

OCTOBER 2012

DRAFT



INFORMATION BULLETIN

Agricultural trailers

Minimum requirements for safe use

Picture to come - Typical agricultural trailers

Introduction

Many pieces of agricultural equipment are classified as agricultural trailers if they travel on the road network.

Agricultural trailers are exempt from the requirement to be registered or meet the standards for registration.

However, these exemptions do not remove the obligation of the operator to ensure the trailer, and any combination of vehicles it is part of, is safe and roadworthy.

This information bulletin provides a practical set of safety standards to apply to unregistered agricultural trailers that will facilitate safe road travel.

What is defined as an agricultural trailer?

An agricultural trailer is a vehicle that does not have its own motive power, that is drawn or towed and used exclusively:

- as an agricultural implement
- for transporting the comb of a grain header
- as a bulk bin used exclusively for holding grain and constructed for that purpose
- for the carriage of bulk fruit bins and constructed for that purpose
- a trailer towed by an agricultural machine operating as an agricultural machine.

What is the maximum mass of a trailer

The total, maximum safe mass for an agricultural trailer is the lowest of;

- the capacity of the towing apparatus fitted to the towing vehicle
- the maximum trailer mass specified by the tow vehicle manufacturer
- the mass limit specified for the tyres, axles or suspension
- the maximum mass specified by the trailer manufacturer or the manufacturer or installer of any of the safety related components on the trailer.

There are other maximum mass limits for vehicles to protect roads, bridges and other infrastructure.

General requirement

All equipment specified should function properly and be in good condition.

Tyres

Tyres used on agricultural equipment are generally chosen for characteristics that suit the functionality of the vehicle.

In line with this, the tyres fitted are often designed for low speed, flotation or traction, rather than for highway use. Accordingly, many do not have a high road speed or load at road speed capacity.

The manufacturer's speed rating of a tyre often varies with the load and tyre inflation pressure. Accordingly, tyres fitted to an agricultural trailer should have a load rating equal to or greater than the gross mass of the trailer at the speed the trailer is towed at.

Tyre types and sizes should be compatible with the wheel rims used.

Tyres should be free of deep cuts, cracks, bulges, exposed cords, evidence of carcass failure or separated or perished rubber.

An agricultural trailer should not be towed at a speed that exceeds the load and speed ratings specified by the tyre manufacturer (at the recommended tyre inflation pressure).

Mudguards

Where an agricultural trailer cannot have mudguards due to its construction or purpose, or they are not fitted, it should not be towed at a speed of more than 20km/h.

Brakes

Stability

The stability of a combination of agricultural vehicles while under braking can be adversely affected by loose or rough surfaces or hilly terrain. If any vehicle in the combination does not have suspension or brakes, the risk of loss of control is increased. Inappropriate speeds also increase that risk.

A tractor that has brakes on only one axle towing an un-braked trailer may not be able to stop in a reasonable distance and requires particular care to prevent jackknifing.

Brake performance

On a dry, smooth, level road surface with no loose material and with one sustained application of the brake, a vehicle combination containing an agricultural trailer should meet the minimum stopping distance set out in the tables below:

| Performance of service brake | |
|------------------------------|---------------------------------------|
| Combination mass | Maximum stopping distance from 35km/h |
| Less than 2.5 tonnes | 12.0 metres |
| At least 2.5 tonnes | 16.0 metres |

| Performance of emergency brake | |
|--------------------------------|---------------------------------------|
| Combination mass | Maximum stopping distance from 35km/h |
| Less than 2.5 tonnes | 30 metres |
| At least 2.5 tonnes | 40 metres |

In any case, combination brakes must be easy to control and the combination must be stable under braking.

Speed and limitations for various braking arrangements

Ideally the trailer weight should not exceed the weight of the towing vehicle. However, the weight of the trailer might be up to a maximum of twice the weight of the towing vehicle if the speed is limited and the vehicle is only used on roads with good sight distances.

Speed and brake arrangement

Where the mass of the trailer, including any load, exceeds the mass of the tractor by between 1.0 and 2.0 times: The speeds indicated are the maximum and assumes a dry, smooth, level road surface with no loose material. Speeds should be reduced where these conditions are not met.

| Brake arrangement or Trailer | Maximum speed for flat road | Maximum speed for hilly road |
|---|-----------------------------|------------------------------|
| No brakes | 20 km/h | 15 km/h |
| Override brakes | 30 km/h | 20 km/h |
| Driver controlled brakes with breakaway protection. | 40 km/h | 30 km/h |
| Driver controlled brakes that include ABS function and breakaway protection | 50 km/h | 40 km/h |

Park brake

The park brake should hold the combination stationary on a slope where the rise of the slope is equal to 1 metre in every 8 metres of horizontal distance.

Where a braking system is not fitted to an agricultural trailer, there should be a means provided to prevent the trailer from rolling away when disconnected from the towing vehicle (e.g. wheel chocks) that can achieve the same performance.

Strength of couplings, tow bars and trailer drawbars

Tow couplings, towbars and trailer drawbars should have sufficient capacity and durability to carry the loads imposed on them while in operation. If the manufacturer's rating is not known for these devices then, as a rule, the trailer tow coupling, towbars and draw bars and their attachments should be able to safely take a load equal to 1.5 times the maximum loaded weight of the trailer (including any load on the coupling) in the fore aft direction and half this load in the up down and left right directions.

DRAFT

Tow Couplings

Trailer couplings used in agriculture are generally of four basic types:

Ball couplings

Ball type hitches are comprised of either a "Bartlett" ball type coupling used on heavy vehicle combinations or the common 50mm tow ball used on light trailers. Both systems have mechanisms designed to prevent the ball and coupling separating until deliberately released. When the combination is connected there is very little free movement between the components. Rolling and steering movement of the trailer are accommodated by the basic design that allows the 'cup' to slide around the ball.



Bartlett Ball

50mm tow ball

Ringfeeder

A ringfeeder is a pin and eye type coupling used extensively where trucks are the towing vehicle. The latch mechanism is designed to prevent the coupling separating until deliberately released. When the combination is connected there is very little free movement between the components. Rolling and steering movement of the trailer are accommodated by the basic design that allows rotation and swivel of the assembly.



Ringfeeder receiver

Towing eyes

Pintle hook couplings

Pintle hooks have developed from the military hook and eye coupling whereby the joint becomes two closed loops requiring one to be manually opened to separate the joint. When the combination is connected there can be a degree of free movement between the components due to the loose fit of the two loops. Rolling and steering movement of the trailer are accommodated either by the loose fitting of the hook and eye, or by the hook or eye incorporating a swivel.



Pintle Hook

Pintle eye (or lunette)

Clevis couplings

Clevis type couplings utilise a hitch pin to capture the connecting tongue of the towed vehicle between the upper and lower flanges of the clevis thereby placing the pin in double shear. The pin is normally secured by a Linch pin or an 'R' clip through a hole in the portion of the hitch pin that protrudes from the lower flange of the clevis.

Rolling and steering movement of the trailer are accommodated by allowing sufficient size of the eye in the tongue to allow angular movement relative to the hitch pin.

The clevis type can also be reversed so that the clevis is on the towed vehicle.

Where the towing vehicle and the trailer both have clevis fittings, it is possible to couple the combination by utilising the flange of one clevis as a tongue providing there is sufficient hitch pin clearance in the tongue to allow rolling and steering movement.



Hitch Pin

Clevis joint

The hitch pin should be retained in place by a secondary device such as a linch pin or other reliable device that will prevent the hitch pin sliding out of position.

DRAFT

Linch pins

Linch pins are often used in the agricultural industry as an acceptable means of ensuring a pin is retained in place.

Linch pins might be used to retain the hitch pin in the clevis joint, provided the linch pin and clevis pin are a close fit in their holes and cannot be removed without physically opening the locking ring and they are maintained in a serviceable condition

However, the devices should not be used in a situation where something may catch and throw the locking ring over so the pin is released.



Linch Pin

“R” clips

“R” clips are used to retain pins on agricultural equipment, however as they can be removed by a distinct pull or push on the clip it is possible for them to be detached if struck by a flying object, striking an obstruction or by being caught by foliage or debris. Using these devices to retain a hitch pin is not recommended.

Under no circumstances should this type of device be used in any situation where there is any likelihood that something may catch or hit the clip and force it out of position.



“R” Clip

Safety chains

All hitch types described require safety chains of appropriate strength in case of accidental detachment.

Safety chains should be attached to trailers in a way that if the couplings or parts of couplings fail, the safety chains are still effective.

The table below sets out the required chain sizes.

| Safety chain size selection | | |
|---------------------------------|--------------------------|-----------------------------|
| Aggregate trailer mass (tonnes) | Chain size (millimetres) | Minimum chain breaking load |
| Over 3.5 and up to 5.0 | 6 | 5.1 |
| Over 5.0 and up to 8.0 | 8 | 8.2 |
| Over 8.0 and up to 12.5 | 10 | 12.8 |
| Over 12.5 and up to 21.5 | 13 | 21.7 |
| Over 21.5 and up to 32.5 | 16 | 32.8 |
| Over 32.5 | 19 | 46.5 |

If the strength of the chains is not known, then, as a rule, the chain must take a load equal to the maximum loaded weight of the trailer (including any load on the coupling).

Any chain attachment should be as durable as the chain itself and take a load equal to the maximum loaded weight of the trailer (including any load on the coupling) in the fore aft direction and half this load in the up down direction.

General

The tow couplings on the towing vehicle and the agricultural trailer should have a rating that is suitable for the trailer being towed and be clearly and legibly marked with the correct rating.

In the case of clevis couplings, the pin should:

- be in double shear;
- be suitable for the coupling and have a strength and durability sufficient for the loaded mass of the trailer being towed;
- have a primary and secondary locking mechanism; and
- unless designed to do so, any secondary locking mechanism should be designed and fitted such that it carries no load other than that required to prevent the pin from falling or bouncing out of position.

Visibility - the need to be seen

Other road users need sufficient warning to see and identify the size and type of object on a road and how it is moving so they can safely adjust their own driving to avoid or prevent a collision.

Vehicles that are travelling at a slower speed than the normal traffic flow, are not very manoeuvrable or can potentially block the road, need to be seen by other road users as early as possible so they can respond appropriately and safely.

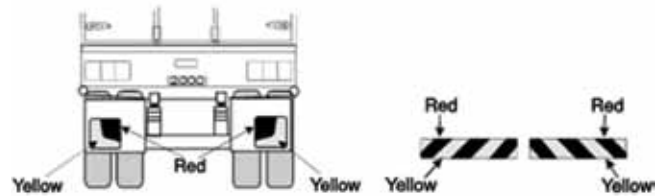
Agricultural equipment is often hard to see because their:

- paint and other finishes maybe degraded or non existent,
- size and shape is often not consistent with the expectation of road vehicles causing other road users to take time to recognise,
- shape can be ill defined due to projections and protrusions.

Difficulties in seeing and recognising the vehicle and how it is being used is made harder by low contrast colours and environmental factors such as foliage, low levels of light, dust and smoke or poor weather conditions such as fog or rain.

Accordingly, it is recommended that the following be fitted to agricultural trailers;

- rear marker plates of the type used on trucks be fitted to the rear
- flashing rotating lights be fitted to towing vehicles
- reflective tape on all faces of the vehicle that can be seen by other road users.



Rear marker plates

Alternate plates

Lighting

All lights and lenses should be kept clean and in good working order.

Daylight operation in clear visibility

An agricultural trailer being used in the hours of daylight when atmospheric conditions allow visibility of at least 250 metres should have fitted and operational:

- direction indicator lights on the rear of the trailer unless the indicator lights on the towing vehicle can be clearly seen by other road users;
- stop lights unless the stop lights on the towing vehicle can be clearly seen by other road users;
- a pair of white front reflectors;
- a pair of red rear reflectors; and
- yellow side reflectors.

The reflectors are a minimum requirement to ensure that the vehicle can be seen if it is parked at the side of the road in low light conditions or after dark.

DRAFT

Night operation or restricted visibility

An agricultural trailer being used at night, or when atmospheric conditions restrict visibility to less than 250 metres, should have fitted and operational:

- direction indicator lights, stop lights, tail lights;
- a pair of white front reflectors;
- front position (side) lights on agricultural trailers exceeding 2.1 metres wide, or on agricultural trailers exceeding 1.8 metres wide, unless side marker lights are fitted, or on agricultural trailers exceeding 1.6 metres wide if exceeding 4.0 metres long unless side marker lights are fitted;
- yellow side reflectors;
- a pair of red rear reflectors;
- side marker lights on agricultural trailers exceeding 2.1 metres wide; and
- front and rear end outline marker (clearance) lights on agricultural trailers exceeding 2.1 metres wide.

Towing with vehicles other than tractors

An agricultural trailer being towed by an agricultural machine or a conventional motor vehicle, should not exceed a posted speed limit or any lesser limit specified by:

- the trailer manufacturer, or
- the speed rating of the tyres; or
- the towing vehicle manufacturer.

Travel speed should also take into account potential instability of the combination due to:

- the construction and equipment of the trailer; or
- the construction and equipment of the machine.

An agricultural trailer being towed by a conventional motor vehicle should ensure that the coupling used is either Australian Design Rule compliant or complies with the information in this bulletin.

DRAFT

For further information please contact the
VicRoads' Manager - Vehicle Standards by
phoning 9854 2702 or visit vicroads.vic.gov.au

