Now that the latest EU Roadworthiness package has passed into European law, fleet engineers, workshop managers and technicians need to rethink their wheel security practice. Brian Tinham reports

Cracking

Commercial vehicle technicians now have additional obligations when it comes to wheel security, following the classification of wheels as safety critical in the latest EU Roadworthiness Package, which entered European law in May. The new legislation – which has been adopted by the European Parliament and European Council – states: 'Compatibility between parts and components, such as between wheels and wheel hubs, should be treated as a critical safety item and should be checked during roadworthiness testing'.

The new legislative text mandates several visual wheel inspection requirements, including both roadside technical inspections and periodic vehicle testing. Specifically, though, it states: 'Wheel size, technical design, compatibility or type not in accordance with the requirements – laid down by type approval at first registration or first entry into service – and affecting road safety [will be classed as a major defect]'. In other words, hubs must be correct for the wheels fitted.

Member states have three years to comply but, while that means UK legislation may not be updated before May 2017, tread carefully. If you are 'unlucky' enough to experience a wheel detachment tomorrow and someone is injured or, worse, killed, you might be in for a rough ride – particularly if investigations reveal that adequate checks (in the eyes of European law) were not carried out.

For workshops and technicians, this may sound like yet another burden – although few would argue with the paramount importance of safety throughout freight and passenger transport. However, for Motor Wheel Service Distribution (MWSD) managing director John Ellis, the newly-mandated inspections are a vindication of his long-fought personal crusade for recognition of what he sees as a dangerous problem – that of inappropriate hubs being fitted on axles entering UK and European markets, and causing premature failures on wheels.

Why now? Is this such a big issue? Few in transport were even aware of different hub designs until recently, much less their potential dangers. But Ellis insists that numbers are growing and that it's all about misguided cost and weight saving. He says the difficulty came to light when some alloy wheels made to tight, industry-standard specification, started being returned with alleged defects.

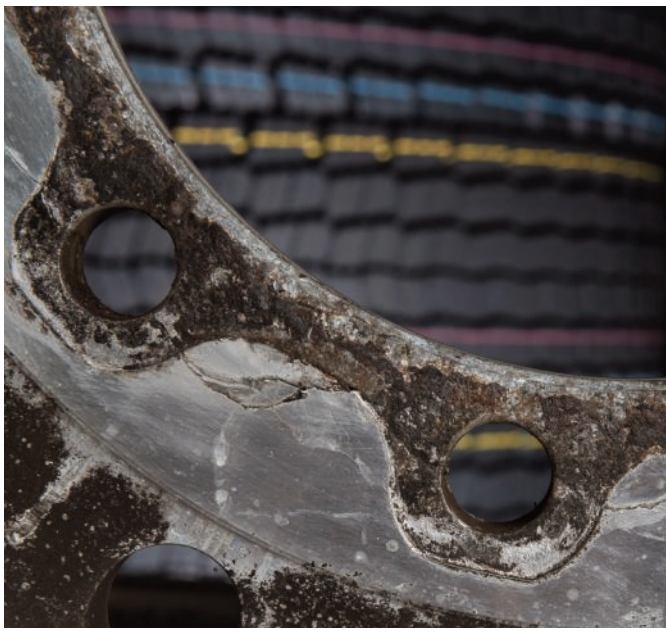
"Tyre fitters like ATS Euromaster were seeing the problem, too, along with other wheel manufacturers, such as Maxion," he explains. "But it wasn't the wheels at fault. They were presenting with cracks, but those were being caused by fatigue from spider- and star-shaped hubs."

In fact, he believes that growing numbers of cracked alloy wheels are just the tip of the iceberg. Steel wheels, he says, are also suffering fatigue, but with cracks going largely unreported, as workshops simply replace damaged units without recourse to the supplier – because of their relatively low cost.

Reduced life expectancy

Note that Ellis is far from alone in expressing concerns. Maxion's latest literature expressly warns technicians to heed ISO 4107, DIN74361-3 and SAE 1694, all of which assume hub shapes with a continuous diameter for European standard wheel types. Maxion explains that EUWA (Association of European Wheel Manufacturers) members have now tested wheels with star-shaped hubs and, although the wheels passed relevant tests, reduced fatigue life was experienced. That, it says, was due to high local stresses, caused by the attachment face shape and diameter reductions of the alternative hubs – a supposition confirmed by finite element analysis.

"EUWA strictly recommends that on vehicles



performance

equipped with non-circular hubs, the wheels ... be checked for cracks on the inner and outer attachment face every 50,000km," advises Maxion, halving its usual inspection limit. And the company adds that defective wheels must be replaced immediately, with hubs also checked as a matter of urgency for wear and cracks – and similarly changed out, if necessary.

Clearly, there has been a problem for some time. It has simply been building up below the radar, with fleet managers and technicians drawing the same, but ultimately wrong, conclusion – that quality wheels were sub-standard. Indeed, in effect, the new European law upholds the finding that non-circumferential hubs, which give only partial contact between the axle and wheel, can cause load stresses significantly beyond the wheels' design parameters.

The EU accepts the research, which shows that these can result in cracks, so creating a potentially serious safety issue. Ellis also argues that the EU ruling highlights the importance of due diligence when purchasing second hand or potentially sub-standard wheels – and hence of the roles of fleet managers and purchasing departments.

"This is a major development and the clearest indication possible from experts at the EU that they understand the safety-critical nature of CV wheels, and that vehicle safety is being compromised when there is a failure to use fit-for-purpose wheels on non-circumferential hubs," asserts Ellis. "That said, this is just the next step in the campaign. We now await clarification from the Dft [Department for Transport] on their timescale for implementation of the Roadworthiness Package."

In the meantime, he intends to continue with MWSD's campaign of education, working with OEMs (original equipment manufacturers), the aftermarket and operators to explain what the changes will mean for their truck, bus and coach fleets – and why they matter. "Some axle manufacturers are still allowing the wrong hubs to come into Europe, and not just via the aftermarket," he insists. "And when it comes to emergency or distressed purchases, some people will grab anything they can without considering whether there might be a dangerous mismatch. So, for as long as this continues to happen, we need to keep up the pressure." TE

Belt and braces approach

Assuming you are using the right wheels with the right hubs, and that you're adhering to IRTE (Institute of Road Transport Engineers) and/or OEM (original equipment manufacturer) guidance on inspection, maintenance and fixing, you should expect no wheel detachments. However, if you're still concerned, there are additional precautions.

Among the best known devices are Checkpoint's original wheel nut indicator and Disc-Lock's safety wheel nut, each aimed at HGVs and PSVs. The former have been in use by big names throughout the industry for years, providing easy indication of wheel nut movement for drivers on their daily walk-around checks. A no-brainer. Meanwhile, Disc-Locks go further – maintaining wheels secure on their axles. What's more, they are quick to fit and remove, and no more costly than standard nuts. Another no-brainer, particularly given that they are approved by major axle makers for spigot-mounted wheels, and fitted by many leading truck and bus fleets.

As Ernie Dixon, transport consultant and ex-fleet engineer, puts it: "I introduced Disc-Locks to the Nynas fleet in 1998 and, in the 17 years since, we have never lost a wheel or had wheel nut or wheel stud issues."

Just one caveat: if a wheel cracks due to incorrect hub fixings, then no matter what wheel security devices you fit, they are likely to fail – especially if locking devices are only fitted to a few studs, as is common practice.

We await with bated breath the arrival of electronic wheel security devices that harness wireless technology and detect imminent separation of a wheel from its hub, warning the driver in real time. But even when such devices are here, they will be no substitute for good engineering practice.