



No slack in drum brake safety

Automatic slack adjusters (also known as automatic brake adjusters, ASAs or ABAs) are an essential part of a drum brake assembly, compensating drum brake wear over time. But they can't work if they are not installed correctly, reports Toby Clark

Automatic slack adjusters have been a mandatory fitment on most trucks, trailers and passenger-carrying vehicles since April 1995: specifically, on category N2 & N3 LGVs, O3 & O4 trailers and M2 & M3 PCVs.

So the few manual slack adjusters out there will be fitted to vehicles more than a quarter of a century old – but it seems that training and attitudes have not kept up. Neil Mitchell, hon. secretary of IRTE Northern Centre, says: “As a DVSA vehicle examiner, I have encountered many in-service commercial vehicles and trailers over the years with defective brakes as a result of automatic slack adjusters being faulty or not functioning correctly through poor maintenance procedures, or being incorrectly installed.”

Some industry figures spoken to for this article suggested that technicians brought up on manual slack adjusters were applying the same principles to ASAs, which are quite different. Neil Mitchell adds: “It is evident that a large number of technicians working in the industry do not understand their function and operation.”

Lawrie Alford, LATC automotive skills mentor, points out that “CPD is vital – technicians need to prove that they have read and understood the instructions. ‘Qualified’ and ‘competent’ are totally

different things – being qualified doesn’t mean you’re competent!”

HOW IT WORKS

An automatic slack adjuster forms the lever that links the push rod of the brake actuator to the S-cam which expands the brake shoes. Its specific function is to compensate for wear in the brake lining and brake drum, by adjusting the angle between the lever and the camshaft; in this way, an ASA removes the need for manual adjustment over the life of the brake lining.

The ASA is a purely mechanical device, which operates in either of two ways: clearance-sensing or stroke-sensing. A clearance-sensing ASA

(the most common type) operates by maintaining a specific distance between the brake lining and drum when the brake is released, while a stroke-sensing unit is adjusted once a maximum stroke distance is reached, to keep the stroke within an optimal value.

The stroke-sensing type could over-adjust if the drum expands or warps in use, allowing the brakes to drag when the temperature drops; however, BPW says its adjuster “is designed to ensure that there is always a sufficient amount of clearance”.

There is another variant: the self-setting ASA (the S-ASA or S-ABA). This is easier to fit, as it does not need to be installed with the control arm rotated to



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Lex Randall

its optimum position. According to Lex Randall of MEI Brakes: "S-ASAs are a lot easier to install, and they account for 80% of OE sales today" so they will be a substantial part of many fleets.

INSPECTION

Slack adjusters should be checked at every regular inspection period – for instance, every six weeks for most operators. As Lex Randall of MEI Brakes puts it: "if you are a good mechanic, you should spend at least five minutes under each wheel end."

Checks include verifying that there is enough stroke available for the push rod, and confirming that there are no cracks, bends or broken fasteners in the control arm or anchor assemblies. Randall says: "We do see ASAs breaking at those anchor points; the most important thing is to check that the bracket and the bolt are OK. Brackets need to be set squarely – the slack adjuster needs a reference point and a start position so the brake can be adjusted." Damage can be caused by stones, parking impacts and speed bumps.

The internal mechanism of worm gears and a ratcheting cone clutch does wear out: you can tell its condition from the 'de-adjustment torque' required to move the worm shaft hexagon head anti-clockwise. The torque must be above a minimum level (typically 18Nm) before the shaft rotates and clicks round to the next tooth on the clutch mechanism (pictured above). Surprisingly, this test is not part of the MOT.

"At about 40Nm, when it's new, they are really heavy clicks," says Randall. "At 18Nm the clicks are quieter. You can monitor the decay," he says – just record the torque required to move the shaft at each inspection. "It's not a requirement to monitor the de-adjust torque, but I think it should be. It gives you feedback about when you need to change it, and preventive maintenance is key."



Once the mechanism has been 'de-adjusted', a ring spanner on the hex end will show whether it comes back into adjustment: the spanner should rotate further clockwise each time the brake pedal is applied and released, until adjustment stops. Finally, the brake needs to be 'reset', according to the specific instructions from the manufacturer.

The mechanism can be replaced – a service pack is available for most models – but most operators choose to replace the ASA as a whole.

A properly-calibrated torque wrench is a must when working on ASAs, and all the manufacturers make it clear that air or electric impact wrenches should not be used on any ASA moving parts.

A correctly-operating adjuster should never need to be manually adjusted in service. It might need to be set up again

after a brake overhaul, but repeated manual adjustment causes premature wear. In any case, the actuator push rod should not have to travel more than two-thirds of its maximum stroke. If it does, this is not an adjustment issue: it means there is a problem with the components or the installation.

GREASING

Lubrication intervals vary with use: a typical on-road truck's ASAs may need greasing twice a year, while a heavy-braking urban bus or refuse collection vehicle should be greased and properly inspected every three months. An off-road vehicle exposed to muck and frequent wheel washes should be greased and inspected every month.

BPW recommends its ECO Li Plus lithium-based grease, while Haldex applies its calcium-based grease from the factory but adds that this is compatible with the more common lithium-based 'chassis grease'. Carl Dibble of Knorr-Bremse says: "Lithium EP2 grease is recommended as it withstands high pressure between the worm shaft and gear".

Lex Randall points out that greasing with molybdenum disulphide ('moly') grease is "a no-no" – it can increase wear – but adds, "I can't stress greasing enough, and that includes the control arms and anchor points". It is also advisable to grease the clevis pin linking the ASA's control arm to the brake actuator yoke.

ASAs are generally equipped with a single grease nipple or screw-in plug. Technicians should add grease until clean grease comes out of the adjustment bolt housing. **TE**

IRTE TRAINING LECTURE

On 23 September the IRTE Northern Centre hosts a technical presentation on slack adjusters by David Jackson and colleagues from component manufacturer and supplier MEI. The venue is at The Barton Manor Hotel A6, Barton, Preston PR3 5AA, starting at 8pm. It will be recorded and available to view via soe.org.uk afterwards.

FURTHER INFORMATION

How it works (video) – www.is.gd/hakepa

Installation (video) – www.is.gd/educiy

DVSA maintenance guide (2013; a revision is in preparation) – www.is.gd/delita