

LOOSE WHEEL FUNDAMENTALS

Despite ongoing progress in commercial vehicle design, loose or detaching wheels continue to have a disastrous impact on fleet costs, public safety and reputation.

Despite years of investigative research and conclusive reports, we are still finding within the industry a concerning lack of understanding or a simplistic view of the wheel failure process.

Without a clear understanding of the sequence of events which lead to a wheel detachment the selection and/or implementation of a mitigation product and system can be seriously compromised.

There are three primary situations which can initiate the wheel detachment event sequence,

Stud fatigue stretch: Probably the most common problem usually caused by a previous overtorquing of the nut which has stretched the stud past its elastic limit resulting in stud “creep” over the remaining life of the fixture, often caused by incorrectly set rattle guns or oiled threads.

Hub to rim settling: again a common situation caused by rust scale, corrosion, paint or dirt on the refitted rim or hub surfaces preventing mating of the fixture. These deposits bed in during service resulting in a reduction in clamping force and loose wheels.

Human error: The failure to torque or incorrectly torque the fixture after maintenance intervention. Or the failure to identify and address mechanical inconsistencies in the clamping assembly ie cross threading, stud wasting nut or rim fretting.

LOOSE WHEELS CAUSE LOOSE NUTS

“Use of locking devices will not prevent relaxation and since the wheel integrity is dependent upon the friction grip provided by the stud tension, the relative looseness of the wheels will damage the studs and result in eventual wheel loss due to failure of the fixing.” Ref Boltscience

Due to high cyclical loads over a short period the resultant lack of clamping force will allow movement of the rim which in turn frets on the nut taper or nut/ hub face. This fretting tends to cause ovality in the rim and nut and wasting of the stud.

This is the critical time in which to identify any nut movement

DON'T HIDE YOUR PROBLEM

Simply preventing the nut from turning will not prevent a loose wheel, most simple lockers provide no essential indication of the arising situation, some, due to their design may even restrict visual identification of tell-tale fretting marks around the nut.

As clamping force decreases and mechanical damage increases, load is usually transferred to adjacent studs with successive stud failures radiating out from the original. UK research findings indicate that approximately 45% of all documented wheel fixing problems are associated with failed wheel studs

- Some wheel safety products which rely on the integrity of all wheel studs to remain in place may be seriously compromised during wheel stud failure.

WHEEL LOSS MAY NOT MEAN NUT LOSS

Flexing and high Side loads acting on the loosening assembly may cause fatigue cracks to radiate from stud holes resulting in rim failure whilst the studs remain with the hub

Unless these events are detected early, the result is total failure of the wheel assembly and detachment from the vehicle.

MITIGATION

60 KLMS retorques provide some opportunity to identify and resolve potential assembly failure, although in the case of human error, it must be said that with initial loose nuts, serious damage or detachment can occur in 60KLMS.

Warning hangers provided by REDCAT detailing the wheels affected/mileage/operator/retorque date can provide a record of repair.

When refitting wheels, it is essential to inspect all components for wear/ fretting marks or damage. This is indicative of previous problems and may require further investigation and replacement of components. It is also essential that stud and hub piloted wheels and nuts are not mixed and studs are not oiled unless manufacturers state otherwise.

Stud fatigue stretch on the other hand can be easily missed, resulting in loosening wheels between scheduled maintenance checks, whilst the vehicle is in service.

For cost efficient effective, proactive fleet maintenance and increased safety, your wheel safety product must, at the very least, provide a clear and simple indication of these issues between scheduled maintenance checks.

This provides for timely scheduled intervention, minimising expensive part replacement, unscheduled downtime or, at worst total wheel detachment

VISUAL IDENTIFICATION

At Redcat we realise that the essential Pre-emptive identification of the problem is the basis of good maintenance

Redcat understands that by visually identifying initial critical nut movement during a simple walk round, the subsequent scheduled repair can substantially reduce fleet costs, and improve downtime and safety.

Redcat Industries are the Australian manufacturer of a large range of high quality cost effective indicators, the designs of which are based on 45 years of researched loosening wheel technology.

REDCAT's renowned International patent pending REDCAT2 indicator/locker and REDCAT3 ring indicator/locker not only visually identifies the critical wheel loosening period but additionally lock the nut from further movement, providing an even greater level of security, Simply pushed over two torqued nut (REDCAT2) or five (REDCAT3) the pre angled pointer, high UV, variable PCD link, securely engages with all nut points without the need for fiddly clips or mechanisms, resulting in a constant monitoring, robust reusable variable PCD product.

All REDCAT indicators provide a visual identification of overheating brake hubs, dramatically reducing fleet downtime and cost by quick identification of the problem hub.

Our indicators clearly indicate your company's commitment to safety and good maintenance.

REDCAT INDICATORS, tried and tested, they simply work

NB – The use of REDCAT indicators assist in the pre-emptive identification of loosening wheels, they are not intended to replace or compromise recommended vehicle, wheel or hub manufacturer's maintenance procedures, REDCAT do not take responsibility for incorrect use or failure to adhere to advised manufacturers maintenance procedures.