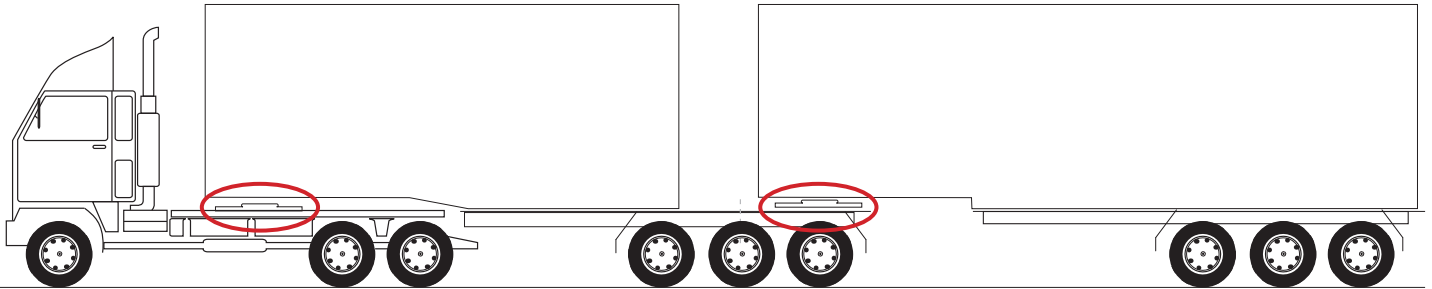




HEAVY VEHICLE SERVICING

INFORMATION

Updated May 2019



SKID PLATE INSPECTION INFORMATION SHEET

Keeping your heavy vehicles maintained regularly is sound business practice, ensuring vehicles use fuel efficiently and preventing avoidable, and costly, accidents or breakdowns.

While routine maintenance is straightforward, this section outlines any issues that are not always being addressed or go beyond routine maintenance requirements that all those with an interest in the safe operation of heavy vehicles need to be aware of.

HEAVY TRAILER KINGPIN AND SKID PLATE SECURITY

King pins and skid plates need appropriate inspection and maintenance. This is especially important where the design makes it difficult or even impossible for inspection to be carried out.

In these circumstances the potential for corrosion or structural failure and resultant detachment from the towing vehicle is a significant risk. Operators, drivers and mechanics, as well as trailer designers, certifiers and vehicle inspectors, all need to take appropriate action to ensure trailer detachment does not occur.

This information sheet provides background information into the causes of skid plate failures and some practical advice to avoid king pin/skid plate failures.

King pins

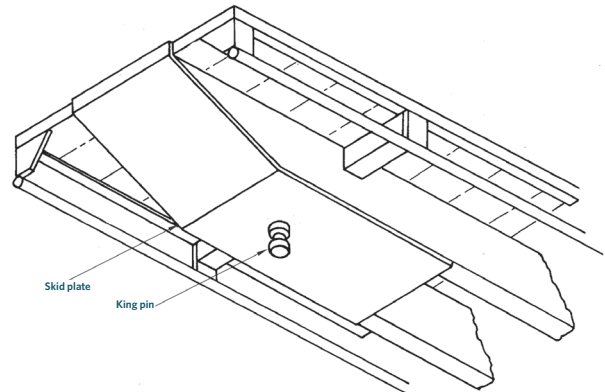
A king pin is a pin attached to the skid plate of a semi-trailer and used for connecting the semi-trailer to the fifth-wheel of a towing vehicle.

Skid plates

A skid plate is a structure forming part of the semi-trailer which houses the king pin and which sits on top of the fifth wheel to form the connection between the towing vehicle and the semi-trailer.

The design of the skid plate support structure should allow for the inspection of the king pin mounting, the inspection of the skid plate attachment to the trailer, the inspection of the structural reinforcements, and provide for drainage of moisture from above the skid plate so that the likelihood of corrosion is minimized.

It is highly recommended for the design to include an inspection hatch and drain holes or snipes. Drain holes and snipes may be used for inspection via borescope but an inspection hatch makes inspection simpler and easier and is the preferred method.



A typical skid plate and king pin design

Main causes of corrosion

- Moisture ingress through the trailer deck.
- Poor design of skid plate and supporting structure where moisture and debris are able to accumulate above the skid plate.

Main causes of structural cracks

- Design life of the trailer has been reached.
- Expected stress levels have been exceeded.

Inspection of skid plates

While a skid plate and its associated king pin may look in serviceable condition when examined externally, closer inspection of the cavity above the king pin may identify signs that the structure or attachment of the skid plate and/or king pin have been compromised through:

- missing, damaged or corroded king pin securing bolts
- cracking of the skid plate or surrounding supporting structure
- corrosion of the skid plate or surrounding supportive structure.



A closer inspection reveals a serious structural failure of the cross-member



A closer inspection reveals corrosion around the skid plate support structure

TRANSPORT OPERATORS

Operators should:

- assess their fleets and identify vehicles at risk from this problem (monocoque semi-trailers such as refrigerated units and tankers, etc are higher risk vehicles)
- establish causes of abnormal skid plate damage (eg distortion)
- ensure that at risk semi-trailers are monitored and not operated if safety is being compromised
- keep inspection and maintenance records.
- ensure the design life of the trailer isn't exceeded
- fit an inspection hatch and/or ports as these assist in the visual inspection of king pin security, removal of debris and the presence of corrosion
- contact the manufacturer or a heavy vehicle specialist certifier for advice on adding drain holes or snipes in the skid plate supporting structure if there are none.



Checking for skid plate distortion

MAINTENANCE WORKSHOPS AND MECHANICS

Maintenance workshops and mechanics should:

- inspect internal structure and establish causes of damage to skid plates and king pin mounts before repairs are carried out.
- ensure the removal and fitting of king pins is carried out to manufacturer's instructions.
- ensure all mating surfaces are clean and allow a flush fit with the mounting surfaces of the king pin. This is critical in maintaining the correct clamping force.
- use a calibrated torque wrench to tighten to manufacturer's specification.
- ensure that repair and maintenance records are kept.

TRAILER DESIGNERS AND CERTIFIERS

Designers and certifiers should:

- ensure that the requirements, which are in force in respect of king pin and skid plate design and certification, including repair and modifications, are complied with and the operator has the relevant technical and maintenance information.
- ensure their designs include an inspection hatch and drain holes or snipes which allow inspection of the king pin and surrounding structure internally and enable any moisture to drain away.
- ensure the design life of the trailer is clearly communicated in terms of maximum kilometres or years, and design plate has been fitted.

VEHICLE INSPECTORS

Certificate of fitness (CoF) inspections include inspection requirements for king pins and skid plates. CoF inspectors should check the condition and security of king pins and their associated components according to the requirements.

A skid plate or skid-plate mounting:

- is not securely attached, or
- is cracked, distorted or has significantly deteriorated, or
- has corrosion damage within 150mm of the mounting points.

TYPES OF KING PINS

Bolt in mounted king pin

The king pin is bolted directly into the back plate and can be easily replaced from below.



Welded king pin



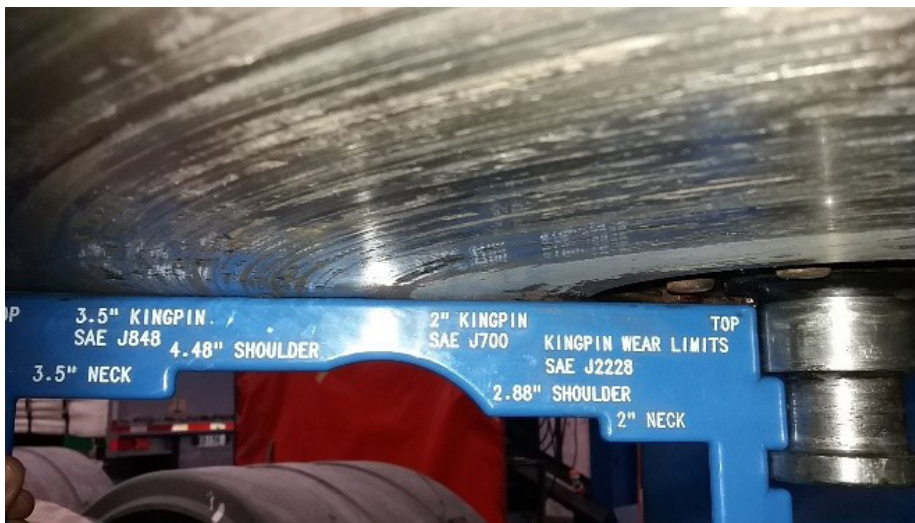
SKID PLATE/KINGPIN INSPECTION GUIDE

Tools required:

- Kingpin gauge (eg SAF Holland TF-0110)
- Skidplate straight gauge (eg Jost 'jostgaugeskidplate')
- 150mm scale or taper gauge

1. Signs of pitting, deep grooves, or unusual wear

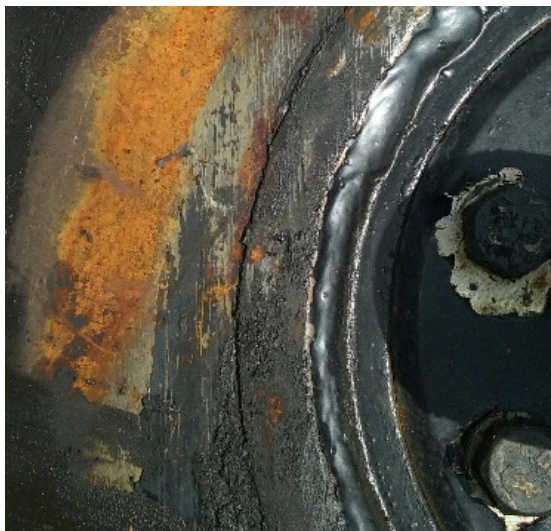
Pitting and grooves (such as shown in the image) are often the result of improper lubrication of the skidplate. The trailer should be referred to an HVSC if pitting and grooves are found.



This skidplate has excessive pitting and should be referred to an HVSC for inspection.

2. Cracks in skid plate or surrounding structure

Carefully check the skidplate assembly for any cracks (including signs of previous repair). Cracks are most common on welds but can occur in areas of high stress. The use of a borescope is recommended where an inspection cannot be carried out from above. If any cracks are found, the trailer should be referred to a heavy vehicle specialist certifier (HVSC).



The cracks on this skidplate indicate the trailer shouldn't be used and it should be referred to an HVSC.

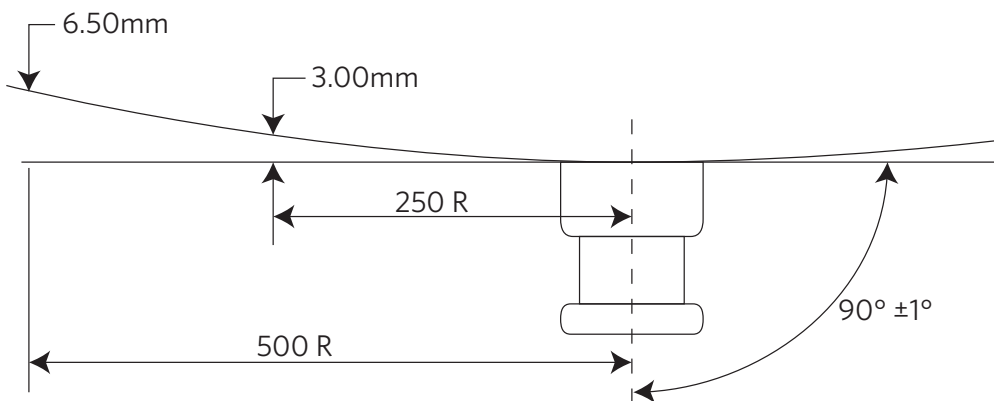


This skidplate has signs of previous repair and fresh cracks. It should not be used and it should be referred to an HVSC.

3. Skid plate flatness

Check the skid plate's flatness using a long kingpin gauge (such as Jost ##) or a suitable straight edge. Check the flatness in all directions using a scale or suitable gap measurement device.

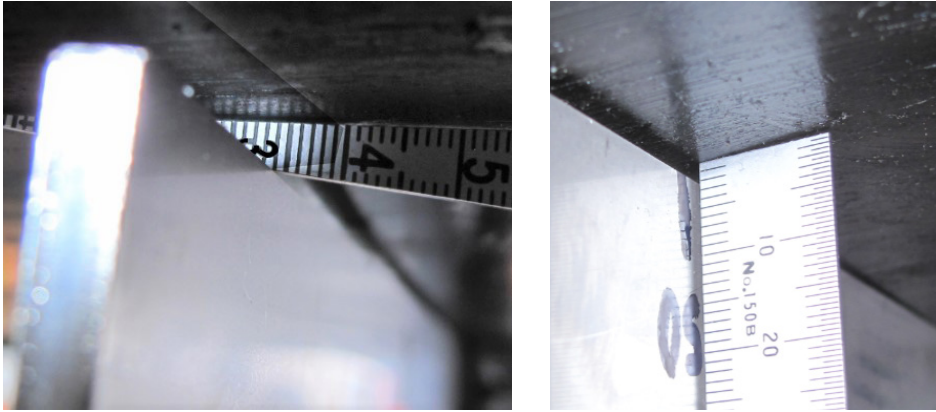
Convexity



The convexity of the skidplate should be checked in several locations. At a radius of 250mm from the centre, 3mm is allowable and at a radius of 500mm, 6.5mm is allowable. Anything beyond this should be referred to an HVSC.

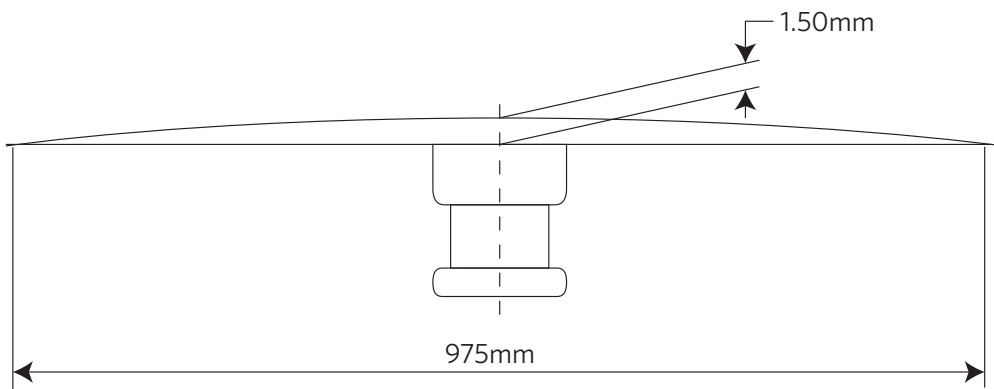


It's recommended to add measurements (such as the 250mm mark) to the gauge for quick reference.

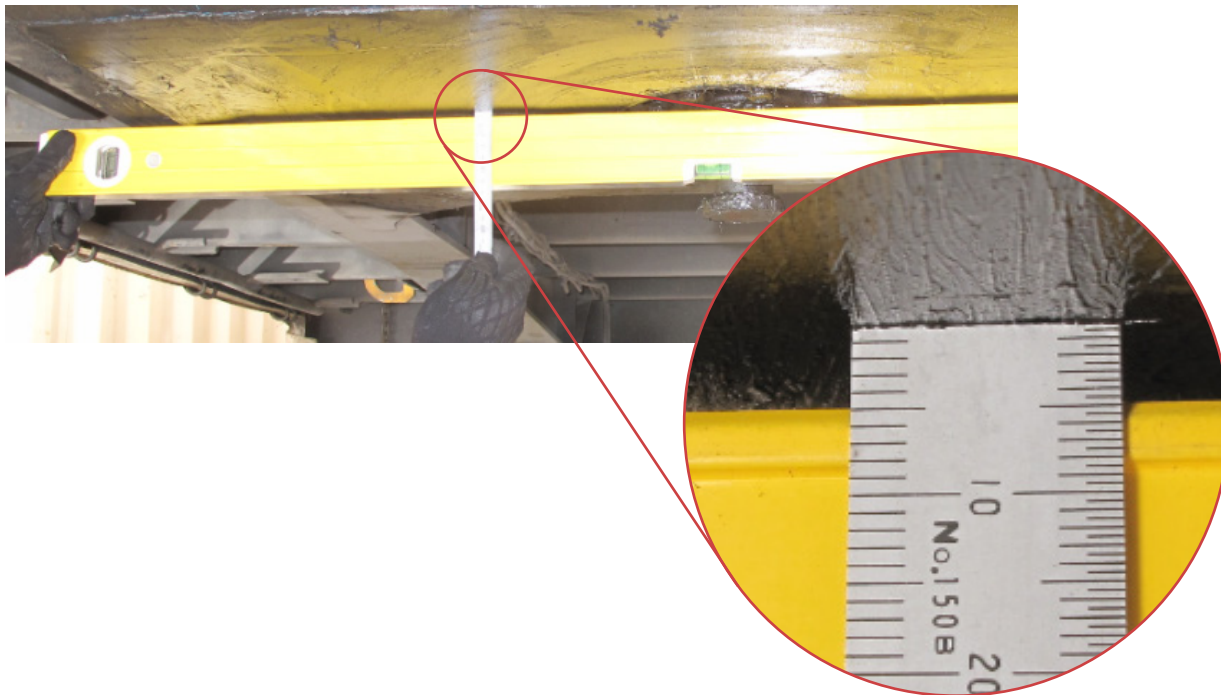


This skidplate is within spec at approximately 1.5mm at 250mm and 1.8mm at the ends.

Concavity



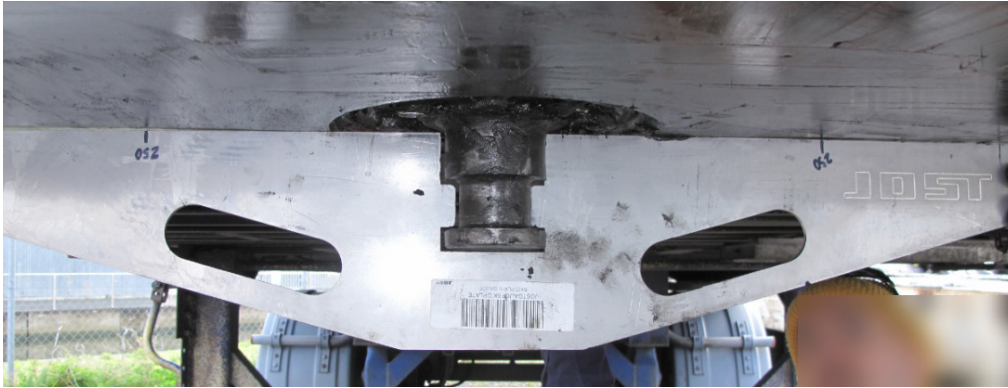
The concavity of the skidplate should be checked in several locations. The maximum allowable concavity is 1.5mm. Anything beyond this should be referred to an HVSC.



At 5mm, this skidplate is beyond the 1.5mm limit for concavity. It should be referred to an HVSC.

4. Squareness of rubbing plate to ensure kingpin is installed at $90^{\circ} \pm 1^{\circ}$

Check that the kingpin is perpendicular to the skidplate using a kingpin gauge. Check this in at least in two directions (eg front-to-rear and left-to-right).



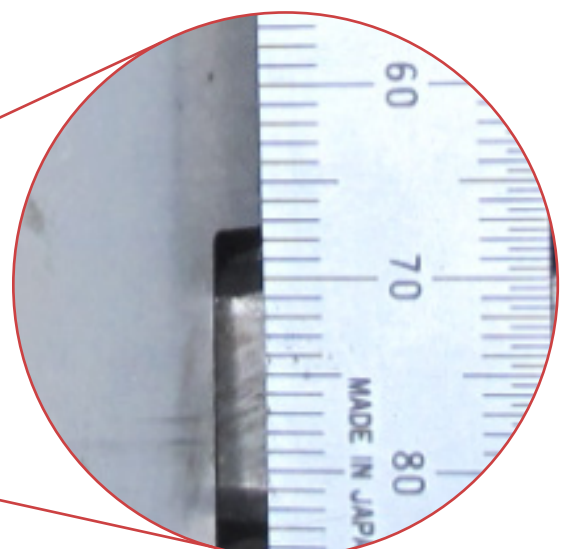
The gap is uniform around this kingpin, indicating that it is perpendicular.

Mounting height (70mm, replace at 73mm)

Using a skidplate gauge (or straight edge) as a reference, measure the kingpin's mounting height.



The mounting height on this kingpin is OK because it is at 71mm.



5. Throat size - all around (new is $\text{\O}50.8\text{mm}$, replace at $\text{\O}48\text{mm}^{**}$)

A 'go/no-go' gauge is the simplest tool for measuring the kingpin's throat size. Measure in several directions (eg front-to-rear and left-to-right). If the gauge can fit over the kingpin's throat, the kingpin must be replaced.



The throat size on this kingpin is OK because the gauge cannot slide over it.

6. Top flange (shoulder) size (new is $\text{\O}73\text{mm}$, replace at $\text{\O}70\text{mm}^{**}$)

A 'go/no-go' gauge is the simplest tool for measuring the kingpin's top flange size. Measure in several directions (eg front-to-rear and left-to-right). If the gauge can fit over the kingpin's top flange, the kingpin must be replaced.



The top flange on this kingpin is OK because the gauge cannot slide over it.

7. All bolts present (and properly torqued if replacing kingpin) and in good condition

Check that all bolts are present. Replace any loose bolts – **do not re-use or re-tighten**.



Check the bolts for evidence of wear which may indicate other issues, including kingpin incompatibility or skidplate wear.



The heads of the bolts are worn (as in the image above) and the following should be considered:

- **If the kingpin is within the height requirements**

There's a compatibility issue between the kingpin and bolts, and it is advised to replace the kingpin and bolts using a fully matched assembly (using bolts that come with the kingpin).

This can be done without referring the semi-trailer to an HVSC.

- **If the kingpin is outside the height requirements**

Either the skidplate has worn beyond acceptable limits or the kingpin's base is too thick for the skidplate's thickness.

This should be referred to an HVSC for review.