Achieving Perfect Wheel Balance on Pre-War Cars

CHAS VYSE

Correct assembly order of the lead weighting discs (variable number as required), conical washers and 'cotton reel' cover. Three of these assemblies are fitted to each road wheel.

Up until recently, achieving perfect wheel balance on a Rolls-Royce or Bentley spoked wheel has been quite difficult, in as much as a custom made splined attachment needs to be fitted to a tyre shop dynamic wheel balancer to balance the wheel accurately. I never did find a tyre shop that had this attachment, although I did discover that a major wire wheel rebuilder in the UK does have a dynamic balancer suitable for a Rolls-Royce wheel. However, this firm does not use the original Derby balancing method and, instead, sticks lead weights to the rim of the wheel in the manner of a modern car; visually unacceptable in my view.

So, the only recourse is to static balance the wheel manually, using the original lead disc method; but which is nothing like as accurate as dynamic wheel balancing. Static balancing becomes even more inaccurate if the car is fitted with wheel discs that have to be removed in order to access the wheel weights and which therefore do not form part of the balancing equation. The lead washers are made from 1.2mm lead 'flashing' available from Builder's Merchants. They must not bind inside the cover, as it will make it difficult to remove them. Use the large washer that goes on top of the cover as a template when marking out. You will find the lead is easily cut using a large pair of scissors. Fill the cover completely with lead discs and then drill through the hole in the cover, to accurately form the holes in all the lead washers.

Five ounces of beads are needed for each 19 inch wheel/tyre; 6 ounces for a 20 inch wheel.

A lesser known solution to achieve *perfect* wheel balance is to additionally use zircon grade ceramic beads. The beads are poured into the inner tube and then whenever the car is driven at a speed of circa 20 mph or more, the beads distribute themselves around the periphery of the tube, to precisely counterbalance any imbalance in the wheel, tyre and disc combination. Bead distribution takes place by way of centripetal, rather than centrifugal force. It 'works' in a similar way to a domestic spin dryer. When the wet clothes are loaded into the drum and the dryer is first switched on, the drum wobbles alarmingly on its flexible mounting as the unbalanced load starts to rotate. But centripetal force quickly acts to redistribute the clothes into the familiar tangle and the now balanced rotating drum, spins up to high speed smoothly and perfectly in balance.

Ceramic beads being injected using an applicator.

To balance a wire wheel, first statically balance the wheel by using the original lead disc method. Strip off any wheel discs that are fitted. Note that some coachbuilders, such as Barker, fit a bracket inside the disc, on the periphery opposite the valve extension. The purpose of this bracket is to counter balance the weight of the valve extension. Other coachbuilders didn't bother with this nicety. If your car has wheel discs with no counter balancing bracket fitted, then after removing the discs, refit the valve extension to the wheel and let it hang loose, so that it becomes part of the weight to be balanced. Next, check that a front hub has no play and rotates easily and smoothly with no trace of the brake binding. Mount the wheel/tyre to be balanced to this front hub and tighten down. Remove the three 'cotton reel' covers from the lead weight mounting studs and remove all existing lead washers. Note that early cars do not have covers over the weights. Taking the valve as a datum point, position the wheel at 12 o'clock and hold it absolutely still. Then gently release the wheel. If the wheel rotates, as it almost certainly will, add one, two, or more lead discs to the 'light' side and run a quarter inch BSF nut finger tight down on the stud. Add a nut to the two other naked studs, to cancel the weight of the nuts out. Repeat the exercise at 3 o'clock and add more lead discs as required.

Continue by positioning the wheel at 6 o'clock and adding or subtracting lead weights as necessary. Then the same for 9 o'clock. The aim is to be able to finally position the wheel at any point on the clock face, hold it motionless, let go and observe zero wheel rotation. When you've reached this happy state, the wheel will be statically balanced. Note that it is quite common for an old wheel to be so out of balance, that it will need a full complement of lead discs on one stud, with the second and third stud sparsely populated or indeed empty. Tighten the 5/16 BSF nuts (conical washer underneath) and refit the 'cotton reel' covers, with another bigger conical washer under the domed nut.

Replace the wheel disc(s) if fitted and then deflate the tyre and remove the valve from the inner tube. Position the valve at 6 o'clock and pour in 5 ounces (142 grammes) of ceramic beads for a 19 inch wheel; 6 ounces (170 grammes) for a 20 inch wheel into the inner tube. You will need to use a tiny funnel and pour quite slowly. Ceramic beads (zircon quality) can be bought from abrasive blasting suppliers or more conveniently from www.dynabeads.co.uk who also supply a handy injector.

The wheel/tyre/disc will now be in perfect balance and will stay that way for the life of the tyre; you can of course use the inner tube with the beads inside on any other tyre. If you have unwittingly been driving around with unbalanced wheels, the effect of perfectly balanced wheels is really noticeable. The whole car will now appear to drive more smoothly with a steady steering wheel. And you can expect expensive tyres to last that much longer. Ceramic bead balancing can also be employed on the later cars with pressed steel wheels and tubeless tyres, but the system is not suitable for modern ultra low profile tyres. Bead balancing is an established practice in the commercial sector. Truck wheels operate in a tough environment and are often kerbed. Substantial weights are usually needed to balance a big truck wheel, which means that car style clip-on rim weights would not remain in place for long. Beads inside the tyre are used instead - sometimes held in suspension in a specialised gel. Some commercial operators have claimed a 15% increase in tyre life using ceramic bead balancing, as the wheels remain in perfect balance over the life of the tyre. ■