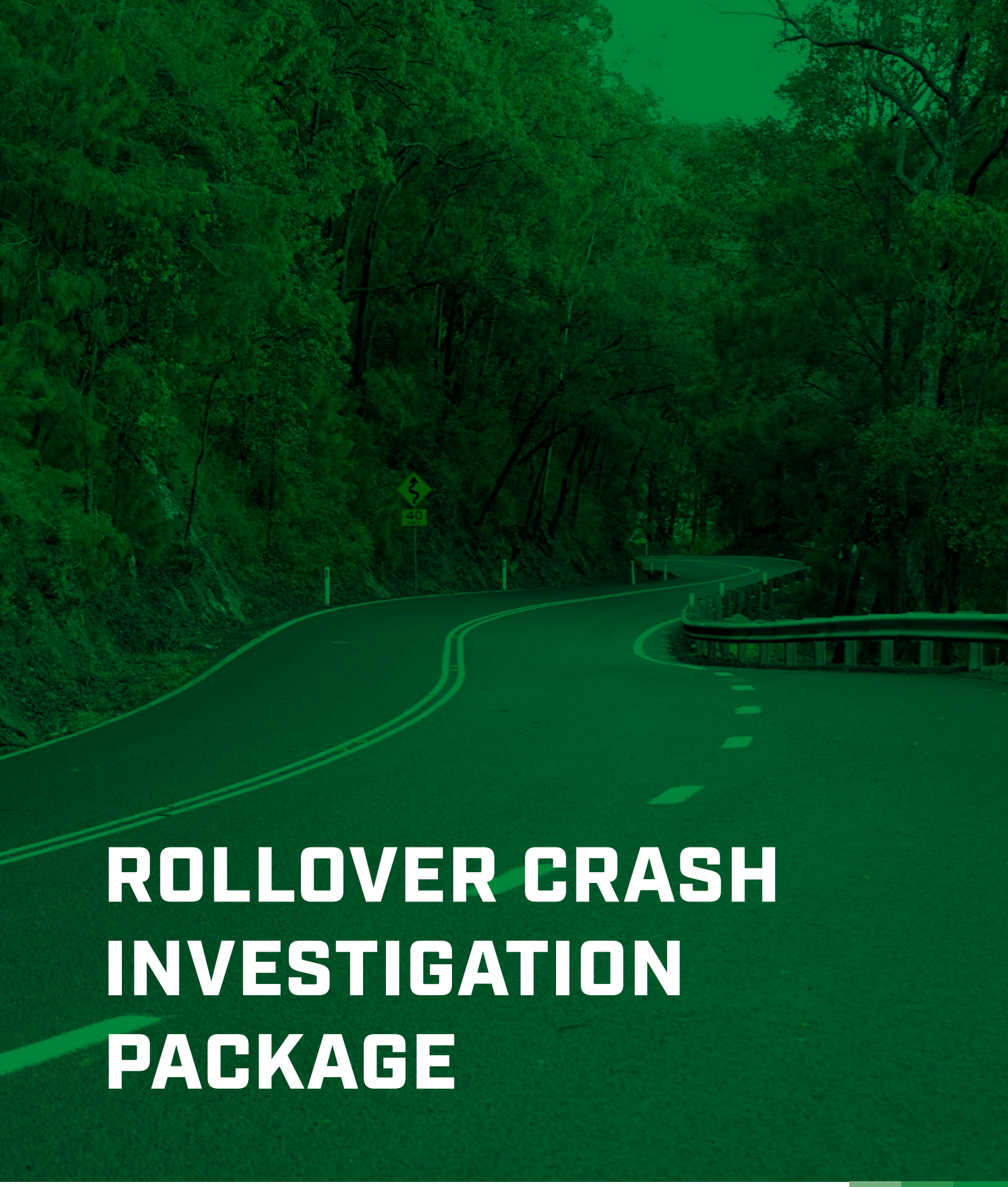


# ROLLOVER CRASH INVESTIGATION PACKAGE

HEAVY VEHICLE ROLLOVER AWARENESS PROGRAM
HVRAP

LBRCA
LIVESTOCK, BULK AND RURAL CARRIERS
NSW

# ROLLOVER CRASH INVESTIGATION PACKAGE

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# ROLLOVER CRASH INVESTIGATION PACKAGE

## Purpose

The rationale of this package is to achieve consistent rollover crash reporting across our industry. The data collected in this package will assist with a holistic approach of identifying causes and trends.

Using the theme, *"You can't control what you don't understand"*, this data is crucial for developing crash prevention initiatives and finding solutions.

Most transport operators will have their own investigation and reporting system. This is not intended to replace existing systems, but rather to complement them. The relevant data that is collected will be for a reporting, storage, and analysis program for further analysis.

**Context:**

Before using this package, you must have completed the Heavy Vehicle Rollover Awareness Program (HVRAP) and any relevant industry specific modules.

This package focuses on both technical and behavioural aspects. It is also designed to consider the whole freight task and beyond to identify how actions by individual sectors of the transport chain can affect other sectors and may unknowingly influence contributing factors.

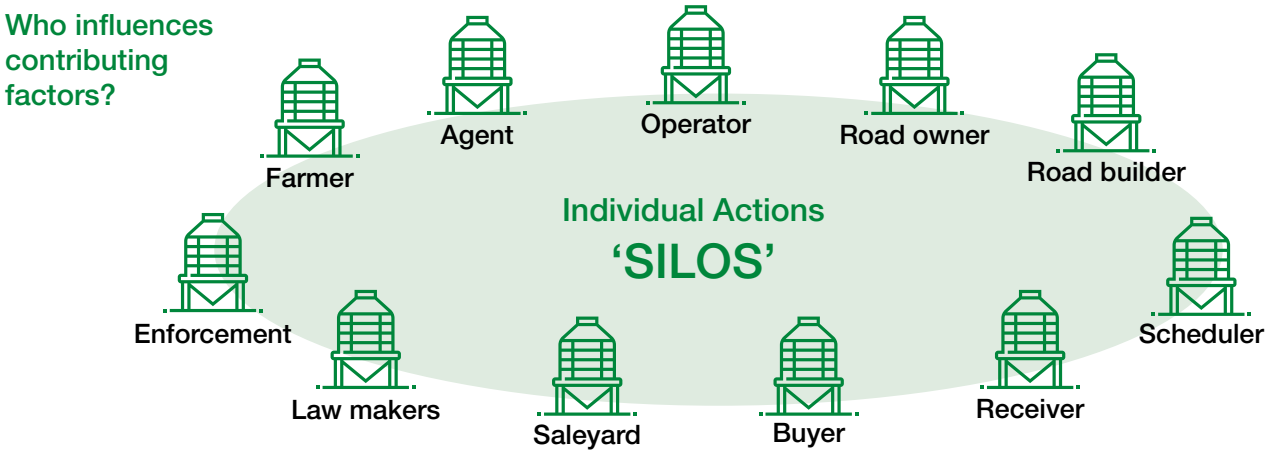



***Figure 1.*** *There are many parties that may influence the freight task and each industry may be unique.*

Keeping with the theme of HVRAP that rollovers are essentially a mathematical equation (centre of gravity x centrifugal force &/or dynamic forces).

These forces may result from many contributing factors, and when there are enough of them, they add up to cause the truck to rollover.

The package asks the investigator to consider these contributing factors and ask why we do things the way we do and if there is a way to make the freight task safer.

**The package:**

This is a three-part package.

1. An information and data collection toolkit.
2. An investigation matrix.
3. A reporting, storage and analysis program.

**The information and data collection toolkit:**

Contains practical information and tips on heavy vehicle rollover investigation. This kit can be tailored to your industry and to focus on your operations. The toolkit explains common scenarios of rollovers and why the investigator is asked to gather the information that is required. It also explains how to gather this information and guides the investigator through technical aspects.

**The Investigation matrix:**

Is a simple pro-forma document that has been designed for ease of use at the crash scene/site and recording important information consistently.

**A central storage and analysis program:**

A functional program that will allow for whole of industry analysis and reporting.

**Note -** *The data collected and stored on the program will not include information that will identify drivers or other individual, parties or truck owners.*

## The Information and Data Collection Toolkit

Before using this package, you must have completed the Heavy Vehicle Rollover Awareness Program (HVRAP) and any relevant industry specific modules.

This toolkit contains practical information and tips on heavy vehicle rollover investigation. The toolkit explains common scenarios of rollovers and why the investigator is asked to collect the information required. Using the toolkit will allow for functional analysis and reporting across the industry that allows for identifying trends for rollover crashes.

It is a comprehensive and systematic approach.

Information:

- → Summary of crash
- → Driver details, profile and experience
- → Vehicle details - prime mover & individual trailers
- → The load and the anatomy of the load
- → The road and crash site details
- → The driver's activity and journey details
- → Other details from the investigator
- → Matrix summary of contributing factors
- → Glossary of terms and definitions

## Gathering Information

**Note -** *In many cases some of this information may not be available. Investigators are asked to gain the information that is reasonably available when considering the circumstances of the incident).*

### Summary of the crash:

The rollover at a glance - type of crash, when, what, where, who.

### Date, time, day:

This information is important to identify trends on dates, days, times. Crashes at certain months, weeks of month, day of week and time of day can show a trend.

### Investigators and dates:

At least two people should be involved in the investigation and it should be started ASAP.

## Type of Crash (typically)

### Rollover that causes crash:

These are typically on road, at speed, trailer led rollovers. Trailer rolls first. Speed does not have to be very high, but the truck certainly needs to be moving to generate centrifugal force at the rear of the trailers. They are generally caused by the sum of the combination of high centre of gravity and excessive centrifugal force. When this sum of these combines to reach high enough levels the trailer rolls and takes the truck with it.

### Crash that causes rollover:

Where the truck crashes first and the crash causes the rollover. E.g., Run off road, collision with object or another vehicle.

### Tip over:

Tip overs typically occur in a paddock or on a farm or forestry road. They generally don't involve much centrifugal force, but more are likely to be a result of the centre of gravity or the balance point of the truck or trailer reaching a point where the truck and/or trailer fall or tip over. Experience shows that this would typically be escalated by crossfall/super elevation of roads, banks, drains or boggy roads where the truck or trailer tips to an angle where it falls over. A typical example would be a truck rolling onto its left side on a left-hand corner. While these are indeed serious incidents, the solutions to preventing these can be fundamentally different to "on road, at speed, trailer led rollovers".

### Description of crash:

Was it the whole vehicle or a trailer only rollover? A short description to add to above details and any extra information to define the crash. e.g. Single vehicle trailer led rollover. Whole combination rolled on RH side on LH bend. Was there another vehicle or 3rd party involved?

### Driver details:

The drivers name, if there are not privacy issues.
**Note:** *This information is not required for the central storage and analysis program.*

### Operator details:

If there are not privacy issues. This can give a profile on companies that have several rollovers.
**Note -** *Some of this information will need to be re-entered in appropriate sections.*

### Driver profile:

This to build a profile on drivers age, experience, qualifications, and training. The driver's knowledge of the vehicle, the loads, and the route. How the driver was paid, whether hourly rate, percentage of truck, kilometres, or other? Was the truck double shifted (has 2 or more shifts over 24 hours by more than one driver)?

## Crash Summary

Date: Time: Day:

Investigators: 1. 2.

Date investigation started: Date completed:

Road: Location:

Type of road: ☐ Public Road ☐ Sealed ☐ Unsealed

Other location details:

Vehicle type/combination:

Type of crash: ☐ Rollover that caused a crash ☐ Crash that caused rollover

☐ Tip over ☐ Single Vehicle ☐ Multi-vehicle ☐ 3rd party involved

Operator:

Description of crash:

## Driver Profile

Age: Gender: Yrs Experience: Licence Category:

Rollover Program completed: ☐ Yes ☐ No Date of training:

Other driver training/qualifications:

Date of training:

Is this the driver's regular vehicle? ☐ Yes ☐ No

Does the driver have experience with this type of load? ☐ Yes ☐ No

Has the driver driven this route before? ☐ Yes ☐ No

Does the driver have crash history? ☐ Yes ☐ No

How is the driver paid? ☐ Hourly ☐ % of truck ☐ Other

Was this truck double shifted? ☐ Yes ☐ No

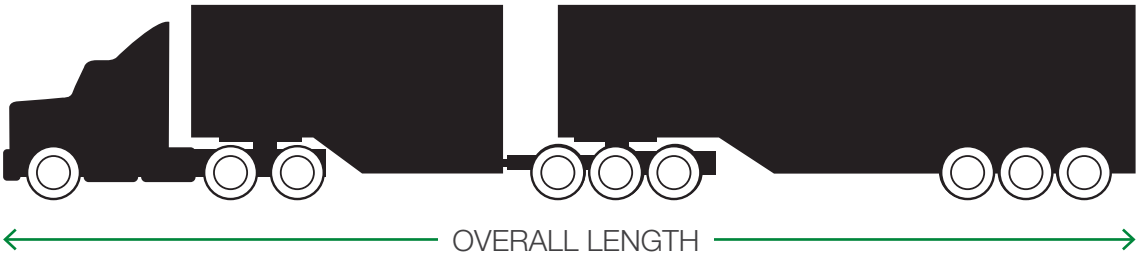
Experience / other details:

**Vehicle details:**

Identify type and combination of vehicle. This is important to find trends in makes, design, stability and use of technology. Information on combinations and terminology can be found in the glossary of terms and definitions. Combination - use terms. Total number of axles.

If possible, provide photo of undamaged truck combination prior to the crash.

*eg. below: 9 axle B-double, tandem drive, triaxle trailers.*




**Gross weight/loaded mass:**

The loaded weight of the combination when it crashed. If no weigh bridge or scale data available, this could be gained if the product is loaded onto another truck and weighed. Or it may just be an estimate.

**Tare mass:**

If unknown, this may be able to be obtained from recent weighbridge data.

**Overall vehicle length:**

As illustrated above. The total length of the combination by construction.

**Overall loaded length:**

Plus, rear projection on rear trailer.

**GML/CML/HML/PBS:**

What mass scheme the vehicle is operating under. Refer to the glossary of terms and definitions.

**Mass/maintenance/fatigue management:**

Is the vehicle operating under any of the National Heavy Vehicle Accreditation Scheme (NHVAS) or other quality schemes? This can show a trend of what works and what doesn't.

**Prime mover:**

- Make
- Model
- Year of manufacture
- Suspension: Air or mechanical and make if possible.
- ABS and EBS/ESC braking: ABS should be fitted to all B-doubles. EBS and ESC may be fitted. It may require the investigator to ask the truck owner or look up manufacturer's specifications. Were the systems connected and working?
- Other technology: eg, lane assist, seeing eye.
- Reported defects; These maybe defects that were reported prior to the crash, or observed when inspecting the vehicle after the crash.

## Vehicle Details

Combination description:

Gross weight/loaded mass of the combination:

Tare weight of the combination:

Overall Vehicle Length: Overall Loaded Length:

Mass - GML/CML/HML/PBS:

Mass/Fatigue/
Maintenance/Management:

Other details:

Prime mover/truck make and model:

Axles: Year of manufacture:

Suspension: ABS: EBS/ ECS: CTI:

Other technology:

Reported defects:

Other details:

## Trailers

As the trailer will typically roll first and this is usually due to a high centre of gravity combined with centrifugal force, we need a lot of information to get a picture of the causes and understand trends across the industry.

- **Manufacturer**
- **Type of trailer:** eg. semi, pig, dog. Is it a short B trailer (pup/stag)? Refer to the glossary of terms and definitions.
- **Axles:** Number of axles on the trailer.
- **Suspension system:** Most will be airbag suspension as shown. If it has a spring or mechanical suspension use those terms and any details you have.
- **ECS/EBS:** It is important to know if the trailer was fitted with ESC/EBS and if possible if it was plugged in and working. Identifying an EBS compliance plate or valve may require a trained eye. Data may be able to be downloaded by an experienced technician.
- **Axle mass:** Estimated weight on the axle group. In case of a dog trailer it will be combined mass of both axle groups.
- **Tyres and wheel sizes:** Usually 22.5" as standard but low profile 19" wheels and others may be used. Tyre profile is also important as this can affect stability. List if dual wheels or super singles.
- **Bed/floor heights:** Are vital. It has been identified that higher bed heights are overrepresented in rollovers. The trailer may have a sloping floor or a step, so there is provision for measurement of the front and rear of the trailer. Refer HVRAP modules 2.4 COG and 3.2 Vehicles.
- **Body height:** Height of body or load carrying equipment such as pins on a log truck. when measured from the ground.
- **Rear projection:** Estimate of the rear projection (length of load past the extreme rear of the trailer) on the rear trailer can be useful information in determining the effects of centrifugal force or the way the truck was loaded.
- **Load security, types and methods:** This information can be helpful when determining if there has been load shift.
- **Reported defects:** These maybe defects that were reported prior to the crash, or observed when inspecting the vehicle after the crash.

*Air bag suspension*

*Spring suspension*

*EBS valve*

***EBS Trailer Connectors & Coil***

*EBS (Electronic Brake System) connectors are used for the electrical connection of the ABS/EBS braking systems between the truck and trailer for both 12V and 24V electrical systems. Whilst ABS has 5 pins, EBS requires two additional contacts (7 total pins) to permit the exchange of data between cab and trailer so as to optimise the braking effect. The ABS/EBS system conforms to ISO/DIN 7638 and the technical specifications of the materials used conform to ADR/GGVS norm requirements for vehicles transporting hazardous goods.*

**Designation: 11 R22.5 148/145L**

**11** = *the tyre width expressed in inches*
**R** = *the construction code (the radial construction)*
**22.5** = *the rim diameter in inches*


*Bed heights can vary considerably in a fleet of trucks as shown in this example.*

## Trailer Details

*If there are multiple trailers, use a separate table for each trailer, and identify as trailer 1-2-3*

Trailer make/type:

No of axles: Suspension system:

ECS/EBS:

| | AXLE MASS | TYRES/WHEELS | EBS/ESC |
|---|---|---|---|
| Semi: | | | |
| Dog: | | | |
| Pig: | | | |

Bed height: Front: Rear:

Body height: Front: Rear:

Estimated Rear Projection:

Load Security:

Reported defects:

Other details:

## The Load

### Anatomy of the Load:

Refer to loads and loading HVRAP modules 2.4 COG and 3.1 Loads.

Trucks carrying many of our primary industry products may be overrepresented in rollovers fundamentally because they often have high centre of gravity and potentially unstable loads. It is important that we understand the anatomy of the load involved in the rollover. There are many things that can affect this.

### Load details:

The product the vehicle was carrying. Include any known information on the weight of the product. eg. Canola at 600kg per cubic metre. If there were multiple products, describe them and where they were placed.

### Load height:

The overall height of the load of the trailer. This is a main factor that contributes to these crashes. If the trailer has lost the load during the rollover, this will have to be estimated. If the load height was not consistent, provide information on the front and rear heights.

### Consignor and receiver:

This can be important information when looking for trends and contributing factors.

**Note:** *This information is not required for the central storage and analysis program.*

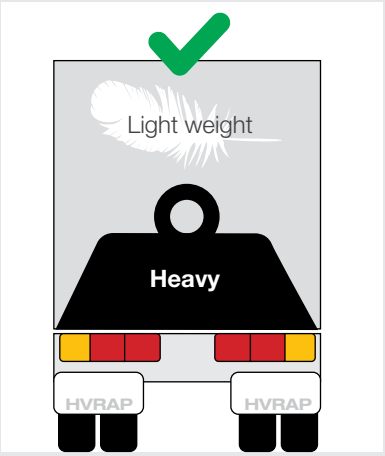
### Loader:

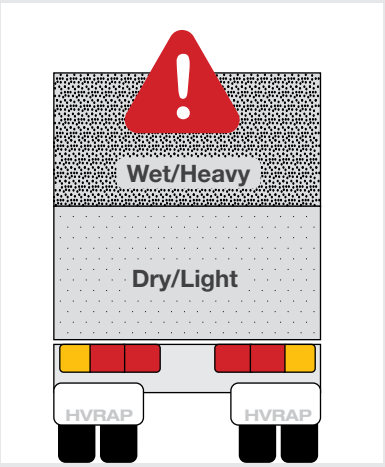
Who loaded the truck? It may also be worth interviewing the loader driver.

**Note:** *This information is not required for the central storage and analysis program.*

### Stability:

In some rollovers, it has been suspected that unstable or top-heavy loads may have been the major cause. Consider if the load may have been top or side heavy.




*A top-heavy load. Bigger heavier logs loaded up high causing pins to splay.*

*An unstable load. Loaded badly and to one side.*

**Load Details**

Product/s:

Description of load:

Product information - volumes, weight etc:

Load height estimate:
*(use as applicable)*

| | | | | | |
|---|---|---|---|---|---|
| Truck: | | Front: | | Rear: | |
| Trailer 1: | | Front: | | Rear: | |
| Trailer 2: | | Front: | | Rear: | |
| Trailer 3: | | Front: | | Rear: | |

Other details:

Consigner: Receiver:

Loaded by: Company:

Loading method:

Stability – could it have been top or side heavy:

Other details:

## Road & Crash Site Information

This is the part that will require some tools and ample time. Taking good measurements and photos are important.

- Use a satellite view from google maps.
- If you have GPS, take an accurate reading.
- Identify the road name and any km markings.
- Was the road wet, dry or slippery?
- Could sun glare, fog, dust or visibility been an issue?
- Was it a tight corner or slight bend? Engineering drawings of the road could help. Google maps could be of value.
- Measure the road width and take note of gradient.
- Consider camber and super elevation.
- Take note of all signs and speed limits.
- Estimation of speed at the time of crash could be by witness/driver statements, ESC, GPS or engine management data or other means. For credibility, how was it gained? If previous trips have been done on this road and location by this vehicle, comparing previous data is useful. This information can go into the investigators notes.
- Measure/photograph yaw marks (definition below).
- Take note of line/lane markings. eg. single white line, fog line, double lines
- Was there mobile reception at the crash site. Was there reception prior to the crash scene. Evidence shows areas with sporadic reception will sometimes tempt drivers to look at phone when reception is gained for a short distance.
- Is there crash history at the site? Ask people at the scene and in the industry and Police. Check prior records and if possible and check with the road owner.
- Give a general written description of the road. eg. windy, undulating with bumps.
- Obtain ESC, GPS or engine management data, which may also show G-forces prior or ESC interventions before and during the incident etc.


**Yaw Marks**

The tyre yaw marks are produced when centrifugal force is trying to overcome the grip of the tyres.

As centrifugal force acts on the trailer trying to push it to the outside of the corner the inner tyres are unloaded and as such do not leave yaw marks on the pavement. The outside tyres however are heavily loaded due to the weight transfer caused by the centrifugal force.

Refer to HVRAP Module 1.3 What happens and why?

## Road & Crash Site Details

Road:

Location/km mark: GPS:

Direction of Travel: Wet/Dry:

Visibility (clear, dust, sun glare):

***Description***

Flat, incline or decline: Gradient-slight/medium/steep:

Width: Conditions:

Super elevation or camber details:

Surface (sealed/unsealed): Shoulders:

LH/RH Bend/Straight: Radius-slight/sharp/medium:

Side truck rolled on to: ☐ Left ☐ Right Speed Limit:

Signs:

Estimated Truck Speed: How gained:

ESC, GPS or Engine Management or other data available:

Details of data:

Sight distance issues?

Yaw marks: Details:

Line/lane markings:

Mobile phone reception:

Details of reception in the crash area:

Is there known crash history?

General description of the road:

Other details:

## Driver Activity and Journey Details

This information is important to track the driver's activities to identify trends of start times and crash times.

- → Drivers' previous day's activities. (If practical include information from a longer period to identify patterns and rest times etc)
- → Drivers activities on the day of the crash.
- → Other information as distance travelled, crash location and destination are also useful.
- → Opening and closing times of loading and receival points can have an effect.
- → Was driver double shifted and under pressure for a changeover?
- → Rest breaks are important. If work diary pages are available, the investigator may be able to obtain copies. Beware of privacy issues.
- → Dash cam or other footage is very valuable and can be sometimes lost at the scene. Getting this can be very important. Beware of legal issues.
- → Driver distraction has been identified as a major issue. Drivers using mobile phones, reaching for food or drinks, reaching for UHF radios or unfamiliar with controls in the cabin are often listed as causes of rollovers.

### Driver Activity & Journey Details

Previous day - Start time: Finish time: Finish location:

Day of crash - Start time: Start Location:

Departure point before crash: Time:

Destination:

Departure point distance to crash site: Destination opening time:

Crash site distance to destination: Destination closing time:

Details of last rest break:

Work diary pages: Dash cam footage:

Description of crash day activity:

Driver distraction details:

Other details:

## Contributing Factors

This section is for the investigators to use for recording a summary of their findings of factors that contributed to the rollover. Feel free to add more if required.

**Rate main factors from low/medium/high.**
Low - L  Medium - M  High - H

| DRIVER/ACTIONS | Rating | VEHICLE/LOAD | Rating | ROADS/CRASH SITE | Rating |
|---|---|---|---|---|---|
| Driver inexperience | | Different vehicle | | Visibility | |
| Complacency | | Mechanical failure | | Sight distance | |
| Fatigue | | Brake failure | | Sun glare | |
| Speed | | New drive tyres | | Road Failure | |
| Distraction | | High bolster height | | Soft road edges | |
| Mobile phone | | High COG trailer | | Banks | |
| UHF radio | | High COG load | | Poor shoulders | |
| Reaching food/drink | | Unstable load | | Pot holes | |
| Health issues | | Loaded one side | | Negative camber | |
| Evasive action | | Insecure load | | Excessive cross fall | |
| Oncoming vehicle | | | | Kerbs | |
| Livestock | | | | Drains | |
| Skid off road | | | | Ice/snow | |
| Time pressures | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

## Investigators notes

The investigators should also provide written notes on other observations and details relevant to the crash.

## Tips for conducting an investigation

**Note:** *These tips are meant to be general guidance for industry investigators gathering information for their own use. Much of the information that could be helpful in the RCIT can be gathered away from the crash scene. Remember, your safety and wellbeing come first. Ensure that you have the permission and support from appropriate management before conducting an investigation.*

### At the crash site/scene:

In many cases it may not be possible to conduct a detailed inspection at the crash site, however if you are able to, make yourself known to any Police or emergency services at the scene. They have total authority and be prepared that they may ask you to leave.

Information collected at the crash site/scene will be collected in individual pieces but will be analysed as part of the whole picture.

Attending crash scenes can be a traumatic experience and the shock of being there can affect your decision making. It is important to take this into consideration before you start the investigation and to ensure that you have the authority from relevant parties.

Also, be aware because of the potential stress of being in this situation it is easy to forget what you have seen and you may also be confused when recalling from your memory.

If possible, have another person (buddy) to assist you in the investigation. Take your time and try not to rush to assumptions.

### Use the matrix as a tool:

The attached matrix is a tool to assist and remind you of the information that you should collect at the scene. Take your time and add additional notes as you go.

### Measurements:

This is not a critical forensic investigation. It is intended to gather information to find causes and identify trends when analysed in conjunction with other rollovers. It is important to use a tape measure for vehicle details such as bed and body height. Road markings, yaw marks and sign locations etc can be done by measuring how far your footstep is and stepping the distance out.

### Take a lot of photos:

If you have access to more than one camera, use one for snap shots and another for the investigation photos. Take the investigation photos in a sequence that makes sense to you and try to have your buddy document what they are as you go. Your memory is likely to be affected by the trauma of being at the scene. This sequence will vary from crash to crash depending on what is happening in regards to recovery etc.

***Vehicle:***

- → Truck and trailers from all angles
- → Brakes and brake valves and systems and components
- → Steering componentry
- → Tyres and wheels for sizes and roadworthy condition
- → Suspension systems
- → Load restraint
- → Load restraint

***Load:***

- → The load in the truck/trailer
- → Load in a sequence as it hit the ground
- → If it is a bulk load, take pics of any variations in moisture or density

***Crash scene:***

- → Take a lot of photos of the scene from all angles
- → If safe and possible walk from the start of tyre yaw marks with camera on movie mode and commentate what you are seeing. Take still photos along the way.
- → Tyre yaw marks will disappear quickly or become confused with other vehicles so get these photos ASAP.
- → When the scene is clear do a drive through on movie mode. Start a fair distance before the crash site and ensure you capture road and line markings, signage and corners, sight distance, bumps in the road, potholes, shoulders and all other relevant details. Do this from both directions. Use commentary to explain what you are seeing.
- → Include a google maps picture.

**Witnesses:**

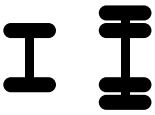
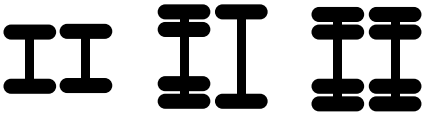
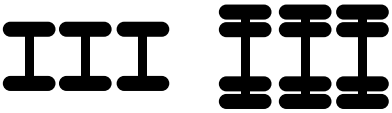
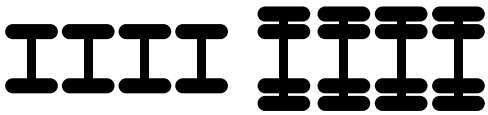
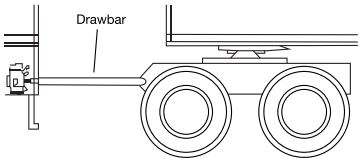
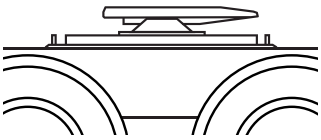
If it is reasonable, talk to any witnesses at the scene to get information. Remember they may be affected by shock or emotional distress.

**After the crash:**

*VERY IMPORTANTLY, IF YOU ARE AFFECTED BY WHAT YOU HAVE EXPERIENCED, IT IS IMPORTANT TO SEEK COUNSELLING.*

# Glossary of Terms & Definitions

| | |
|---|---|
| **Truck** | A rigid motor vehicle built mainly as a load carrying vehicle. |
| **Twinsteer axle group** | A group of two axles:<br>a. with single tyres; and<br>b. fitted to a motor vehicle; and<br>c. connected to the same steering mechanism; and<br>d. the horizontal distance between the centre-lines of which is at least 1m but not more than 2m.<br>  |
| **Prime mover** | A heavy motor vehicle designed to tow a semitrailer. |
| **Semitrailer** | A trailer that has:<br>a. one axle group or a single axle towards the rear; and<br>b. a means of attachment to a prime mover that results in some of the mass of the trailer's load being imposed on the prime mover.<br>  |
| **Lead trailer** | A semi-trailer with a fifth-wheel assembly mounted over the rear axle group, usually the first trailer in a B-double or other B-coupled combination (e.g. B-triple).<br>  |
| **B-double** | A combination consisting of a prime mover towing two semitrailers, with the first semitrailer being attached directly to the prime mover by a fifth wheel coupling and the second semitrailer being mounted on the rear of the first semitrailer by a fifth wheel coupling on the first semitrailer.<br>  |
| **Road train** | A combination, other than a B-double, consisting of a motor vehicle towing at least two trailers, excluding any converter dolly supporting a semitrailer.<br>  <br>*A-double (double road train)*<br>  <br>*A-triple (triple road train)* |
| **Stag trailer** | A short last trailer in a B-double combination that connects to a fifth wheel on the towing trailer situated under the towing trailer's load-carrying area.<br>  |

| | |
|---|---|
| **Dog trailer** | A trailer (including a trailer consisting of a semitrailer and converter dolly) that has:<br>a. one axle group or a single axle at the front that is being steered by connection to a towing vehicle by a drawbar; and<br>b. one axle group or a single axle at the rear.<br>  |
| **Pig trailer**<br>(also rigid drawbar trailer, drawbar trailer, pony trailer) | A trailer:<br>a. with one axle group or a single axle near the middle of its load carrying surface; and<br>b. connected to the towing vehicle by a drawbar.<br>  |
| **Single axle** | a. one axle; or<br>b. one axles with centres between transverse, parallel, vertical planes spaced less than 1.0m apart.<br>  |
| **Tandem axle group** | A group of at least two axles, in which the horizontal distance between the centre-lines of the outermost axles is at least 1m, but not more than 2m.<br>  |
| **Tri-axle group** | A group of at least three axles, in which the horizontal distance between the centre-lines of the outermost axles is more than 2m, but not more than 3.2m.<br>  |
| **Quad-axle group** | A group of four axles, in which the horizontal distance between the centre-lines of the outermost axles is more than 3.2m but not more than 4.9m.<br>  |
| **Drawbar** | That part of a trailer (other than a semitrailer) that connects the trailer body to a coupling for towing purposes.<br>  |
| **Fifth wheel coupling** | A device (other than an upper rotating element and a kingpin) used with a prime mover, semitrailer or converter dolly to:<br>a. permit quick coupling and uncoupling; and<br>b. provide for articulation.<br>  |
| **Skel-trailer**<br>(also skeletal trailer) | A semitrailer or trailer consisting of a bare framework and chassis used primarily for transporting containerised freight. |
| **Front under-run protection system (FUPS)** | A device or barrier installed at the front of a heavy vehicle with the purpose of preventing other vehicles from being pushed underneath the front of the heavy vehicle in the event of a collision. |

# Mass Limits and Accreditation Schemes

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| **General mass limits (GML)** | The heavy vehicle general axle mass limits prescribed in the HVNL that apply to public roads in Australia unless otherwise limited by load restriction signs. |
| **Concessional mass limits (CML)** | A mass exception under the HVNL which allows concessional mass limits for particular vehicles or vehicle combinations dependent on certain conditions being met (e.g. must hold NHVAS Mass Management Accreditation).<br>The mass exception allows tandem and tri-axle groups to be 5% above general mass limits (GML), with a maximum gross mass increase of 1.0 tonne for a vehicle up to 55.0 tonnes gross mass and 2.0 tonne for a vehicle exceeding 55.0 tonnes gross mass. |
| **Higher mass limit (HML)** | A mass exception under the HVNL which allows higher mass limits on approved routes for particular vehicles or vehicle combinations dependent on other conditions being met (e.g. IAP and/or road friendly suspension may need to be fitted to the vehicle). |
| **Gross combination mass (GCM)** | Means the total maximum loaded mass of a vehicle and any vehicles it may lawfully tow at any given time:<br>a. if the Regulator has, under section 56, specified the total maximum loaded mass of the motor vehicle and any vehicles it may lawfully tow at any given time - specified by the Regulator under that section*; or<br>b. otherwise - stated by the motor vehicle's manufacturer.<br>**Note: HVNL Chapter 2, which includes section 56, has not yet commenced and as such jurisdictional definitions may also apply.* |
| **Gross trailer mass (GTM)** | The mass transmitted to the ground by the axles of the trailer when it is loaded to its GVM and connected to a towing vehicle. |
| **Gross vehicle mass (GVM)** | Of a vehicle, means the maximum loaded mass of the vehicle:<br>a. if the Regulator has specified the vehicle's maximum loaded mass under Section 57 - specified by the Regulator under that section*; or<br>b. otherwise - stated by the vehicle's manufacturer.<br>**Note: HVNL Chapter 2, which includes section 57, has not yet commenced and as such jurisdictional definitions may also apply.* |
| **General access vehicle (GAV)** | In terms of heavy vehicles on Australian roads, these are vehicles which do not require a permit or notice to run on the road networks. These vehicles have as-of-right access to the network unless otherwise sign posted. |
| **General mass limits (GML)** | The heavy vehicle general axle mass limits prescribed in the HVNL that apply to public roads in Australia unless otherwise limited by load restriction signs. |
| **Mass management accreditation** | An accreditation allowing, for a period of not more than three (3) years, the vehicle to operate at concessional mass limits or higher mass limits applying under the mass requirements. |
| **Performance based standards (PBS)** | An alternative accreditation scheme for heavy vehicles setting minimum performance levels for safe and efficient operation (as opposed to standard prescriptive rules). Greater access is generally afforded for higher performance. |

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| **Basic fatigue management (BFM) system** | For an operator of a heavy vehicle, means the operator's management system for ensuring compliance with the BFM standards and business rules, including by:<br>a. recording the name, current driver licence number and contact details of each driver who is currently operating under the operator's BFM accreditation; and<br>b. ensuring each of the drivers is in a fit state:<br>i. to safely perform required duties; and<br>ii. to meet any specified medical requirements; and<br>c. ensuring each of the drivers:<br>i. has been inducted into the system; and<br>ii. has been informed of the BFM hours; and<br>d. ensuring anyone employed in the operator's business, who has responsibilities relating to scheduling or managing the fatigue of the drivers:<br>i. has been inducted into the system; and<br>ii. has been informed of the BFM hours. |
| **Maintenance management accreditation** | a. an accreditation exempting, for a period of not more than three (3) years, the vehicle from the requirement to be inspected before the vehicle may be registered, or<br>b. accreditation of a similar kind under another law of a participating jurisdiction. |
| **Intelligent Access Program (IAP)** | The intelligent Access Program is a program to allow heavy vehicles to have access, or improved access, to the road network in return for monitoring, by an intelligent transport system, of their compliance with stated access conditions. (Also see http://www.tca.gov.au) |
| **Work Diary** | For the driver of a fatigue-regulated heavy vehicle, generally, means a written work diary or electronic work diary kept by the driver for the purposes of the HVNL. |
| **Sight distance** | The distance, measured along the road over which visibility occurs between a driver or rider and an object or between two drivers at specific heights above the carriageway in their lane of travel.<br>There are many specific types of sight distance (e.g. approach sight distance, stopping sight distance) |
| **Load restraint guide** | A document of that name prepared by the National Transport Commission and published in the Commonwealth Gazette, from time to time. |
| **Loaded mass** | The vehicle's mass together with the mass of the vehicle's load that is transmitted to the ground. |
| **Wheelbase** | The distance from the centre line of the vehicle's foremost axle to the rear overhang line. |
| **Road** | For the purposes of the HVNL, a road is an area that is open to or used by the public and is developed for, or has as one of its uses, the driving or riding of motor vehicles. |
| **Road Authority** | The road authority for a participating jurisdiction means an entity that is declared by a law of that jurisdiction to be the road authority for the jurisdiction for the purposes of the HVNL. |

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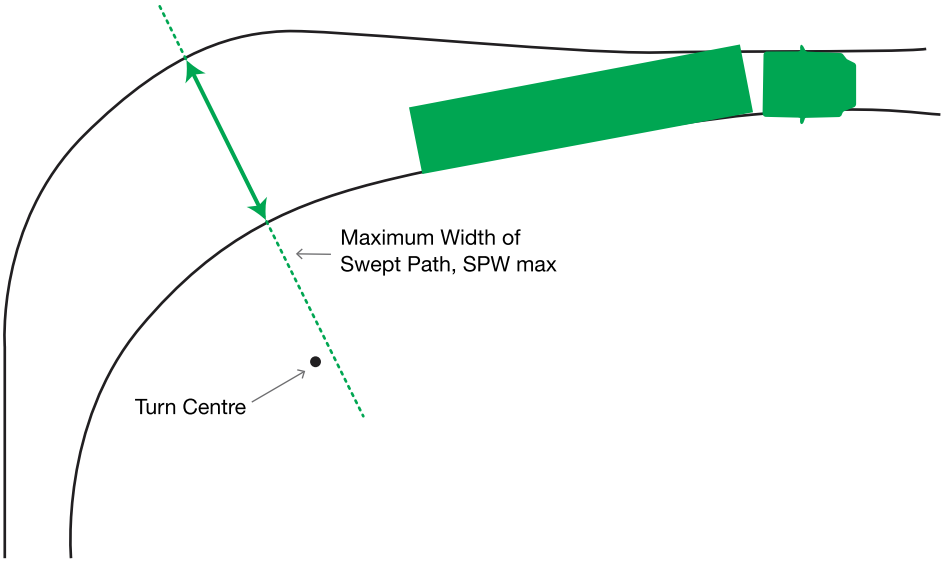
| **Road manager** | For a road in a participating jurisdiction, means an entity that is declared by a law of that jurisdiction to be the road manager for the road for the purposes of this Law.<br><br>For a mass or dimension authority, a road manager for a road in the area, or on the route, to which the authority applies.<br><br>Road managers are defined in the HVNL as it is applied in each jurisdiction i.e. each jurisdiction defines its set of road managers. |
| **Route** | A set of connection roads and infrastructure allowing a vehicle to travel from one location to another. |
| **Swept path** | The area bounded by lines traced by the extremities of the bodywork of a vehicle while turning.<br><br>  <br> |
| **Swept width** | The radial distance between the innermost and outermost turning paths of a vehicle. |