



NHVIM – Section 4

STEERING AND SUSPENSION



Chair - Bob Woodward, ATA/Barkwood Consulting

Panel Members

- Andrew Harris, VicRoads
- Andrew Stroud, VicRoads
- Tim Ellis, Stemco
- Warren Farrugia, SAF Holland
- Glenn Griffiths, Twin City Truck Centre



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Video
Suspension bush failure





Video
? failure



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Panel Members

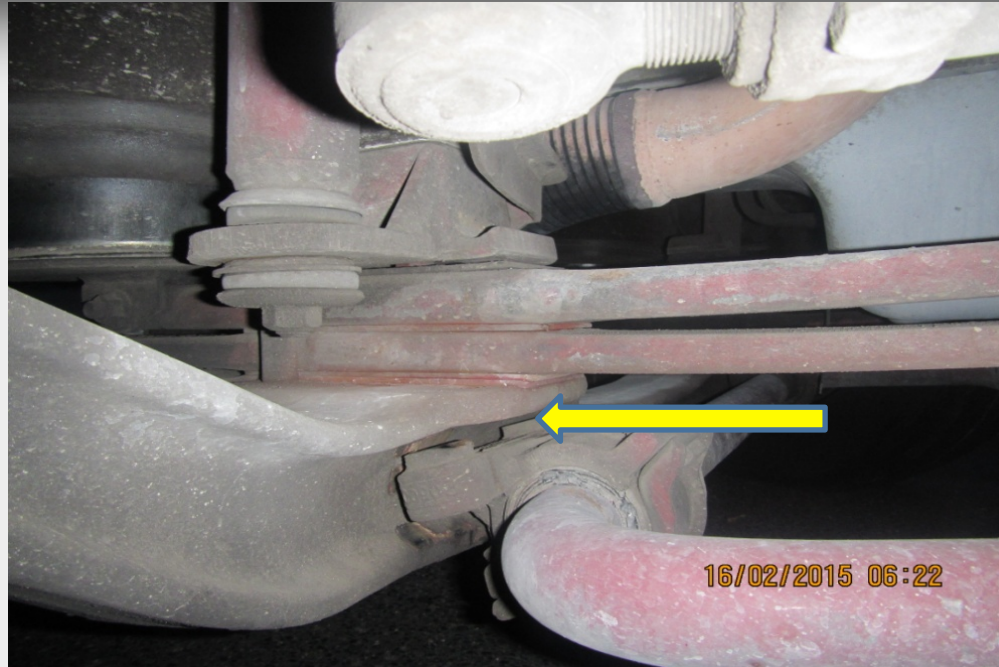
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Semi tipper routine stop missing 'u' bolt



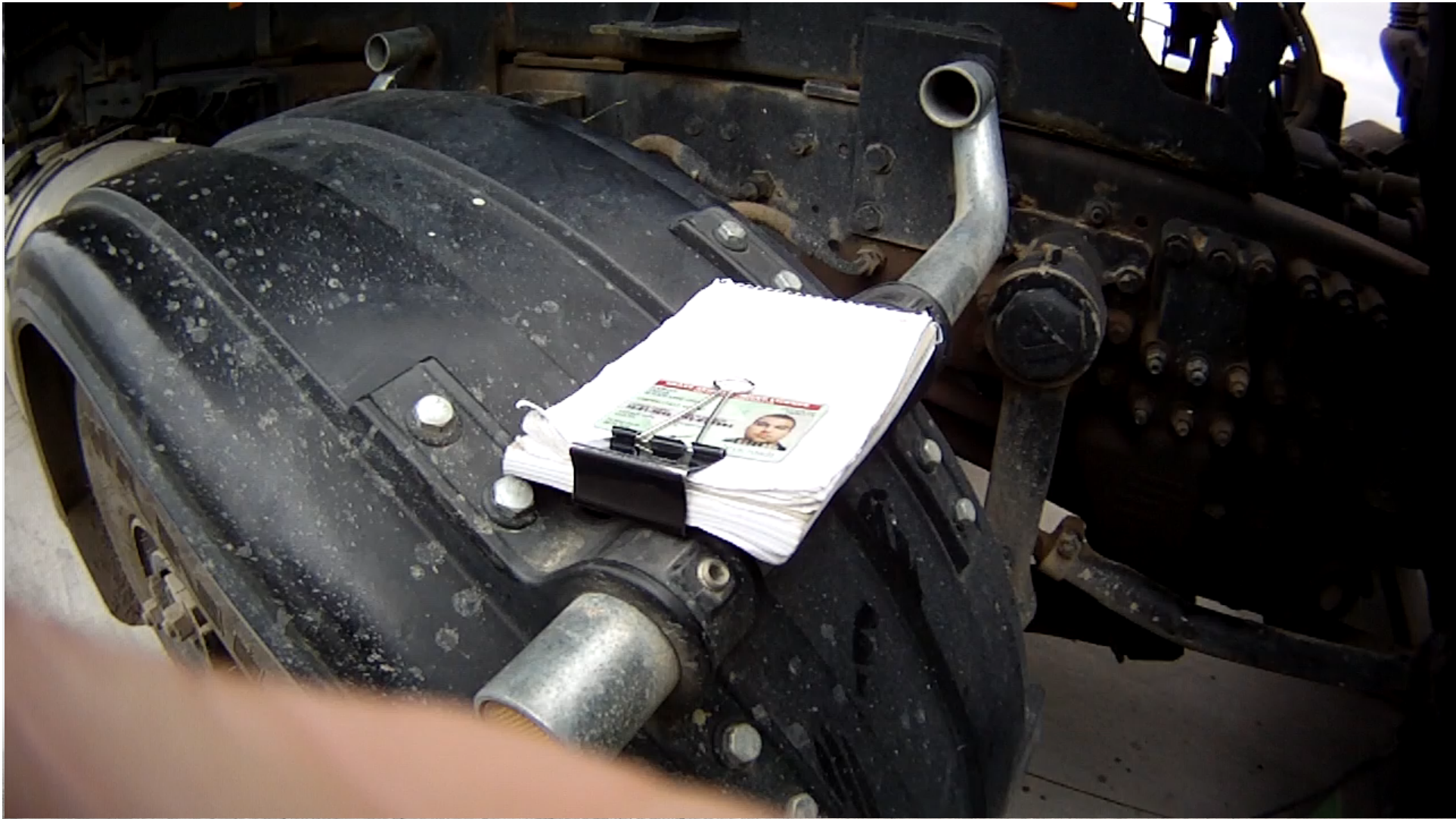
Missing RHF leaf spring
'U' bolt, stopped for
1 headlight ,1 taillight out.





Perforated air bag right rear drive suspension





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Steering and Suspension – NHV Inspection Manual:

- Steering components inside cabin
- Steering free play
- Steering components under the bonnet and under the vehicle
- Suspension components



Steering components inside cabin

- Steering wheel loose on the shaft
- Steering column is insecure
- Steering wheel structure is fractured or the hub, rim, moulding or spokes are loose
- Steering components missing, loose, cracked, heated, bent, welded, damaged or inoperative



Steering free play

- Rotational free play measured (power steering vehicle) at point on the steering wheel
- Must not exceed free play criteria in graph below without road wheel movement.

Steering wheel diameter (mm)	Movement (mm)
up to 450	75
over 450	100



Steering components under the bonnet and under the vehicle

- Steering component fouls another component under any combination of steering and/or suspension travel
- Any threaded, splined or tapered joint is loose
- Free play due to wear – ball joints
 - Must not exceed manufacturer's specifications. or
 - Must not exceed 3mm free play



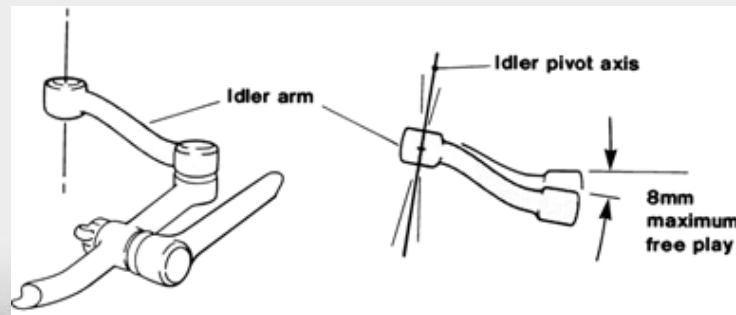
Steering components under the bonnet and under the vehicle – Cont.

- Power steering pump –
 - loose mounting bolts or cracked or broken mounting brackets, braces or adaptors, or is inoperative
 - pulleys are cracked, broken or loose
 - Belts are loose, cracked through to reinforcing piles, extensively frayed or missing drive sections
- Evidence of oil or fluid leaking from any power steering components (dampness or staining around seals is acceptable)



Steering components under the bonnet and under the vehicle – Cont.

- Wheels off the ground – the steered road wheels do not turn freely to the left and right through their normal range of travel
- Steering box, rack and pinion assembly, mounting brackets, bolts and couplings are cracked or not securely fixed to the vehicle
- Play at the end of the idler arm exceeds 8mm



Steering components under the bonnet and under the vehicle – Cont.

- Free play at the steered road wheel rim in a horizontal or vertical plane (excluding any necessary wheel bearing play) exceeds manufacturer's specifications.
- If manufacturer's specifications are not known refer to the below table

Rim Diameter (mm)	Free play (mm)
up to 405	7.0
over 405 to 455	10.0
over 455	13.0



Suspension components

- U-Bolts
- Other spring to axle spring pack clamp bolts
- Centre bolts
- Spring eyes or hangers
- Torque, radius or tracking component assemblies
- Control arms
- Sway bars
- Bushes or any parts used to attach them to the vehicle frame or axle

Reasons for rejection – cracked, loose, broken, missing or worn beyond manufacturer's limits.



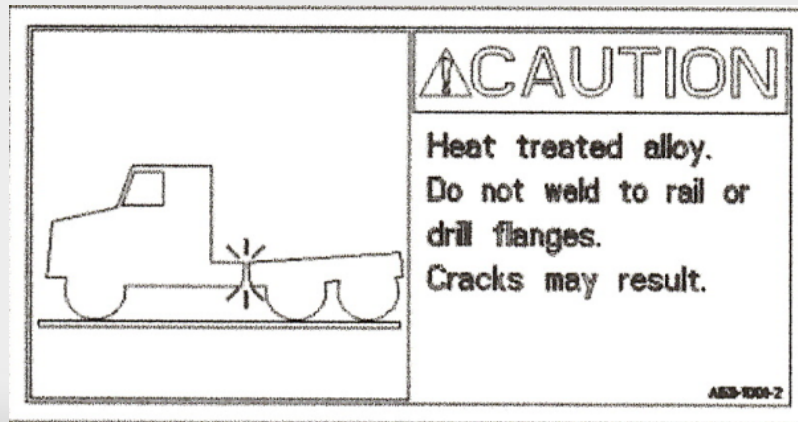
Suspension components – Cont.

- Springs are cracked, broken, missing or damaged
- Springs (including air bags) are sagged or air bag / components leak
- Leaves in the leaf spring are displaced sideways more than 10% of their width or so that they contact wheels, brakes or the frame
- Shock absorbers, if originally fitted, are missing, loose, inoperative or leaking
- Any suspension component is not correctly aligned or is damaged, cracked, loose or broken
- Any nut, bolt or locking mechanism is insecure or missing
- Suspension components are missing, or repaired or modified heating or welding (unless manufacturer's approved repair)



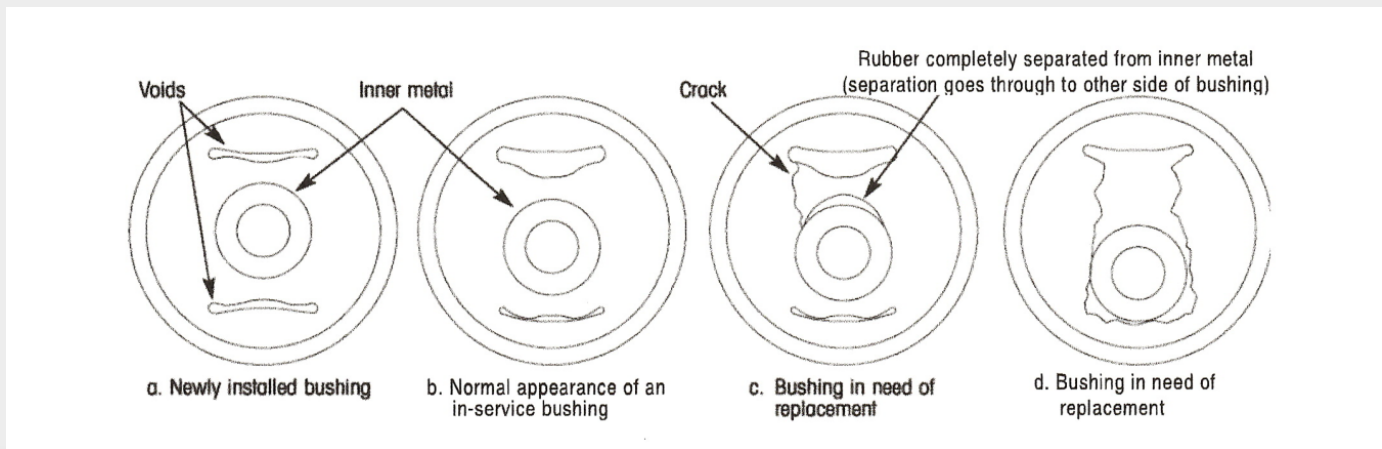
Note:

- Repairs using either heating or welding may adversely affect the strength of suspension components. Any such repairs should only be affected in consultation with vehicle or component manufacturer



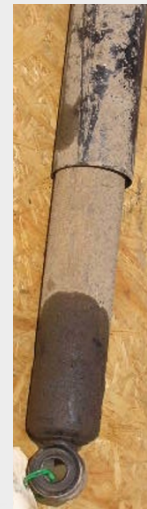
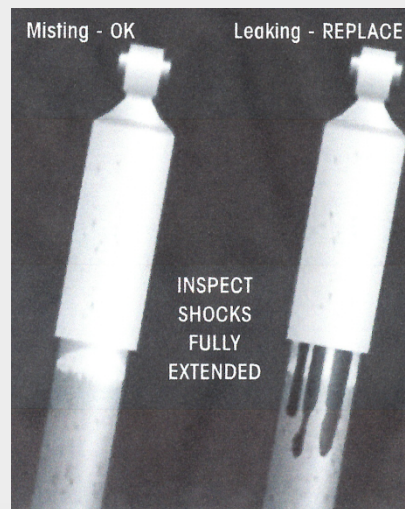
Note:

- Some vehicle suspensions are designed to move within their rubber bushing considerably

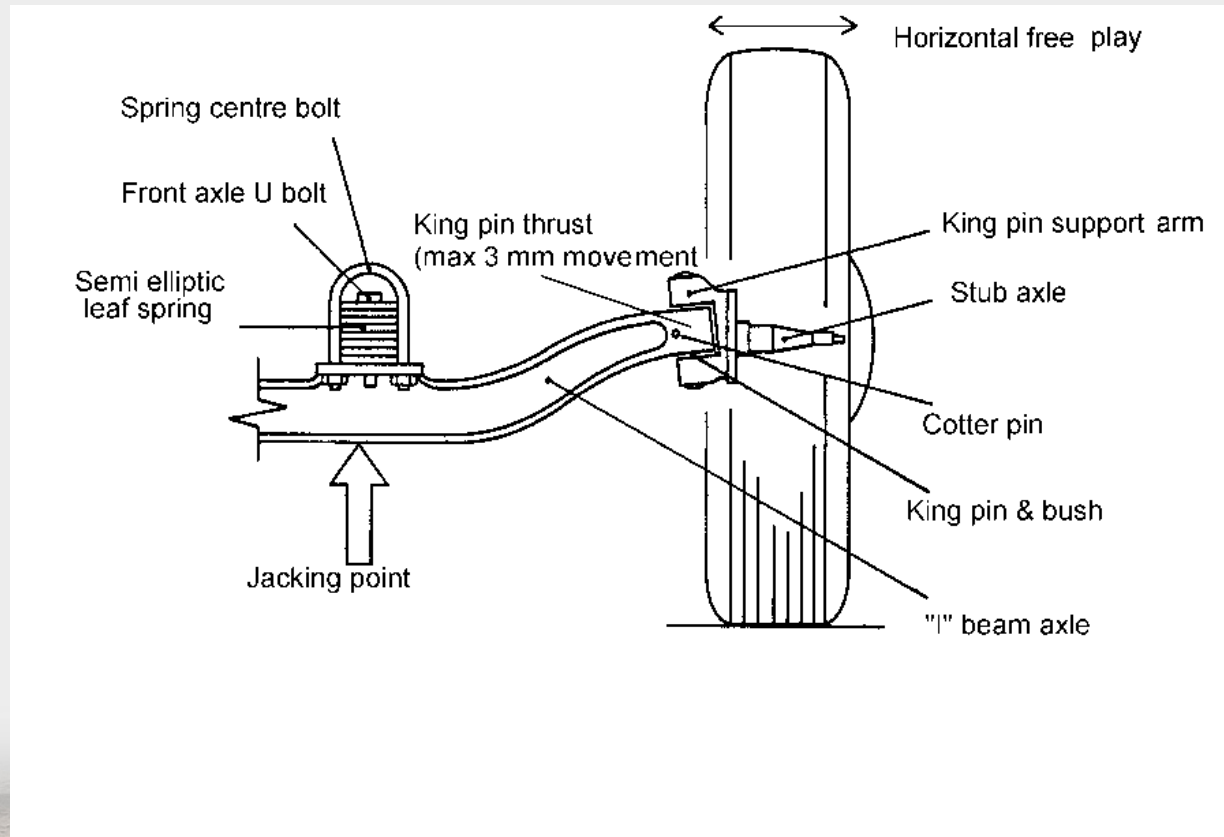


Note:

- Misting shock absorbers are often misdiagnosed as failures.

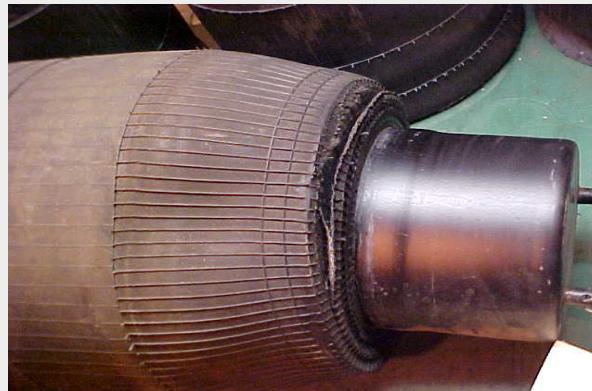


Example:



Note:

- Many suspension parts are hidden and care needs to be taken during inspections.



Maintenance of key components:

- Replace suspension and steering components (don't recondition)
- Use components that meet or exceed O.E quality
- Reach out to the parts manufacturer
- Safety is the number one priority



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Front End



Front End

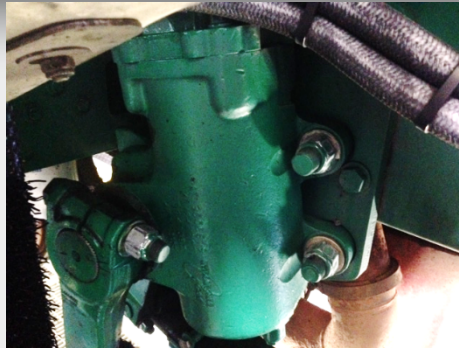
Axle End



Track Rod/Load Share



Steering



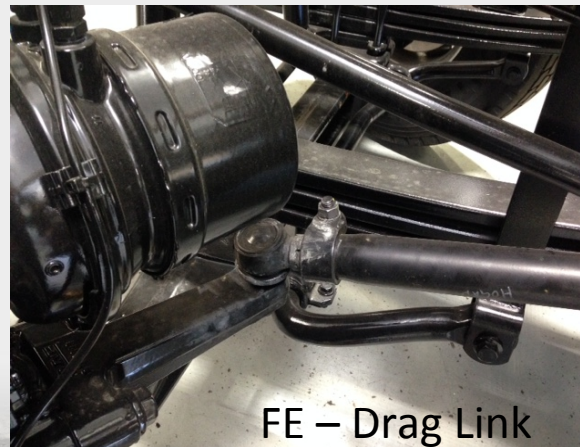
FE – Steering Box



FE – Steering Box



FE –
Axle End

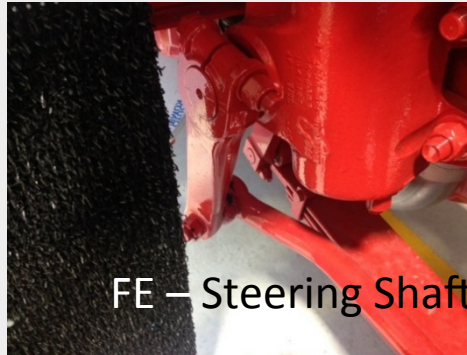


FE – Drag Link





FE – Steering Shaft
/ Airlines



FE – Steering Shaft



FE – Steering Box



FE – Steering Box Input



FE – Steering Shaft



FE – Steering Shaft



FE – Steering Box



FE – Steering Shaft/Box



Air Springs



RE – Track Rod



RE – Air Bag



Leaf Springs



AE –Shackle Bush/Pin



Front Suspension



Front Suspension





RE – Torque Rod



RE – Torque Rod



RE – Torque Rod



RE – Torque Rod



Trailer Rocker Bushes



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Questions

