



# USE OF ON-BOARD WIM IN WEIGHT ENFORCEMENT

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# Presentation

- Australian heavy vehicle fleet
- Australian telematics and on-board mass monitoring environment
- Ability to actually use telematics and on-board mass data
- Telematics and on-board mass applications and uses

*Would like to acknowledge the support of Transport Certification Australia in the preparation of this presentation*

# Australian Heavy Vehicle Fleet (i.e. GVM greater than 12 Tonne)

- **Articulated heavy vehicles:** ~120,000\*
- **Heavy rigid trucks:** ~80,000 to 100,000 (inferred from rigid-truck distribution)
- **Heavy special-purpose vehicles:** ~10,000–15,000

**\* Concerning articulated heavy vehicles approx. 70% have GPS/telematics systems, with two-thirds being Transport Certification Australia (TCA) type-approved or certified**

# Telematics and on-board mass technology

Technology allows us to know:

- Where a heavy vehicle is (what road and location)
- Its axle and gross vehicle mass
- other characteristics



# Australian Market of Telematics Providers

 Certified 

Providing services for: RIM:

AUSTRALIAN TRANSPORT COMPLIANCE CENTRES  
**ATCO**  
PTY LTD

**IntelliTrac**  
Imagine

**FleetLogix**

  
**SENSIUM**  
FLEET TELEMATICS

 **PACIFIC**  
TELEMATICS

 **wisetech**  
global

**SolBox**

 **THE FLEET**  
Office

Providing services for their own fleet:

**JIM Pearson**  
TRANSPORT

 **Heidelberg**  
Materials

 **SATC**  
SOUTHERN AFRICAN TRANSPORT CONFERENCE

 Certified 

Providing services for: TMA, RIM:

 **Ctrack**

**GEOTAB**

 **mX** | by POWERFLEET

 **MTData**

 **netcorp**

PROVEN STRENGTH  
**Tramanco**  
Since 1975

**V-DAG**

 **webfleet**

**WHG.**

Providing services for their own fleet:

**SIMON**  
National Carriers

**PenFinemore**  
TRANSPORT

 Registered

Providing services for: IAP, TMA, RIM:

**BLACKBOX**  
CONTROL

**NETSTAR**  
A SUBSIDIARY OF ALTRON

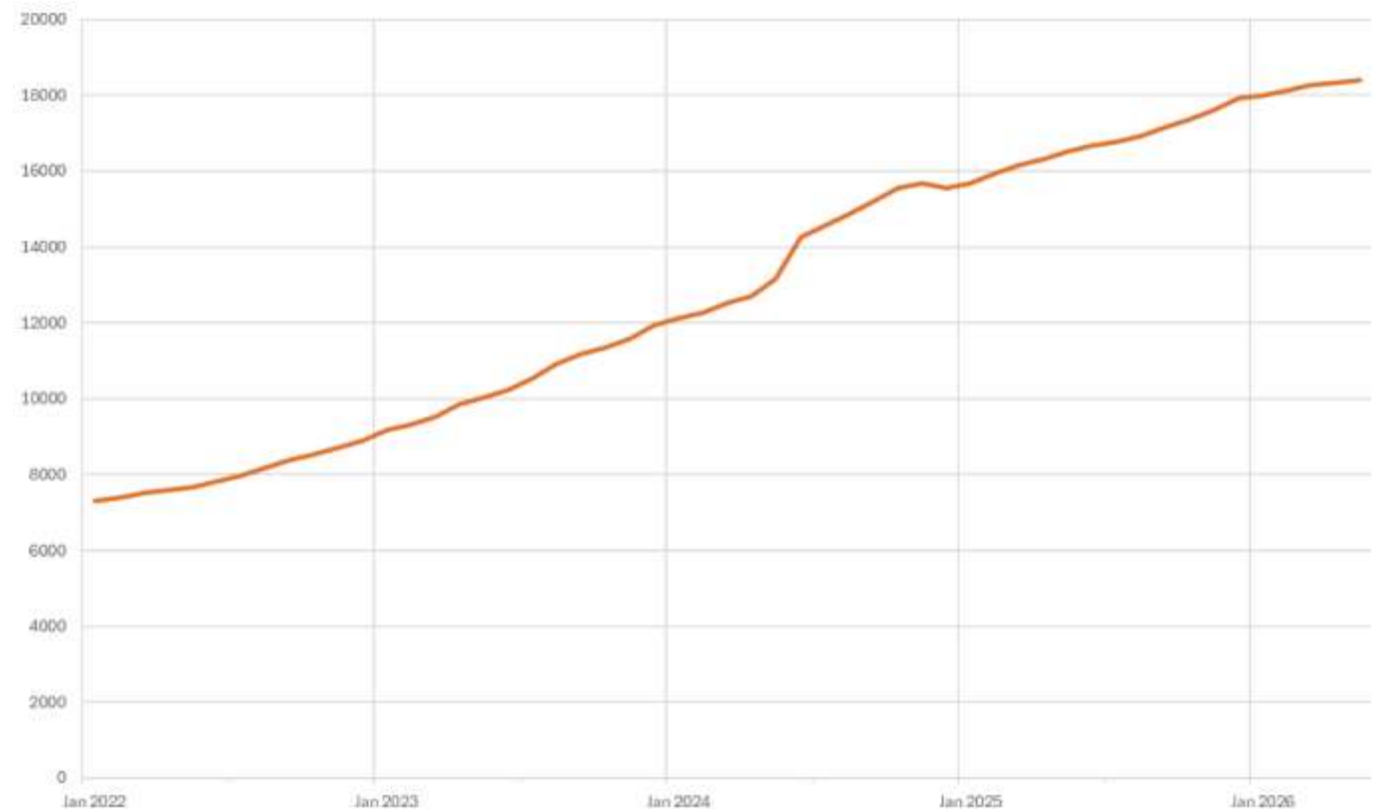
 **Teletrac**  
Navman



# Heavy Vehicle Telematics and On-Board Mass – Regulated Applications Take-up

From 120,00 Articulated Heavy Vehicles approx. 84,000 have GPS systems, with approx. **57,000 being TCA type-approved or certified**

**Over 20,000** heavy vehicles operating under a **regulated scheme** requiring sharing of data through the **National Telematics Framework** with **4,000** also using **On-Board Mass monitoring systems**



# Australian Market of On-Board Mass Providers



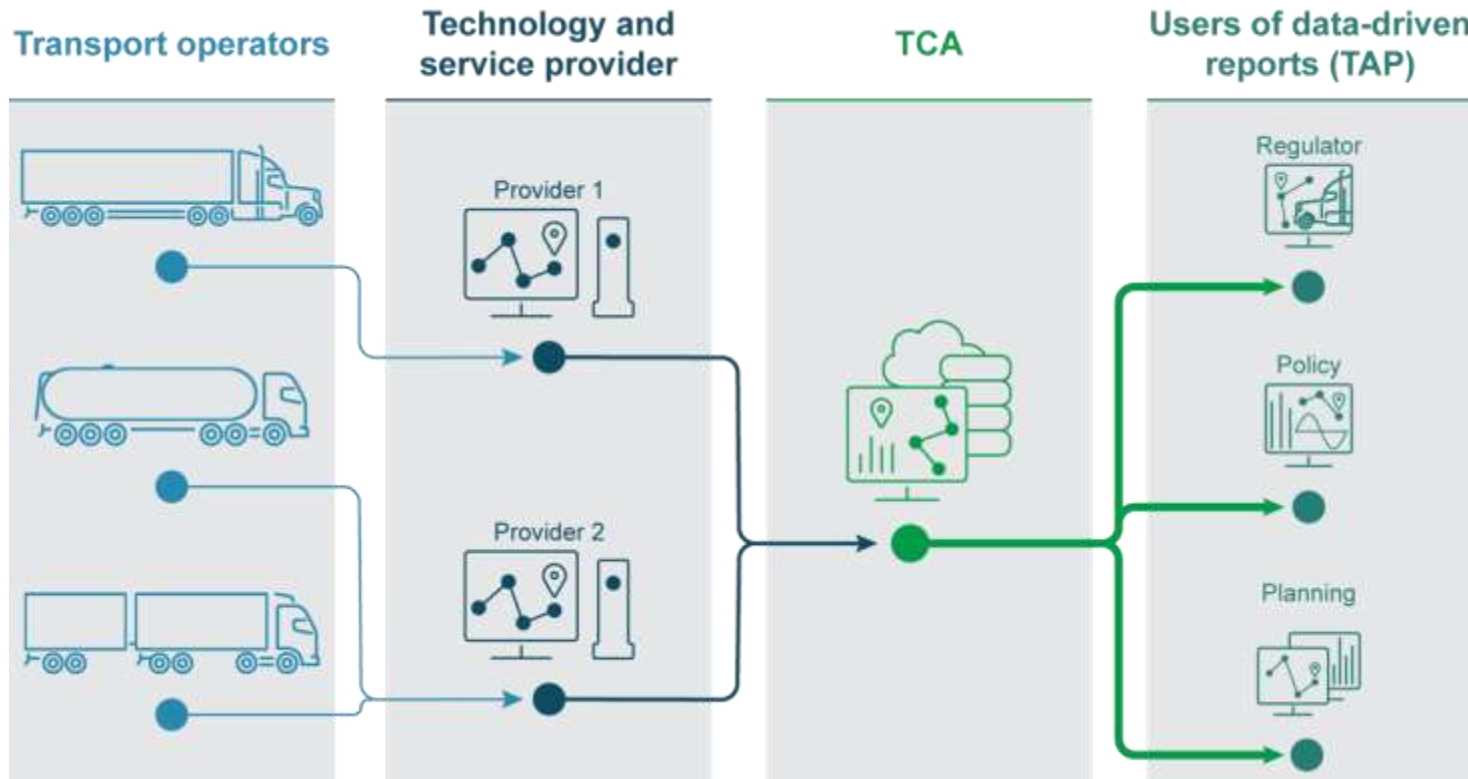
Providing devices suitable for schemes requiring Smart OBM, in conjunction with certified service providers:



Providing Smart OBM devices for their own fleet:



# National Telematics Framework



- The **National Telematics Framework** provides a standardised way to collect movement and mass data from installed telematics devices
- The **National Telematics Framework** was recognised as an international standard by the International Standards Organisation (ISO) in 2012 (ISO 15638)
- TCA provides data reporting and visualisations via the **Telematics Analytics Platform (TAP)**



# All linked - Heavy Vehicle ID, Location and Mass

For **each road segment**:

- Numbers and types of vehicles
- Utilisation (incl. speed, gross and axle mass per trip etc.)

or

For **each heavy vehicle**:

- Location and travel
- Gross and axle mass



# Telematics and On-Board Mass uses

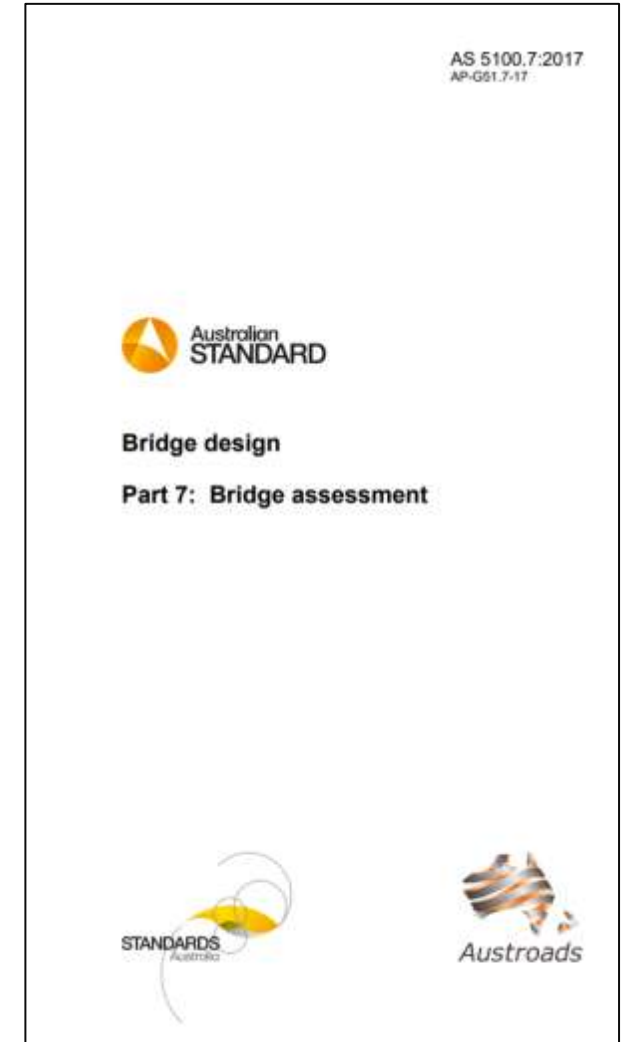
## Enhanced operation and use of heavy vehicles:

- Improved operation and use of HVs including Performance Based Standards (e.g. On-board mass is a condition of operation)
- Improved heavy vehicle access to the network and compliance and enforcement of that access



# Improved heavy vehicle access

- AS 5100.7:2017 is the national standard for assessing bridge infrastructure.
- It includes 'load factors' when assessing structures for heavy vehicle access.
- The magic ingredient is **on-board mass data**...
- ...to reduce load factors and to open up networks.



## Improved Operation and Access – A Double

- 30m long A Double with two 40' or four 20' containers
- On-board mass **facilitates improved PBS operational loading**
- Monitored for **route, speed and mass compliance** (using telematics and on-board mass)
- Permitted on designated routes to carry up to **85 tonne Gross Vehicle Mass (however without on-board mass monitoring only 75 tonne)**





# Mass Compliance and Enforcement (1)

## Key Areas of Focus:

### Vulnerable Assets

- Locations on the network at higher risk due to vulnerable assets and high traffic/mass data
- Using mass data from heavy vehicles enabled with on-board mass to identify overloading on specific vulnerable assets

### Enrolment and participation

- Vehicles operating with a consistently malfunctioning, or non-operational system





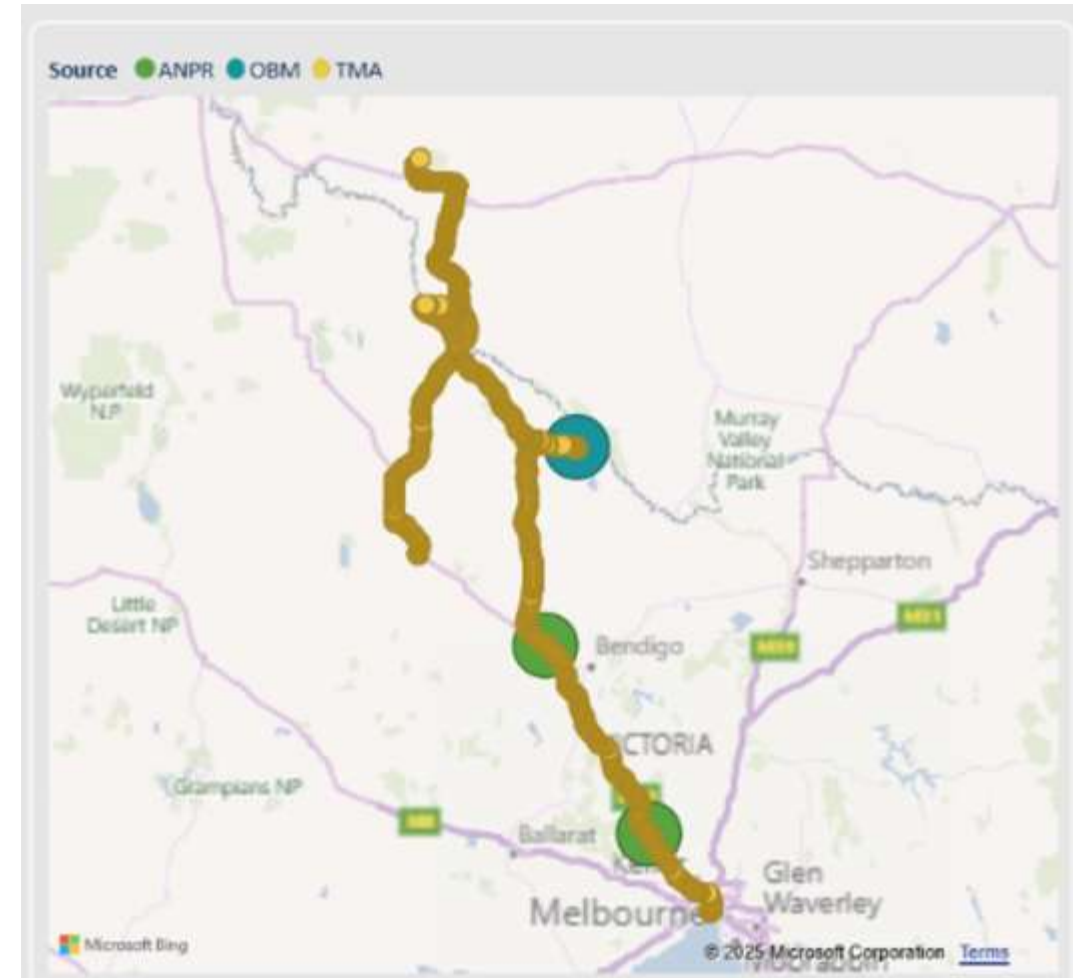
## Mass Compliance and Enforcement (2)

- Bridges** are often limited by temporary, or age-based structure limits, reducing the overall productivity of a route. Monitoring the safe use of these structures until they can be upgraded is critical
- TAP providing a report of On-Board Mass enabled HV that crossed a vulnerable structure, **in excess of the maximum bridge mass of 65 tonnes**. Axle Group masses **over the regulated limit** (22 tonnes), are also indicated.

| Timestamp  | Speed (km/h) | Combination Mass | Number of Axle Groups | Axle Group 1 mass | Axle Group 2 mass | Axle Group 3 mass | Axle Group 4 mass | Axle Group 5 mass | Imputed vehicle_configuration            |
|------------|--------------|------------------|-----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------------------------------|
| 24/05/2024 | 100.7        | 68645            | 4                     | 6114              | 17935             | 22008             | 22588             | NULL              | B-Double                                 |
| 5/02/2024  | 100.9        | 68662            | 4                     | 6504              | 17172             | 22343             | 22643             | NULL              | B-Double                                 |
| 25/04/2024 | 100.5        | 68826            | 4                     | 6377              | 17690             | 22670             | 22089             | NULL              | B-Double                                 |
| 2/02/2024  | 101.0        | 68962            | 4                     | 6486              | 16764             | 22978             | 22734             | NULL              | B-Double                                 |
| 2/05/2024  | 98.1         | 69108            | 4                     | 6377              | 17717             | 22625             | 22389             | NULL              | B-Double                                 |
| 26/04/2024 | 100.3        | 70006            | 4                     | 6377              | 17935             | 22997             | 22697             | NULL              | B-Double                                 |
| 21/06/2024 | 100.4        | 70060            | 4                     | 6359              | 17953             | 22570             | 23178             | NULL              | B-Double                                 |
| 31/05/2024 | 100.5        | 70115            | 4                     | 6450              | 17808             | 22597             | 23260             | NULL              | B-Double                                 |
| 19/07/2024 | 94.8         | 70241            | 4                     | 6431              | 17617             | 22652             | 23541             | NULL              | B-Double                                 |
| 3/06/2024  | 100.1        | 71948            | 4                     | 6441              | 17726             | 23913             | 23868             | NULL              | B-Double                                 |
| 16/07/2024 | 101.0        | 69400            | 5                     | 6280              | 14980             | 17340             | 13560             | 16600             | A-Double or B-Triple (Type I road train) |
| 26/01/2024 | 98.3         | 69480            | 5                     | 6450              | 15420             | 15430             | 14000             | 18180             | A-Double or B-Triple (Type I road train) |
| 30/11/2024 | 100.9        | 69824            | 5                     | 7021              | 17662             | 20348             | 11013             | 13780             | A-Double or B-Triple (Type I road train) |
| 17/07/2024 | 100.9        | 70120            | 5                     | 6320              | 15940             | 17940             | 14000             | 15780             | A-Double or B-Triple (Type I road train) |
| 4/12/2024  | 101.2        | 70231            | 5                     | 5969              | 17726             | 19558             | 13480             | 13498             | A-Double or B-Triple (Type I road train) |
| 15/03/2024 | 98.3         | 70270            | 5                     | 6490              | 16310             | 16260             | 13960             | 17250             | A-Double or B-Triple (Type I road train) |
| 7/03/2024  | 98.4         | 70290            | 5                     | 6510              | 16810             | 16250             | 14340             | 16380             | A-Double or B-Triple (Type I road train) |
| 18/07/2024 | 100.9        | 70460            | 5                     | 6360              | 17320             | 18140             | 13940             | 14600             | A-Double or B-Triple (Type I road train) |
| 3/05/2024  | 100.9        | 70540            | 5                     | 6510              | 16780             | 17080             | 13580             | 16590             | A-Double or B-Triple (Type I road train) |
| 10/05/2024 | 100.4        | 70680            | 5                     | 6410              | 14380             | 17860             | 13720             | 18310             | A-Double or B-Triple (Type I road train) |
| 20/05/2024 | 99.6         | 70790            | 5                     | 6420              | 14600             | 17940             | 13590             | 18240             | A-Double or B-Triple (Type I road train) |

## Mass Compliance and Enforcement (3)

- National Heavy Vehicle Regulator (NHVR) used the reported crossing data (provided on the previous slide) with telematics data for the heavy vehicles for the preceding and subsequent period of travel
- Able to cross match vehicle telematics (location) data for heavy vehicles in excess of max bridge mass, with:
  - **Automatic Number Plate Recognition cameras**
  - **Weigh-in-Motion sites**
  - **Vehicle intercepts by on-road officers, and**
  - **other on-road monitoring cameras and stations.**
- Using this data, the NHVR was able to also provide a secondary vehicle confirmation and take compliance action



# Telematics and On-Board Mass uses

## Enhanced management of the road transport network:

- Improved (quantified) understanding of HV use of the road network
- Improved business cases for funding (capital and maintenance)
- Improved ability to link telematics and on-board mass data to other network events/situations



# Data-driven investment in regional roads

NSW, Victoria, Qld and ACT all using telematics data as part of **investment planning and funding** proposals

The Victorian Government used telematics data to help prioritise AUD62 million in upgrades for regional roads and freight routes (2024–25 Budget)

**For one bridge, the data revealed vehicle detours, masses and delays, helping justify the upgrade**



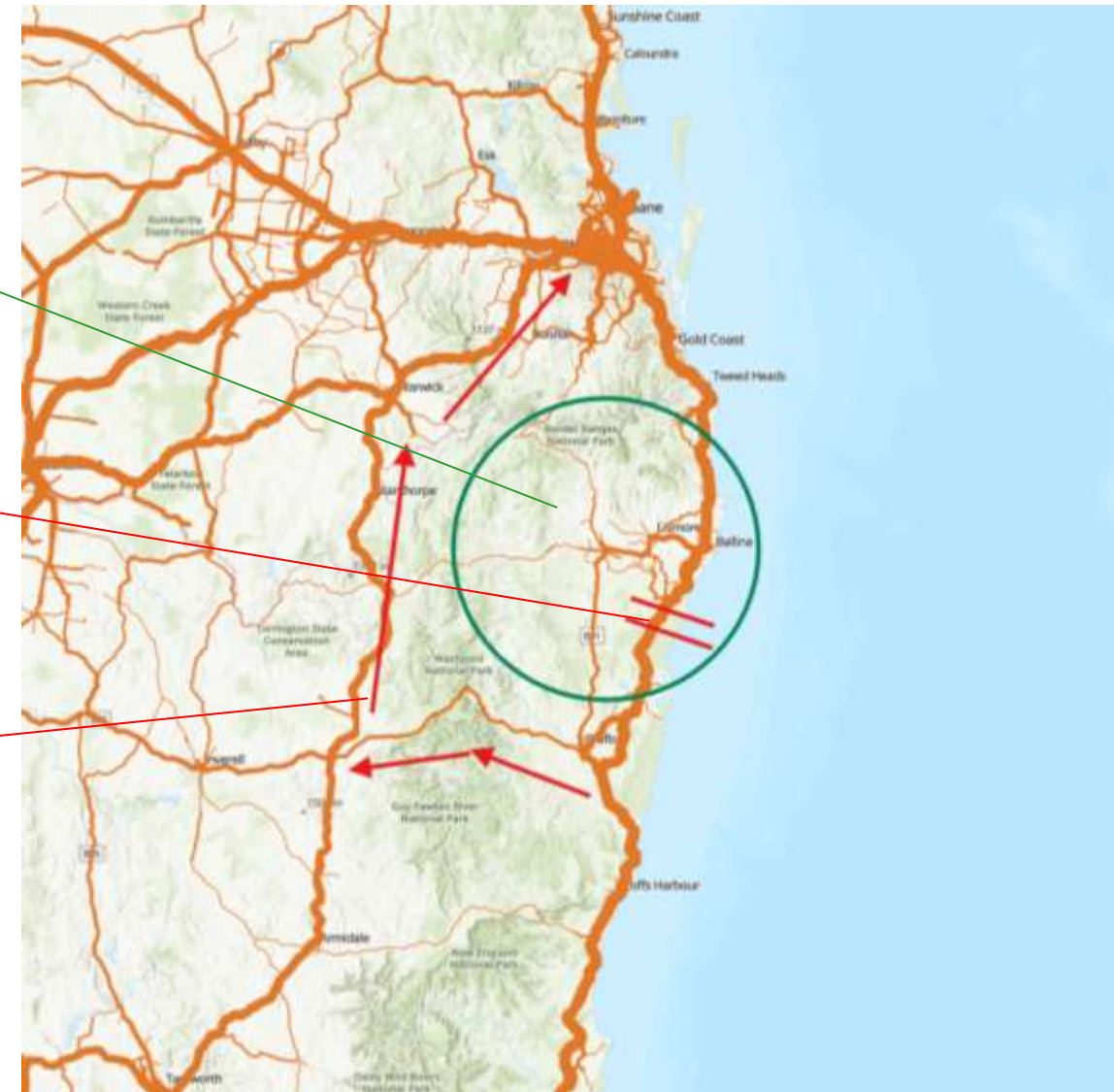


# NSW Flood Analysis

A **flood event lasting three days** in May 2025 in the northern rivers district of NSW, Australia

Resulted in the **closure of the Pacific Highway – the main north-south artery between Sydney and Brisbane**

Found some of the inland parallel **routes 200km away had five times the normal amount of traffic that week** because of that network disruption





## Structure Monitoring

List of monitored structures

Filter structures by jurisdiction/s

- ☒ New South Wales
- ☐ Queensland
- ☐ South Australia
- ☐ Victoria
- ☐ Western Australia

Select a monitored structure

Hexham Bridge

Hexham Bridge - Northbound (No load limit)

- ☒ Hexham Bridge - Southbound (68.5 t load limit)

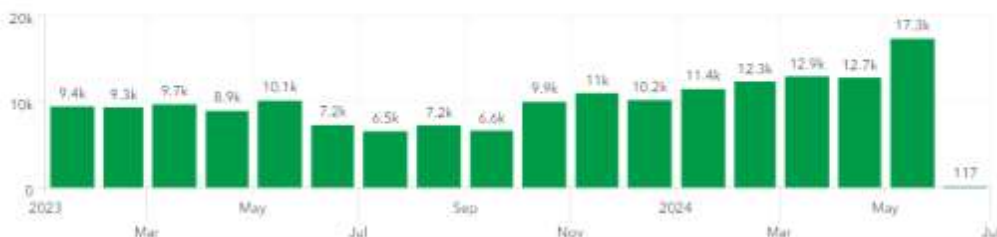
### Hexham Bridge - Southbound: 68.5 t load limit



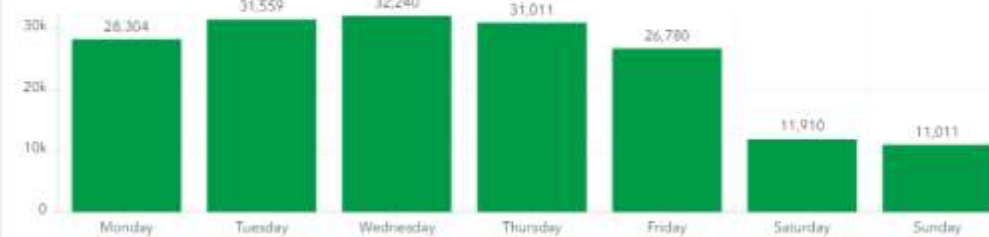
### 85th percentile speed by hour (kph)



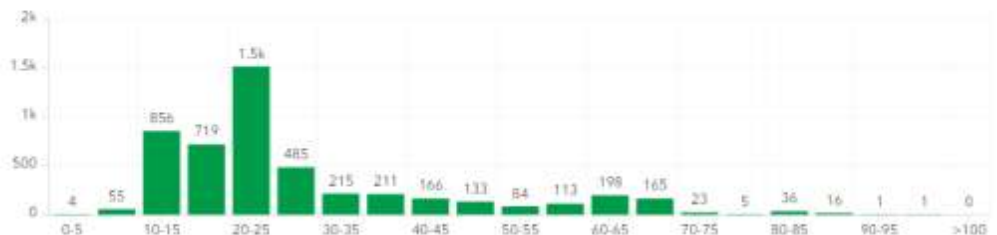
### # Crossings per month (all vehicles)



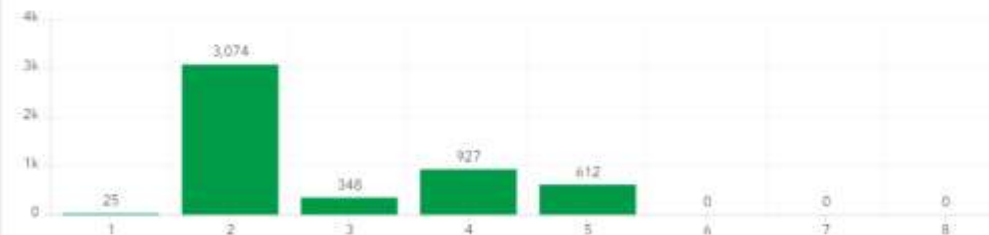
### # Crossings by weekday



### # Crossings by mass (t)



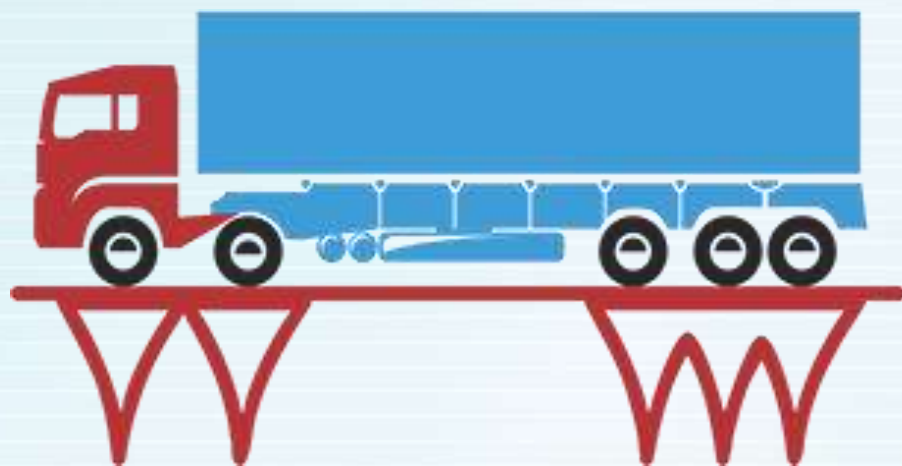
### # Crossings by MSU count



# Conclusion

A heavy vehicles' mass has always been important for road infrastructure design and maintenance.

With improvements in technology our ability to also know the mass of a heavy vehicle at all times means we can improve the operation of the vehicle and the existing road infrastructure network - that is increased **productivity and efficiency while enhancing safety!**



*ISWIM*  
International Society for Weigh in Motion