



Driver & Vehicle  
Standards  
Agency

# Careless Torque Costs Lives

Tighten up



Safety Standards Service

**Too often wheels become detached from commercial vehicles during use.**

**These wheels can cause**

**serious injury  
or death.**

**Many people refer**

**to loss of wheels**

**from commercial vehicles  
as a mystery.**

**Research shows that there  
is no mystery.**

**Careless torque**

**was found to be one of the  
reasons for wheel loss.**

**Someone**

**is responsible for**

**wheels becoming detached  
from commercial vehicles.**

**Following the guidelines  
given here may help  
to ensure that it is**

**not you.**

# Care of wheels

Make wheel fixing maintenance an important part of your **maintenance schedule**. In particular:

- when refitting wheels lightly oil all wheel fixing threads and lubricate the nut to captive washer interface
- always use a calibrated **torque wrench** to tighten wheel fixings; **do not** use power tools or long bars for final tightening
- tighten to the vehicle manufacturers **recommended torques** or **procedures** and in the proper sequence; if a sequence is not quoted use the principle of gradually tightening approximately diametrically opposed nuts in turn
- check for **cracks** in wheels especially around the fixing holes, and in studs, nuts and washers; if in doubt, **renew**
- check for **wear and distortion** of wheel and nut seats and seating areas; over tightening on cone or spherical sets may have raised a lip around the edge which will affect seating of twin wheels; if in doubt, **renew**
- check all **mounting interfaces** – hub mounting face, wheel faces and nut/washer faces must be free from corrosion, damage and dirt
- pay special attention to **paint** - it may improve the appearance but **could be fatal**; any paint on the interfaces should be microscopically thin; paint softens under heat generated from braking and will cause loss of clamping of the wheel and looseness
- Ensure that **wheel fixings** are **checked regularly**, preferably at the start of each shift; wheel fixings can be checked for any looseness by using a calibrated torque

wrench, a socket and **short** bar or maybe by striking the nuts with a small hammer and listening to the noise generated; if the driver is made responsible for this check, make sure they are properly trained

- **do not** simply retighten very loose wheel fixings or wheels which repeatedly become loose; find out why they are loose and whether any damage has been caused
- Use **trained** personnel and keep **records** of all wheel and fixings work, including which parts were renewed and when

## The research

There has been a lot of research into the problem of wheel loss, which is why **it is no mystery**.

Major findings were:

- the use of **low quality replacements parts**; replacement parts from the vehicle manufacturer were generally satisfactory but parts from other sources were found to have poor quality machine cut threads and excessive tolerances including thread to face or seat squareness
- there is a British Standard specification for road wheel nuts, studs and bolts for commercial vehicles, BS AU 50, Part 2, Section 3, 1994; included in this standard is a recommendation that threads and serrations should be formed by rolling rather than being machine cut; the standard is not mandatory but we advise the use of parts which conform to the standard, particularly if they are from sources other than the vehicle manufactures

- early **relaxation of tension** in the wheel fixing after initial tightening following wheel refitting; the wheel stud or bolt is like a very stiff spring which stretches when the fixing is tightened; settlement, even with the vehicle stationary and not subject to vibration, reduces the stretch and the wheel is not clamped sufficiently tightly
- to correct this relaxation, the wheel fixing **should be retightened** to the recommended torque after **30 minutes** if the vehicle is stationary or within **40 kilometres (25 miles) to 80 kilometres (50 miles)** if the vehicle is used

This relaxation will take place regardless of whether the thread of the fixing is right hand or left hand.

**Regular checking** of looseness will still be necessary.

## Recommendations

Many of the recommendations in the publication, plus further details, are given in a British Standard Code of Practice for the selection and care of tyres and wheels for commercial vehicles, BS AU 50 Part 2 Section 7a 1995. British Standards publications are available online at [www.bsigroup.com](http://www.bsigroup.com).

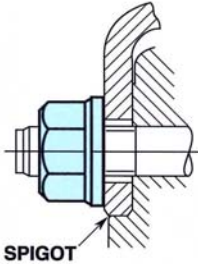
**Maintenance**  
may be onerous,  
it may be a costly  
nuisance but we are  
**not yet**  
in the age of the  
**maintenance free**  
commercial vehicle.

**Look after**  
your  
**wheels**  
and there is a  
greater chance of them  
**staying**  
where they should be:  
**On your vehicle.**

# Types of wheel fixing

## SPIGOT

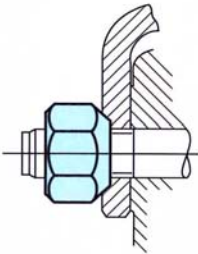
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Most heavy commercial vehicles now use **spigot** mounted wheels where a central hole locates the wheel on the hub. The nuts have captive, rotating, flat faced washers.

## CONE

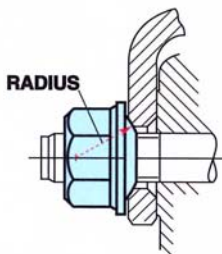
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Other vehicles may have wheels with straight sided **cone** seat type fixings (BS Conical) or **spherical** seat type fixings (European, Din Standard).

## SPHERICAL

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These different types are **not interchangeable** make sure you use the correct type.

## Not recommended:

**Composite or dual purpose** wheels are available which have, either, cone or spherical seating plus the spigot location. Their use is **not recommended**.

# Alternative fixing or locking devices

By all means investigate the use of the various alternative locking or safety devices which are on the market but please consider:

- whether they address the symptoms or the cause of the problems; remember that the research showed that early relaxation occurred without the vehicles moving, therefore, without vibration and equally without the wheel nuts or bolts rotating
- preventing nuts from rotating and thus completely unscrewing from the stud, may avoid some wheel loss incidents but loose wheel nuts still cause wear of the wheel and fixings and eventually failure
- Make sure that even if you do fit alternative fixings devices that you **do not reduce your maintenance or driver daily checks**



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