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TMC
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Maintenance
Conference

PUTTING CHASSIS CRACKING TO BED

Two Part Session:

- Pt. 1 - Common Failure Modes
- Pt. 2 – Chassis Rules
- Question Time

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VICROADS

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Common Failure Modes

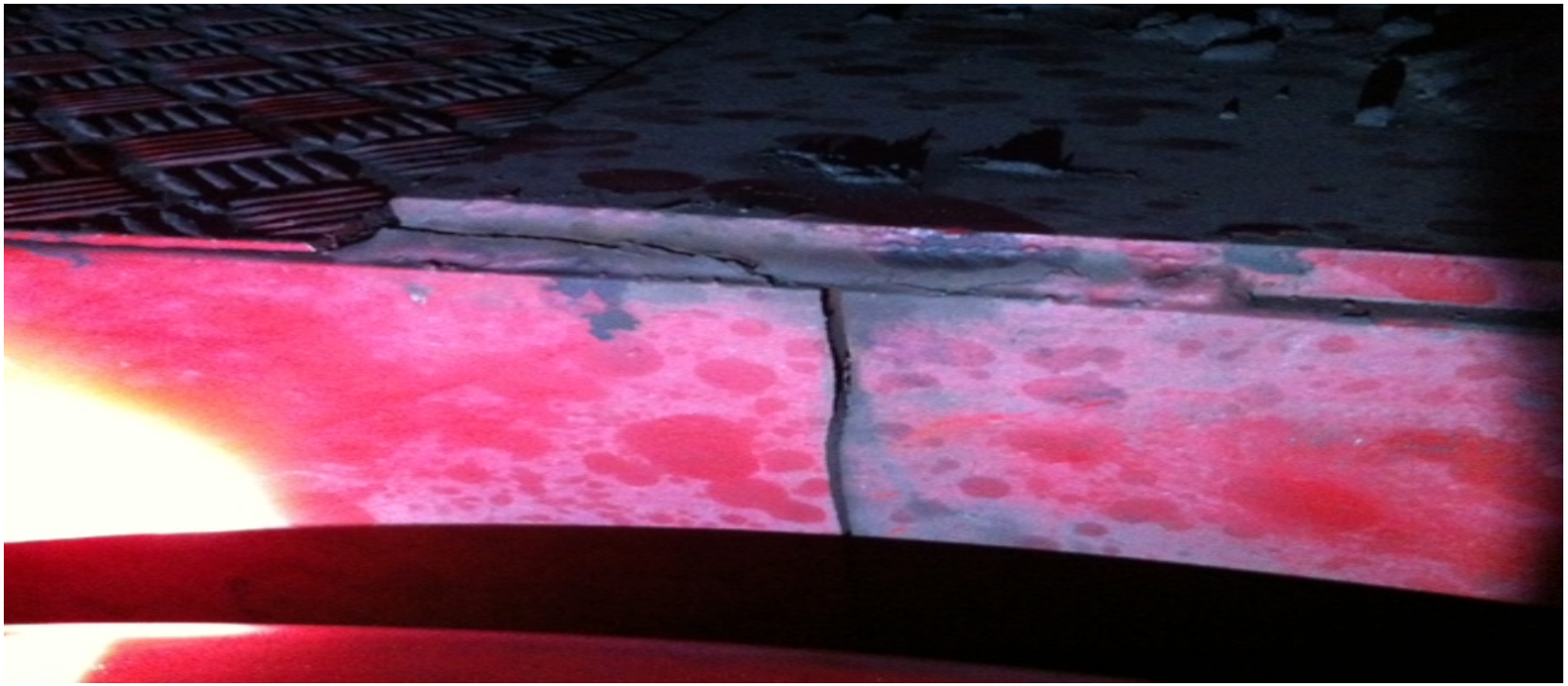
Darrell Gascoyne, Manager Operations
Anthony Harris, Auto Technician (Heavy Vehicles)
Andrew Stroud, Auto Technician (Heavy Vehicles)

VicRoads Regulatory Services

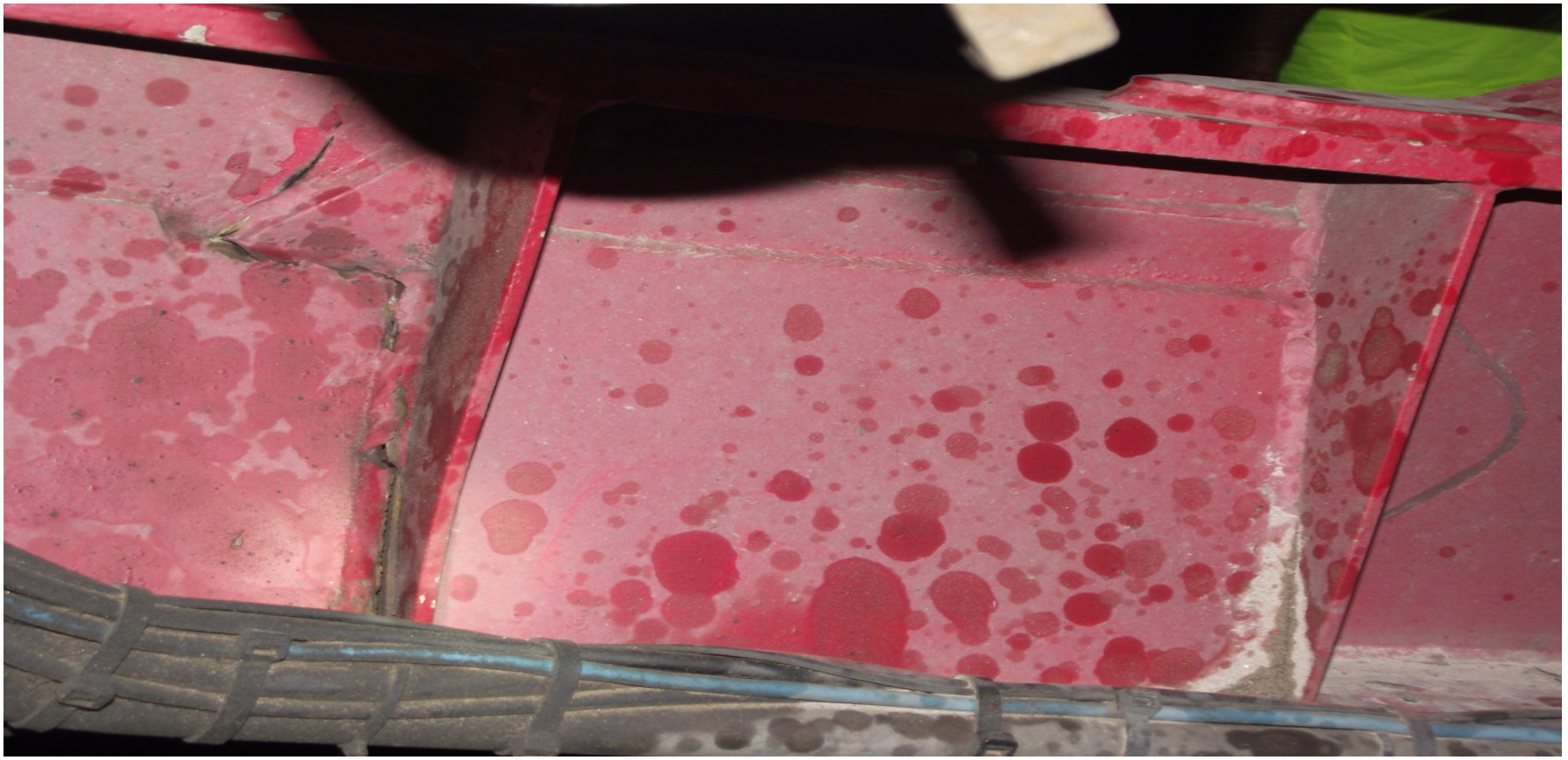
Chassis Cracking?

Tri axle chassis crack, 68 T B-Double Loaded Flour

Other side



Closer



Bitumen tanker

Lead tri axle drop cracked

Kenworth chassis

Tipper body sub frame

Waste truck cracked sub frame

Turntable ripple plate mount

Fuel tanker leg support

Log trailer chassis

Waste truck rear chassis cross tie

Log trailer cross support

A trailer cross member

Tipper sub frame cracked

Jack knife resulting in cracks in drawbar (Repaired)

Concrete agitator front sub frame cross member

Waste truck body mount

Yet another for the same vehicle

Log trailer cracked welded and recracked

Log trailer

Tipper rear door hinge

It keeps breaking so I keep adding

?

Thank you

Jason Stables

Director Holmwood group

Trailer Manufacturer's View

COMMON FAILURE MODES

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Common failure mods

- Poorly executed modifications, drill holes close to edge

More poorly executed modifications (added toolbox)

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With poorly executed previous repair

Overloading / NOT fit for purpose

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What to do

- Ensure trucks and equipment are fit for purpose or application and used within manufacturers ratings
- Ensure any staff carrying out modifications are suitably qualified to do so and understand potential ramifications of their actions
- Consult engineering staff or equipment designers suppliers as necessary

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Thank you

Bob Woodward

BARKWOOD CONSULTING

A Consulting Engineer's View

Bob Woodward

BARKWOOD CONSULTING

This presentation will provide:

- A little of my background in road transport
- Primary causes chassis cracking (truck and trailer)
- Design basics
- Weld Repairs
- Bolts & Bolt Holes – Do/s & Don't/s
- Ancilliaries
- Conclusion

Background

- Involved in specialist trailer design 35 years
- Innovative trailer designs – world 1st tandem tri B-double design
- Joint holder two (2) patents in trailer design
- Heavy Vehicle Engineering Signatory - 21 years

So what are the primary causes of chassis cracking?

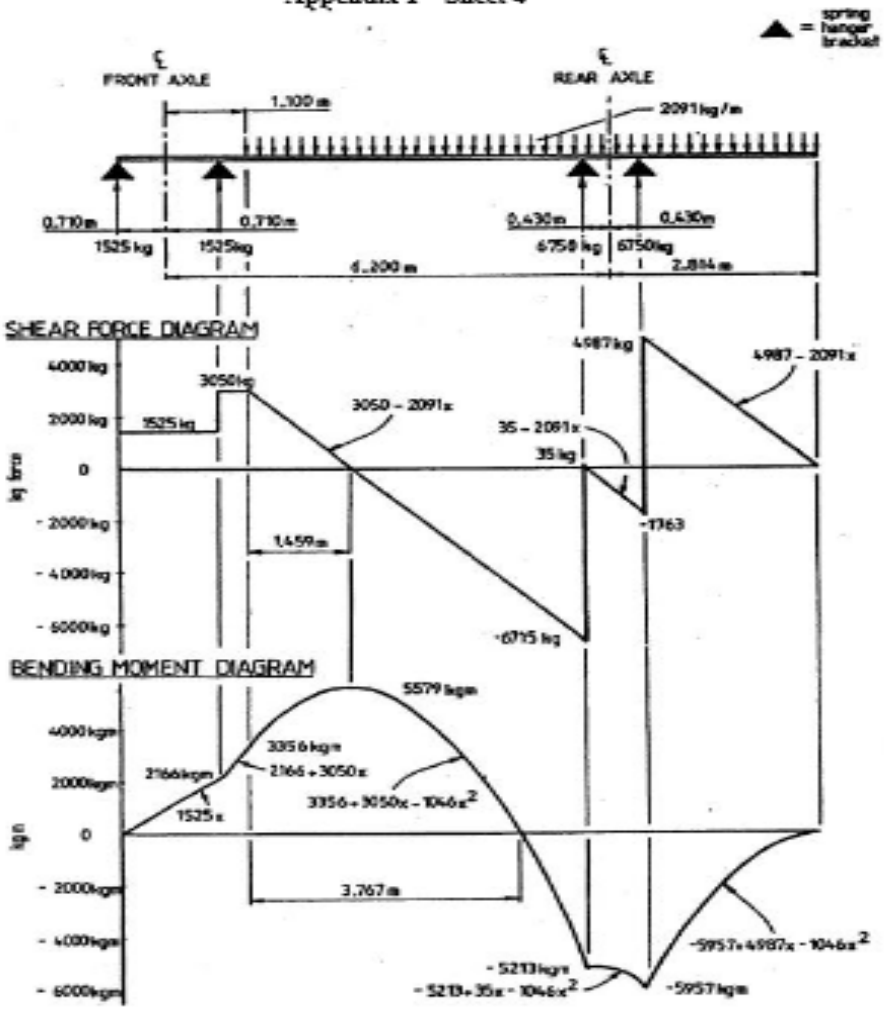
Poor:

- Design
- Modification practice
- Welding practices
- General Maintenance

The design:

- Don’t ASSUME the chassis is up to the task
- Shear force and bending moment assessment
- Service factors VSB #6 are typically 3 (or 5 for Tippers)
- Tip Over Axles
- Chassis extensions

Appendix 1 – Sheet 4



Weld repairs:

- Avoid welding across flanges – unless absolutely necessary
- Trailer hanger attachment to chassis – suspension manufacturer typically wants weld all around;
- But welding across chassis?????
- Have had trailers that each with average 7,000,000 kilometres – new axles, air bags, trailing arms – but no hanger attachment issues:
- Crack repairs – a good start
- Ensure that there is no undercut or cold lapping.
- Minimise heat concentration

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Bolts and bolt holes:

Scriber use

- If you are going to use a scriber to locate the centre of a drill hole, ensure that the scribe mark will be "drilled out". If not, you risk a crack starting at the edge of the hole where the scribe mark continues.

Use hardened washers both under the head and the nut

- alternatively use flanged head bolts and flanged nuts.

NEVER use spring washers against the chassis.

- Use Nyloc or thread locking nuts – only use once!

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Bolts and bolt holes:

Ensure bolts are appropriately tightened

- don't guess always use a light lube on the thread (sewing machine oil is ideal). If the manufacturer doesn't have a specific torque, get a generic bolt torque chart and use that.

Don't cut holes with an "oxy"

- minimise clearance.

Avoid bolts within 20% of depth from edges.

Special considerations

- attaching aluminium to steel

Romesh Rodrigo
ISUZU AUSTRALIA LIMITED

TRUCKS, BODIES AND CHASSIS

Failure of chassis due to lack of suitable subframe (tilt tray)

- Chassis has failed in the area of the main lift ram
- Specified chassis required a more substantial subframe to counter the load imposed by the ram
- Requires more localised reinforcement in the ram area
- Possible application of underslung subframe

Don’t use wooden packers and flitch plates…

- Over time wood can shrink
- This allows movement between the chassis and subframe
- This could result in chassis failure over time
- In this case the driver would be experiencing adverse ride and handling of this particular vehicle

…another view

- Obvious is the movement of the body/subframe/packer assembly
- Bad for handling, potentially dangerous due to body movement
- Use of flitch plates does not allow for packer shrinkage over time
- IF a body uses wood packers it needs to be secured with “U” bolts and crush tubes
- All body mountings must be checked periodically

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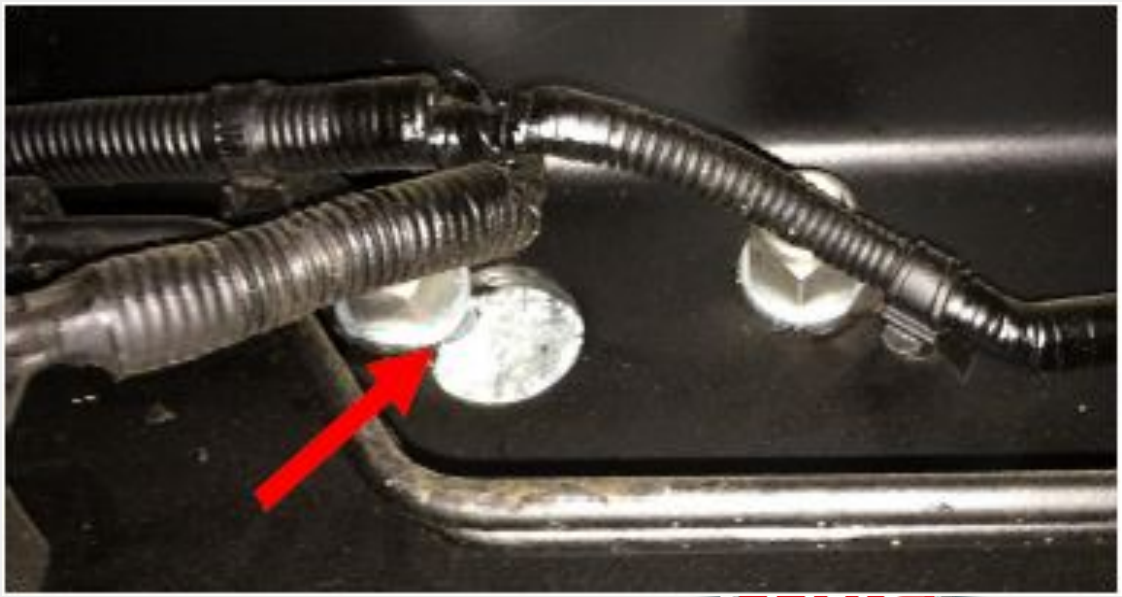
“Figure 8” bolt holes

- Poor workmanship
- Must be immediately rectified by body builder
- If noted in service it must be repaired ASAP to avoid chassis failure



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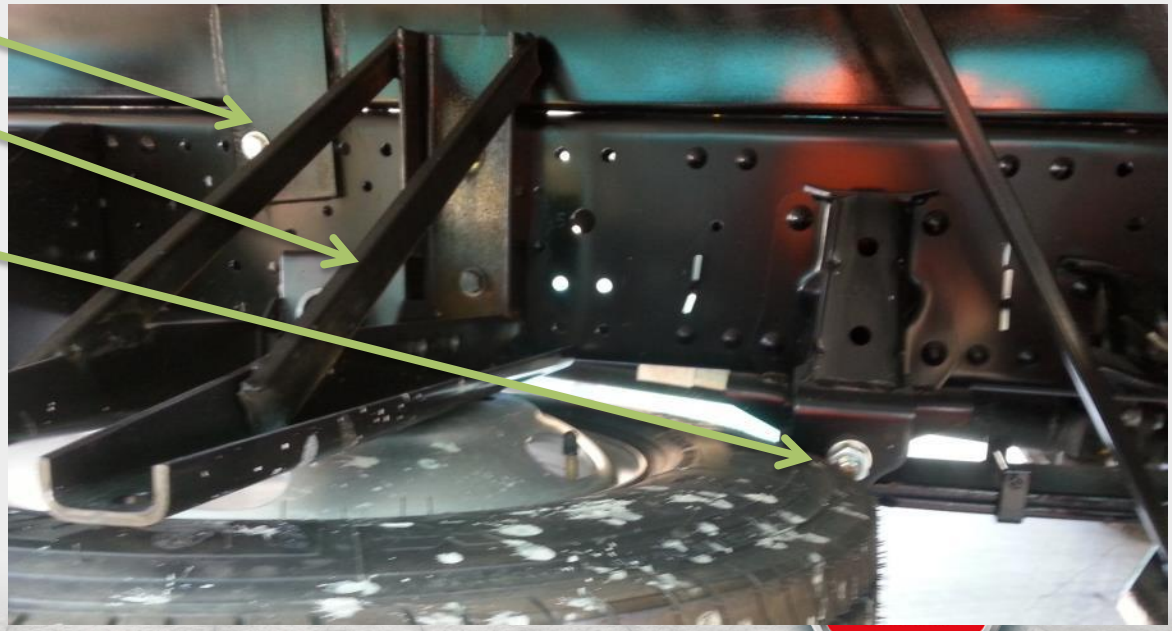
Another example of holes too close

- In this case the flitch plate should have been moved
- Or the hole in the chassis should have been filled prior to the mounting of the subframe
- Appears to be a high investment body considering the galvanising
- So is the truck!!!!!!

Examples of poor body and component mounting

- Flitch plate on an angle and only picks up top holes
- Poorly fabricated spare wheel bracket
- Spare tyre actually hitting rear axle front suspension hanger
- Note the gap between the subframe and chassis
- Poor execution of simple van body mounting

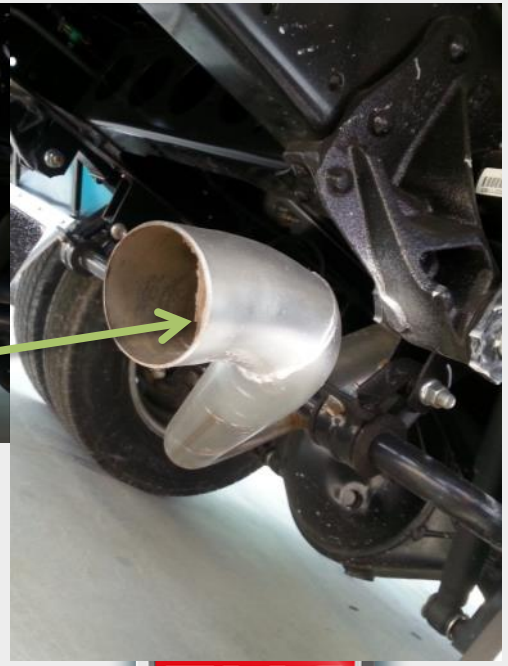


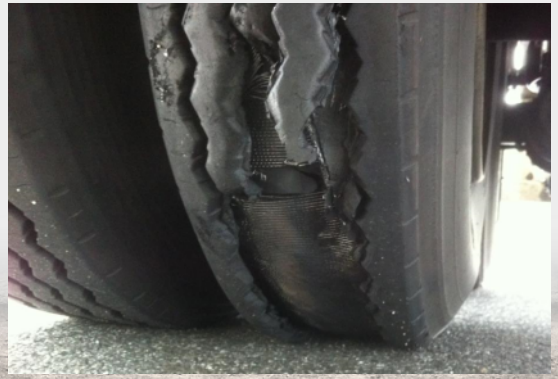
Same body builder different truck

- In this case the spare tyre hits the batteries
- Note the angle of the bottom of the flitch plate
- Raises concerns for the rest of the body mounting

Effect on other components

- In this case the tail pipe length has been reduced to accommodate a tuck away tail lift
- There is nearly 1500 mm of tail pipe here which is unsupported
- Will fail quickly resulting in expensive repair and potential road hazard
- Also note the “burr” in the exhaust
- Potential resultant tyre failure due to badly routed exhaust





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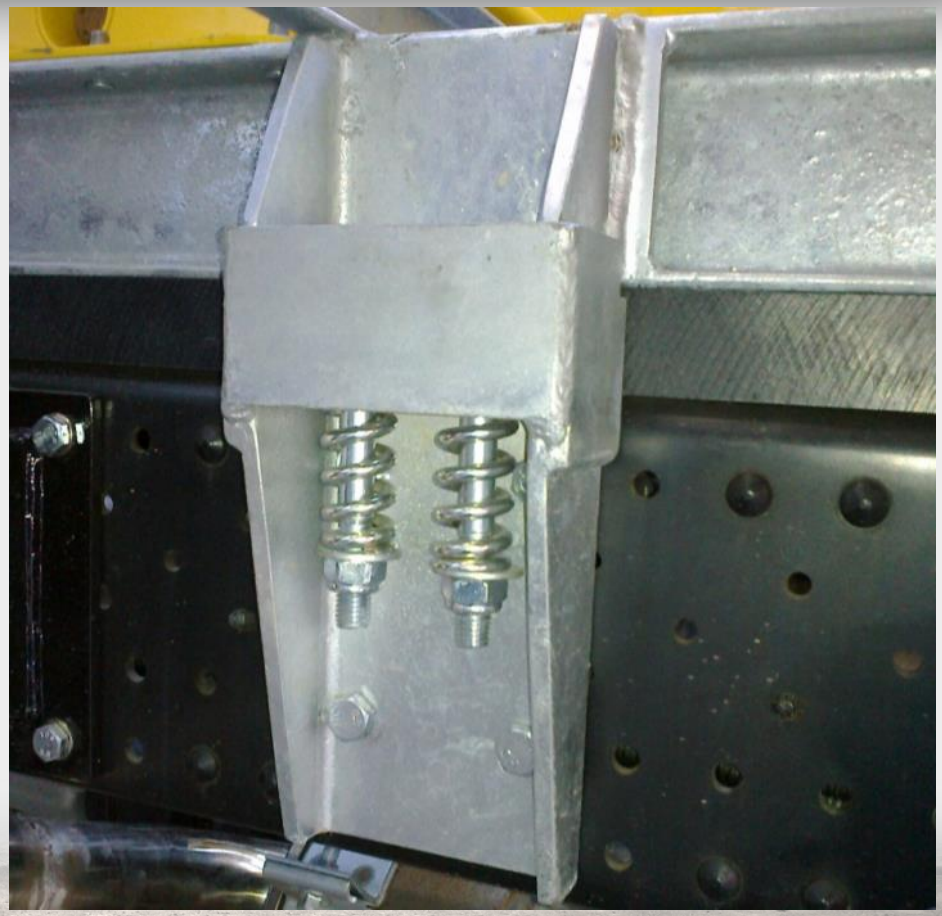
Bare chassis don’t like point loading

- The subframe is offering no support to the chassis
- This mount has the effect of point loading the chassis
- The subframe and chassis should behave as one to be effective

Resilient Mounts for very rigid bodies

- Required for tankers
- Chassis by nature of their design will move
- The body must move with it or allow the chassis to move



Most general freight bodies do not require resilient mounting

- Curtain sider with resilient mount which has resulted in subframe deformation
- Subframe chassis support is now diminished
- Puts more load on remaining mounts
- Potentially resulting in point loading of the chassis

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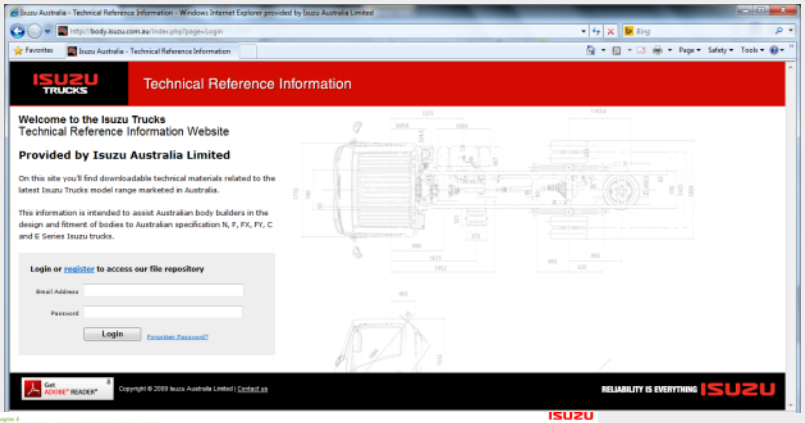
Mechanical component failure resulting in chassis issues

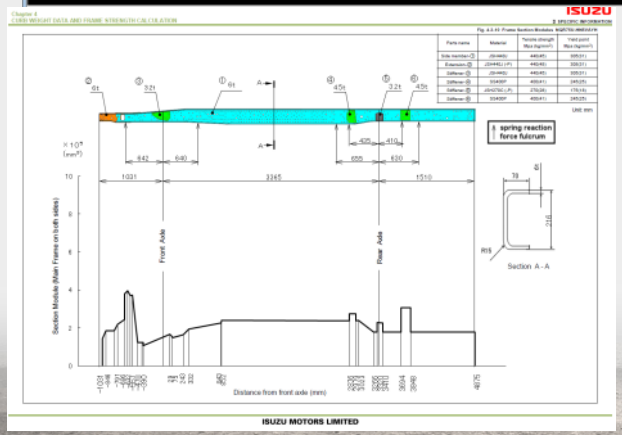
- Bad welding results in mechanical component failure
- This can in turn cause issues due to unusual load input into the chassis rails

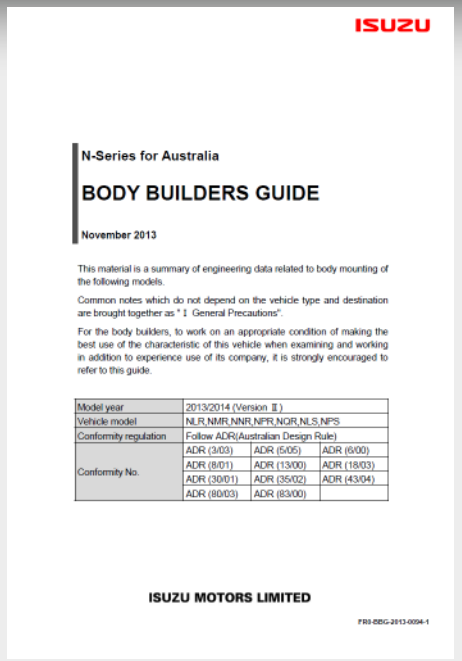
What's important?

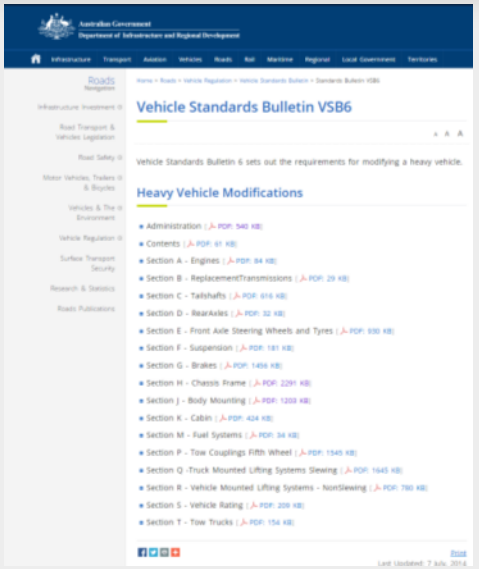
- Subframe, subframe, subframe
- Intelligent body design
- Good workmanship
- Specifying the right chassis for the right application
- Preserving Chassis integrity
- Periodic body inspection and maintenance
- Subframe

More information









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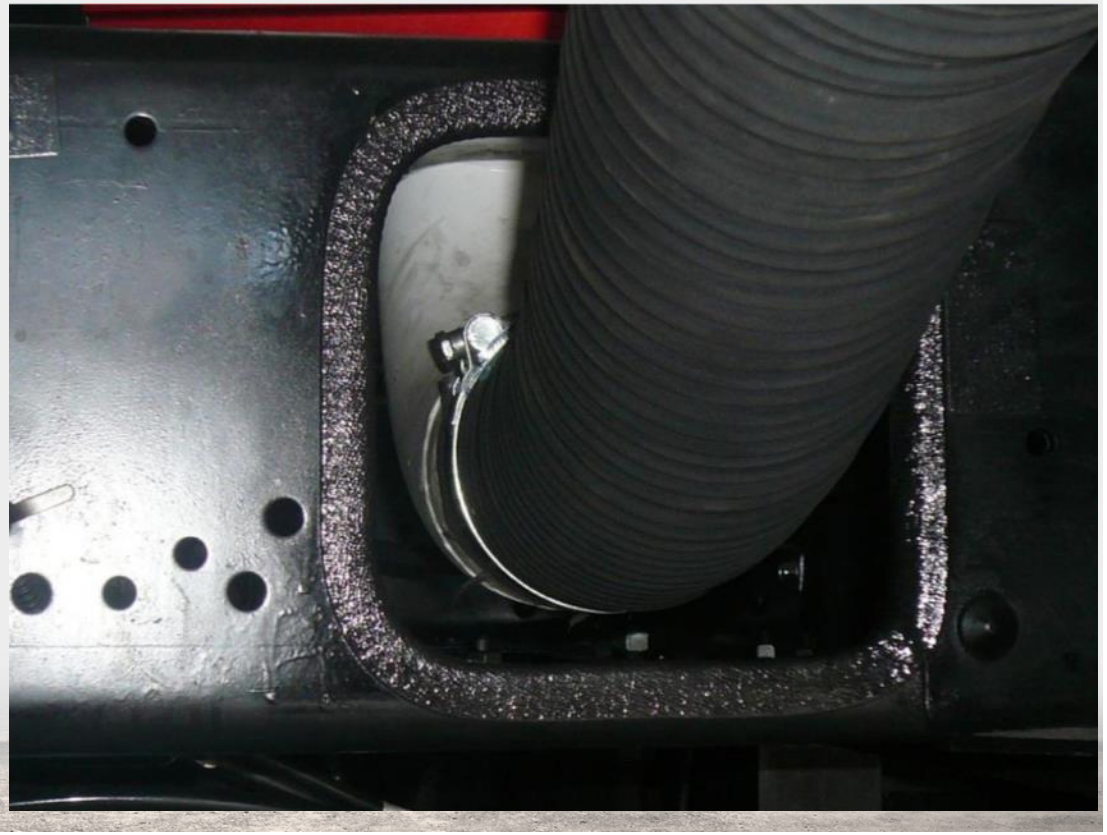
PLEASE don’t do this!!

- Rapid failure inevitable!



Thank you

Chassis Rules

Panel Discussion

QUESTION TIME