

Wire Wheel Balancing

Addressing the problem of achieving perfect rotational equilibrium

WORDS AND PHOTOGRAPHY
RAY INGMAN

TO CELEBRATE this last ever Tech Tips, we depart from our usual format and carry out an appraisal of some special tools.

Such devices are created to alleviate problems, the challenge in this case being the balancing of wire wheels.

The technical reason why this IS a problem will be revealed as you read on, but suffice to say, wire wheels were dropped by Jaguar as a production option in 1974 with the demise of the V12 E-type and are now only fitted as OE to a tiny number of low volume cars – typified by Morgan. In the 40 intervening years, tyre dealers equipped with the correct equipment to carry out the operation have dwindled – worse, some think they can, and are sorely mistaken!

Out of balance wheels manifest their presence by a shuddering vibration throughout the car (varying with road



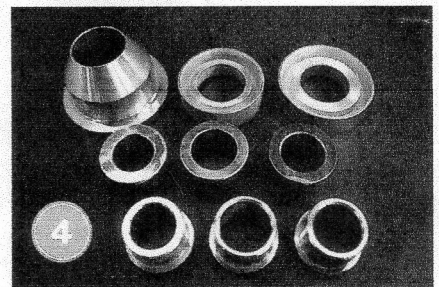
speed) and consequent uneven tyre wear and suspension deterioration; all traits best avoided.

The Problem

To achieve perfect balance, wheels must be mounted on the computerised machine in the same manner as they are on the vehicle. In the case of alloy, steel or modern bolt-on wire wheels, the faceplate replicates the flat hub surface (1) and centralisation is achieved by a co-axially mounted internal cone. The clamping action of the securing nuts is simulated by the threaded locking device, and in some cases, centralisation is further aided by a secondary outboard internal cone.

In the case of 'knock on' wire wheels, there are only two true machined contact surfaces on the central splined hub of the wheel. This type of wheel has a 30-degree chamfer that acts as a seat on the back of its central hub (2); this sits onto a matching 30 degree shoulder on the vehicles hub. (The splines on the hub and wheel are there purely for drive purposes). The wheel is then locked in place with a knock on wheel nut (spinner), which acts as a cup incorporating a 10-degree chamfer that matches the shoulder machined onto the front of the wheel hub.

Wire wheels are frequently erroneously mounted on computerised balancing equipment using a pair of standard internal cones. If the inner cone is too small, the

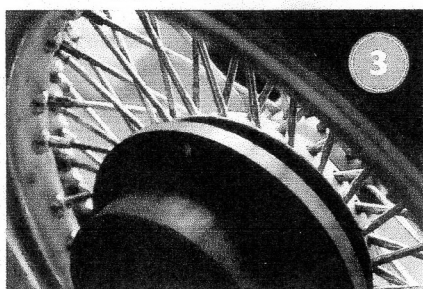
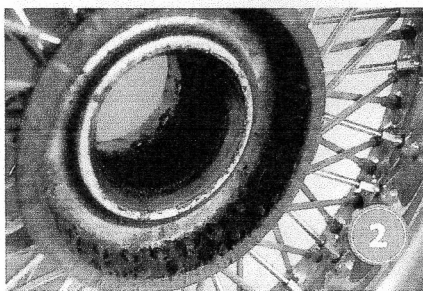
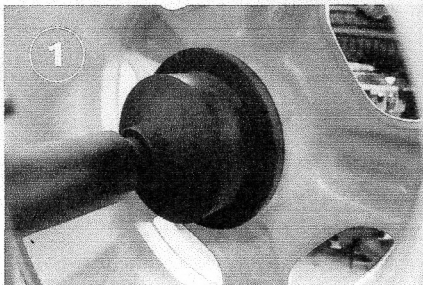


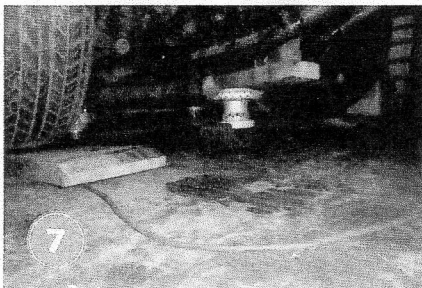
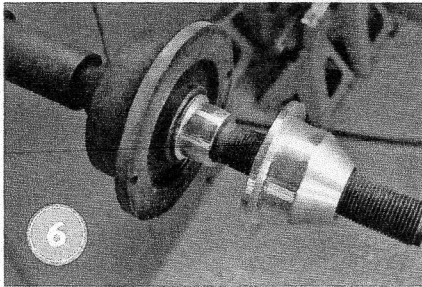
outer edge of the wire wheel hub will contact the faceplate (3). This area of the hub is not a machined surface and it will cause the wheel to wobble on the machine, making it look like a defective component. If the outer cone locates inside the lip of the wire wheel hub, it is touching on another uneven surface; this will also cause the wheel to display the same trait.

The Solution

Like buses, two come along at once... We simultaneously received examples of wire wheel balancing adaptors from Cutteridge (4) and Smoothride (5) for appraisal; they are essentially two interpretations of the same solution.

Only the most well-heeled or fanatical home enthusiast would possess their own electronic dynamic balancing machine – but most high street or trading estate tyre supply companies boast such devices.

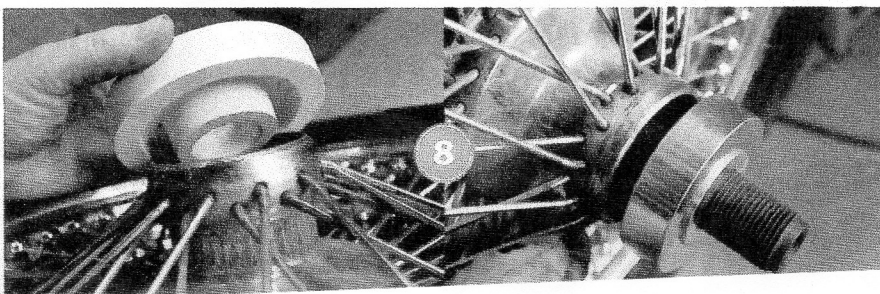




Naturally, these emporia do not see enough wire wheels for it to be economic or expedient to acquire the correct tooling for their machines.

To balance a centre lock wire wheel on a balancing machine, it must have a 30-degree cone and a 10-degree cup to locate the wheel correctly – both kits contain these basic essential items, but further considerations apply.

Our researches established that the majority of machines are possessed of a 36mm diameter threaded shaft (6) – but less common variants employ 40; 38 and 28mm. The Smoothride kit caters for both 40 and 36mm shafts; the Cutteridge adds 38mm to its standard capabilities. Both makers will supply additional insert bushes to cover any missing diameters. It is worth checking the shaft dimension of your chosen service provider's specific machine in advance of engaging their services.




With only some very obscure exceptions, Jaguar splined hubs are (almost!) universally 52mm diameter, but should you own more than one marque of wire wheel equipped classic car, both kits come with 42mm cups. These suit the smaller splines fitted to such vehicles as MGs, Healeys, Astons, and Jaguar's own orphan child – the Daimler SP250.

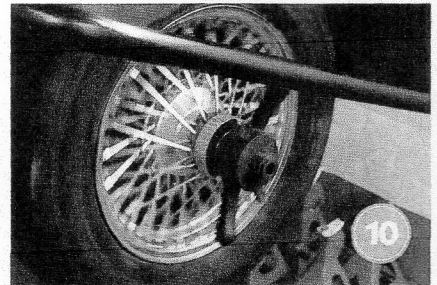
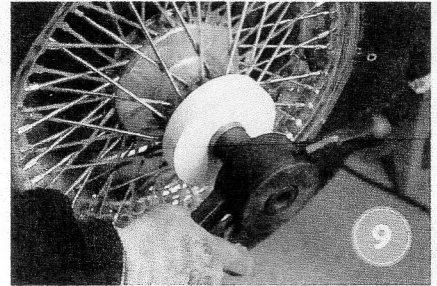
The final differentiator between the kits is that the Cutteridge is manufactured from plated steel and is supplied in a fitted wooden box. The Smoothride is precision moulded in reinforced plastic; any concerns as to this material's resilience in service is dispelled by their demonstration: supporting the rear of an E-type (7) – a static load of around 1500lbs (680kg). One tonne has been sustained in more conventional tests.

In Service

The male inner cone (fitted with the appropriate diameter insert bush) is slid onto the threaded shaft (6) up to the faceplate – this is followed by the wheel/tyre assembly, first ensuring the tapered lands are free from dirt contamination or physical damage. The female cup is then slid up to the wheel's outer taper (8). The resulting assembly is secured with the balancer nut (9), and the wheel is then spun (10) to visually check for wheel run-out (wobble). A maximum of 0.055" (1.4mm) is allowable before rectification is required; this tolerance can be confirmed by the use of a DTI (dial test indicator) or stationary probe and feeler gauges. The methodology then requires digital input of rim diameter, width and offset. Armed with this information, the machine then runs the wheel up to high speed, detecting the magnitude and position of the out of balance forces. A readout informs the operative of the weight and position required to counteract the imbalance. Once fitted with knock on or stick on weights (main image/11) as appropriate, the assembly is once again powered up to confirm perfect balance on the readout: "00-00" (main image).

We utilised both adaptor kits on a set of V12 E-type wheels, discovering that there was nothing to choose between them in terms of ease of use and repeatability. It is arguable that the Cutteridge kit is slightly heavier duty and thus more appropriate to repeated professional use. An attribute reflected in the price differential.

As a final thought, after new tyres have been 'run in' over a few hundred miles, it is well worth having their balance rechecked – this initial period of use removes moulding flash and minor surface high spots. Possession of the tools covered in this feature will mean you are not tied to a specific (and possibly distant) garage to achieve this end result. 



Cutteridge

Wire wheel balancing set: £180.00

www.wirewheelaccessories.co.uk

Also available from Motor Wheel Services
www.mwsint.com; 01753 549360

Smoothride

Full kit (42mm and 52mm hubs): £100.80

Two-cone kit (for 42mm OR 52mm hubs):
£75.72)

Additional insert bushes available to order:

£12 per pair

Postage (UK) £7.00

Available from: XK Engineering, Fosseyway
Performance, A Head for Healeys, MGOC
02476 543311

Email: bob.peacock10@btinternet.com

THANKS TO:

Matt Everton, Independent Jaguar
Specialist, Waltham Cross, Herts
07765 692818