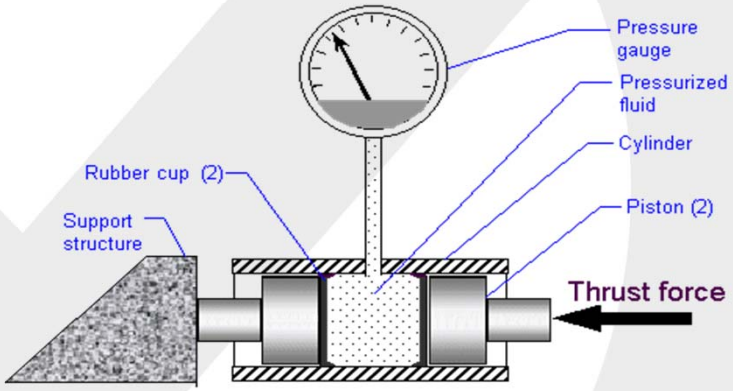
OBM Systems explained

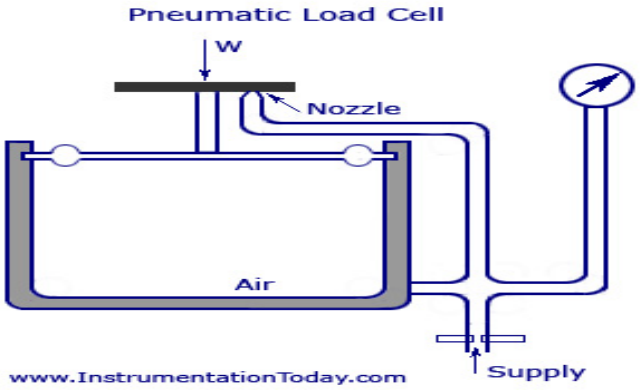


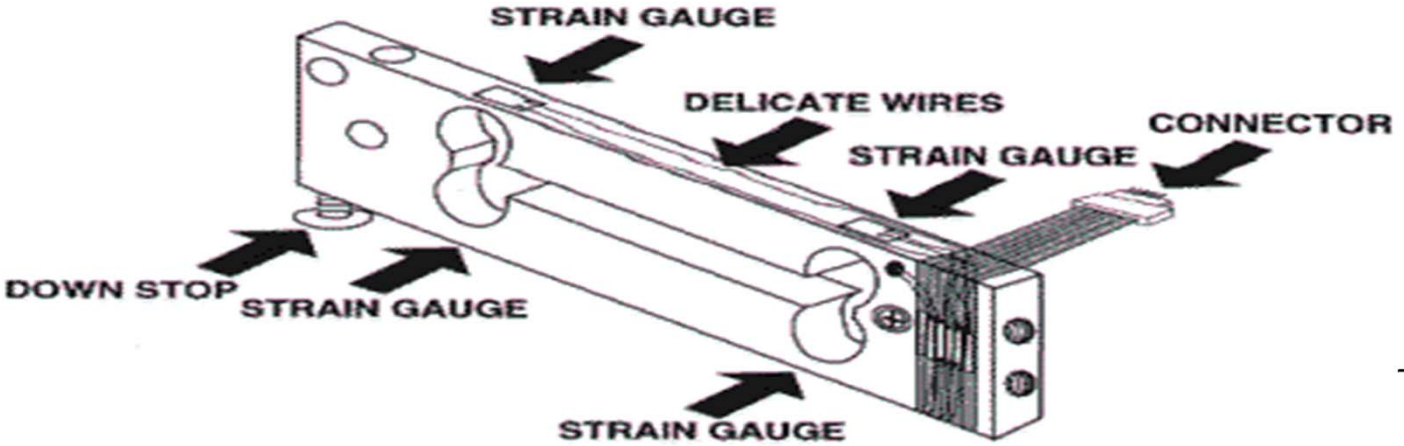
OBM System in a Typical One-or-More Trailer or Dolly Axle-Group Environment Connected to a Rigid Vehicle or Prime Mover

Mass Sensors

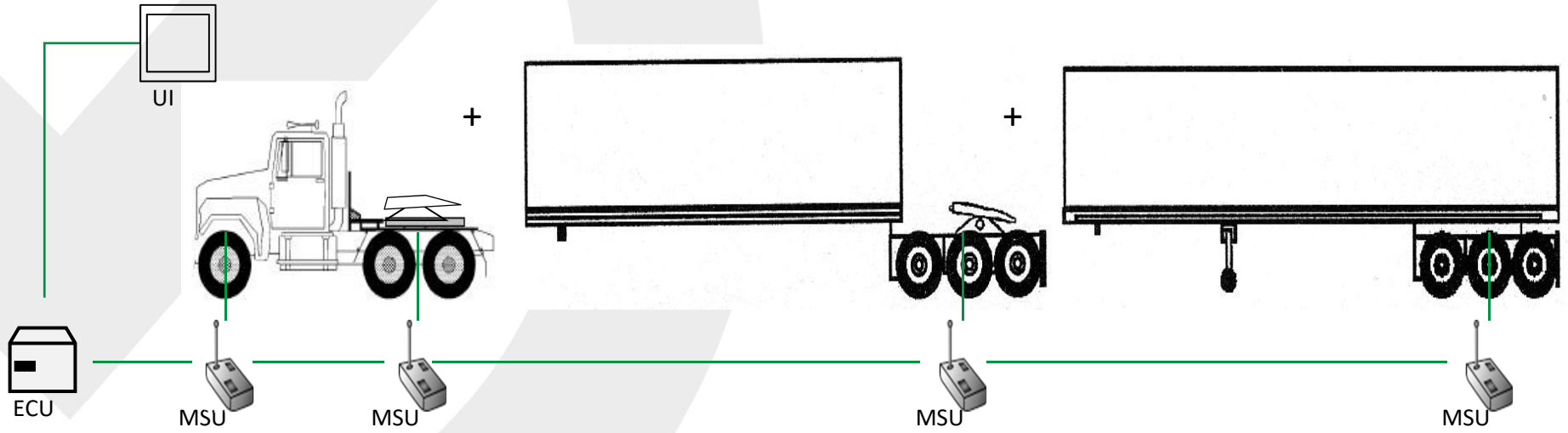
A mass sensor is a physical element that can translate pressure into an electrical signal.







How it all looks on a truck



Benefits of OBM Systems

Commercial:

- Improved access to the Australian road network
- Maximise Payload by avoiding under-loading
- Customer proof of pick up and delivery
- Improved productivity through reduction of lost time at weighbridges
- Manage contractual obligations

Regulatory

- Assurance for Road Managers of heavy vehicle usage of road network
- Compliance with access conditions
- Compliance with COR requirements
- Compliance with Mass Management Accreditation requirements

Interim OBM Solution

- 2010 - Department of Transport and Main Roads (QLD) commenced a pilot of OBM monitoring, enabling access for certain mass-restricted vehicles operating on a limited road network
- 2013 - TCA commenced the national administration of the Interim OBM Solution on behalf of its members
- 2014 - Roads and Maritime Services (NSW) joined the solution
- 2017 - Around 290 vehicles are using the Interim OBM solution

Interim OBM Solution - examples

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Super B-doubles – these vehicles are capable of carrying four 20ft containers or two 40ft containers.

PBS-2B vehicles – these vehicles meet rigorous safety standards, and are a max of 30m in length

Interim OBM Solution

Key operational learnings from the Interim OBM Solution included:

- The need for greater definition clarity of the roles and responsibilities between Service providers and OBM system suppliers
- Management of access to data
- Monitoring of data integrity, tampering and malfunctions
- The need for frequent periodic calibration to ensure accuracy of OBM systems

OBM System Functional and Technical Specification

- Valuable as a stand-alone document
- Focus on OBM hardware
- Forms the basis for Type-Approval
- Available at

www.tca.gov.au

OBM System Functional and Technical Specification

Transport operators and users are able to benefit from the *On-Board Mass (OBM) System Functional and Technical Specification* by:

- Using it to make informed procurement decisions about OBM Systems
- Having competition and choice in type-approved OBM systems, as OBM System Suppliers become type-approved

OBM System Specification

- ‘Performance-based’ philosophy, focus on required outcomes
- Use of a conceptual description (e.g. ECU, MSUs) requiring equivalent, but not exact, physical match
- Innovation encouraged!

  For example:
  - OEM-fitted or an after-market product
  - Technology or human process for MSU detection
  - ‘Shared components’ providing comparable functionality
  - Quality management system approach to calibration to maintain accuracy

OBM System Specification

- Physical Characteristics
- Environmental Characteristics
- Data Collection
- Record Generation
- Functionality
- Data Storage
- Data Security and Transfer
- Interconnection to a Telematics In-Vehicle Unit (IVU)
- Installation, Calibration, Operation and Maintenance

OBM Systems - Key Features

OBM Systems that adhere to the requirements of the Specification are:

- Capable of determining the mass of axle groups on a vehicle via its MSUs, and thus the associated Gross Vehicle Mass
- Able to add and remove MSUs dynamically as the vehicle configuration changes
- Sufficiently robust to function in harsh environmental conditions
- Able to collect data to identify malfunctions or possible tampering
- Capable of interconnectivity with type-approved IVUs

OBM Systems – Accuracy Requirements

- The axle group mass measured by the MSU shall not deviate from the absolute axle group mass by more than 2% of the maximum permissible mass (i.e. the legal mass limit for an axle group) of the axle group for 98% of observations, when:
  - the vehicle is stationary and on level ground
  - the MSU is calibrated, and
  - the OBM System is operating in accordance with the Specification
- The calibration regime and frequency is flexible to meet this requirement, and is to be documented

Type-Approval Overview

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Type-approval process is now under way with TCA currently assessing OBM systems from five different suppliers

Type-approval provides an independent validation and recognition for OBM System Suppliers.

Type-approval is ‘Performance-based’ - focus on required outcomes rather than prescriptive functionality

Benefits of Type-Approval

OBM System Suppliers who are type-approved are:

- Recognised in the market as a supplier that has achieved an independent benchmark for quality, reliability and functionality
- Entitled to use the TCA type-Approved OBM Systems logo:

- Type-approved systems will be published on the TCA website

The Future for OBM Systems

While type-approval provides assurance that an OBM System meets defined technical and functional requirements for mass measurement, Road Managers require mass data that also meets chain of evidence requirements

The next stage for OBM will deliver on these requirements through an operational regulatory program for mass monitoring

OBM will be another application of the National Telematics Framework, TCA has commenced work on this next stage for OBM

The Future for OBM Systems

High level concepts to be considered include:

- The relationship between vehicle mass / configuration/spatial records as Intelligent Access Conditions (integrated or stand-alone)
- Development of mass monitoring applications (Off-The-Shelf conditions)
- Impact on Non-Compliance Reporting
- Service Provider functionality to manage mass conditions
- Road Managers' operational processes and systems