

Preventing Wheel Loss – Steve Bullôt



The loss of a wheel on any vehicle is a catastrophic failure and in some cases wheel loss can cause a lethal crash. Very good reasons for ensuring wheel security. Also, significant penalties exist under both the Land Transport Act and the Health and Safety at work Act, for causing a crash

A wheel detaches from a vehicle for four reasons; Hub failure, wheel stud failure, wheel nut failure or failure of the wheel. For the purposes of this article, we are concentrating on the wheel end of the issue, the wheel and its connection to the hub via studs and nuts.

Causes of wheel loss or insecurity include;

- Wheels not tightened to the specified torque
- Wheels not tightened in the correct sequence
- Wheel nuts fully tightened one at a time rather than in stages
- Wheel nuts under tightened, risking the nut coming loose and/or the wheel fretting on the stud causing failure.
- Wheel nuts over tightened, risking the stud being elongated and possibly failing.
- Contact surfaces between wheel and hub contaminated meaning wheels do not seat properly and can 'settle' and wheel nuts loosen after being tightened.
- Mismatching of wheel nuts and wheels or wheels and hubs.
- Insufficient stud length when using non-standard or aftermarket wheels preventing sufficient wheel nut engagement. A minimum of three stud threads should protrude through the nut when correctly tightened.

When considering wheel security there are a number questions that individuals throughout the chain of responsibility should be asking themselves;

Vehicle owner/operator;

- Is a pre & post use driver walk around inspection mandated?
- Does the pre and post use walk around inspection require a visual check of the wheel and wheel nuts?
- Have drivers been trained so they understand what they are seeing when they visually inspect a wheel?
 - Do they understand the implications of rust marks or streaks around or emanating from wheel nuts?
 - Do they understand the implications of cracked wheels especially cracks emanating from wheel nut holes?

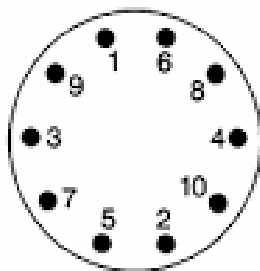
- Are loose wheel nut indicators fitted to help with the inspection of wheel nuts and provide an immediate visual indication when wheel nuts have moved?
- Do you allow your service provider sufficient time to ensure wheel end servicing can be carried out effectively?

Vehicle maintainer

- Is there sufficient time and resource available to carry out effective wheel end safety checks?
- Are wheel nut torque settings checked and recorded every time a vehicle presents in the workshop?
- Are wheel nut tightness records kept and reviewed?
- Is there a written procedure to follow when wheel end maintenance is being carried out?
- Does the procedure reference the vehicle manufacturer's instructions regarding wheel security?
- Does the procedure require that wheel studs and nuts are inspected for damage every time a wheel is removed?
- Does the procedure include cleaning the mating surfaces prior to assembly/reassembly?



- Does the procedure require that free running of wheel nuts over the full length of the wheel studs is checked?
- Is the use of appropriate thread lubricant recommended?
- Does the procedure specify the use of a calibrated torque wrench to tighten wheel nuts?
- Does the procedure include using a calibrated torque wrench to tighten the wheel nuts to the manufacturer's recommended torque settings rather than relying on a powered impact wrench (rattle gun)?



- Does the procedure require wheel nuts to be tightened in a sequence designed to ensure wheels are tightened evenly?

- Does the procedure require that, after any wheel removal, the wheel nuts are torqued then checked/retorqued after the first 50 to 100 km of travel after initial tightening? Note that when being retightened to the required torque, wheelnuts should not be slackened off before tightening.
- Is this requirement flagged in a vehicle's maintenance record and the owner/operator/driver advised??

Driver



- Does the driver carry out a pre and post use walk around inspection?
- Does the walk around inspection include wheel checks?
- Do the wheel checks include checking wheel nut security, witness marks (rust) that could indicate wheel damage or loose wheel nuts?



- Does the required wheel check include checking the wheel nut indicators, if fitted?

Inspecting the Wheel

There are a number of tell-tale signs that a wheel may be loosening that can easily be spotted without the use of tools, such as;



- Rust marks emanating from the wheel nut outwards towards the wheel rim.



- Bright metal rub marks around wheel nuts.
- Wheel nuts not seating snugly in the wheel



- Cracks in the wheel, especially emanating from beneath the wheel nut or between the wheel nuts.

If any of these signs are seen, the vehicle should be placed 'out of service' and referred to the workshop for maintenance.