

Optimizing Tire Balance

TEXT AND PHOTOS BY GREG COCKERILL



▲ Wetmore's Safety Service was established by Roy C. Wetmore in 1928 and attracts both classic and late model cars. The building has a history of its own, including a stint as a Packard dealership after the war. In the late Forties, Frank Lloyd Wright provided Wetmore with a plan for remodeling the facility. In a novel attempt to garner attention, Wetmore mounted a car with "wobbly" wheels, a Wills St. Claire, on the roof. Though there have been other cars, this 1964 Chrysler has held the honored position since 1966. A brief history of the establishment appeared in the Jan. '87 issue of *Cars and Parts*.

IF YOU SPEAK TO CAR COLLECTORS ABOUT TIRES, YOU'LL FIND NO SHORTAGE OF OPINIONS. MANY ARE NOW FAVORING RADIALS, AND CITE RIDE AND BALANCE PROBLEMS WITH BIAS-PLY TIRES AS THE REASON. PURISTS, ON THE OTHER HAND, CONTINUE TO EMBRACE THE VARIETY OF AUTHENTIC REPRODUCTION TIRES THAT ARE AVAILABLE. REGARDLESS OF YOUR CHOICE, A HIGH-TECH MOUNTING AND BALANCING CAN MAKE A WORLD OF DIFFERENCE.

Typical computerized wheel balancers simply spin the wheel and measure imbalance with the tire in an unloaded state. However, consider that the tire is actually compressed when the car is on the ground and this contact patch acts like a spring. As the tire revolves, the car is suspended on an infinite number of spring points. If the spring force created by the tire was uniform, a simple balance job would be sufficient to achieve a smooth ride. In reality, this spring force is not uniform, but instead varies around the tire's circumference.

Major vehicle manufacturers learned years ago that if they could manage this radial force variation (RFV), they would get fewer complaints about ride quality and tire balance. They developed a process called match-mounting, whereby the 'softest' part of the tire was matched up with the high point of the wheel. While not perfect,

this methodology yields far better results than random mounting of the tire on the wheel.

To see if this technology could be applied to collector cars, I contacted Bill Keyes at the Detroit office of Hunter Equipment. He told me about a state-of-the-art wheel balancer they produce, the GSP-9700. This unit has the capability to measure RFV, rim run-out and eccentricity, as well as wheel/tire imbalance. Its capability is so great, Hunter actually markets the device as a Wheel Vibration Control System.

Keyes explained that the RFV feature is normally used to resolve existing vibration complaints, but could easily be used for optimizing the initial mounting of tires and wheels. He put me in touch with Chris Lynch, the owner of Wetmore's Inc., Ferndale Michigan, for a demonstration.

Chris agreed that using the Hunter

GSP-9700's RFV feature would be a great way to optimize the mounting and balancing of antique-car tires. He has



1 The old tires, with factory steel wheels, were dismantled from our test vehicle and the wheels inspected for any damage. The Hunter GSP-9700 will be used to measure both lateral and radial runout.



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2 Wetmore's head technician, Mike Leisner, inspects the new tires carefully before mounting. We chose Coker's new J78 x 15 B.F.; Goodrich reproductions.

3 The tires are mounted to the wheel with no particular orientation. Later, the GSP-9700 will direct Mike to re-index the tire's position on the wheel in order to minimize road force disturbances. One or more additional iterations will ultimately be required, which can be time consuming. The hi-tech GSP-9700 is more than just a balancer. It uses a force roller to apply approximately 1,400 pounds to the spinning tire. This simulates the car's weight on the tire and produces vibrations similar to real world driving. A computer in the machine displays forces and imbalance, and determines how to reorient the tire on the wheel to minimize these disturbances. After changing the tire's position on the wheel, the assembly is then rechecked to verify the improvement.

4 Radial and lateral runout of the steel wheel are checked first. All four wheels yielded similar satisfactory results. Mike explained that production steel wheels can exhibit varying amounts of runout, usually due to variations in manufacturing.

5 Most shops rely on a standard cone-shaped adapter that indexes with the center hole of the wheel. Mike uses a special set of precision adapters made by Haweka of Germany. These adapters use both the lug holes *and* the center hole to pilot the wheel. This ensures that the wheel is consistently mounted in exactly the same position on the Hunter, each time it is removed and reinstalled for checking balance and RFV.

6 The J78 is now ready to be tested for RFV and balance. This closeup shows the road force roller that will contact the tire during force measurement. After the RFV is measured, the force roller will automatically retract and the tire will be spun to check for balance.

found that low volume specialty tires often exhibit greater variation in uniformity and dimensional features than typical OE tires, and assured us the match-mounting process would yield the best possible ride characteristics from a given set of tires.

Our test case would be a 1970 Buick Electra convertible. For tires, we used a fresh set of reproduction J78 x 15 dual-stripe whitewalls. These bias-belted tires are a new offering from Coker Tire of Chattanooga, Tennessee, and are faithful copies of the Electra's original dual-stripe tires. Follow along with the pictures as we go through the match-mounting process.

The conclusions? While time consuming and more expensive than traditional balancing, I would highly recommend this process to anyone who plans to use reproduction or specialty tires on their antique car. The alternative is to go with conventional balancing and seek out the RFV process only if you have a vibration problem. However, by being proactive and match-mounting the tires initially, you will be guaranteed the best possible ride that your tires can provide, first time out. You'll be happier with your tires and your car, and may save some repeat visits to the tire store!



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JOHN "RED" ELSON *Estate Auction*

SATURDAY, NOVEMBER 27th, 2004 • 9:01 A.M.

LOCATION: 624 W. Ward St., Versailles, OH 45380

Classic Cars - Modern Cars - Car Parts - Tractor - Farm Items

COLLECTOR CARS AS FOLLOWS BEING OFFERED AT APPROX. 1:30 p.m.



1908 STODDARD DAYTON SPEEDSTER (RARE FIND)

Authentic 45 hp 4 cyl. engine, spoke wheels, loaded with a lot of brass incl. brass Carbite headlights, squeeze horn, exhaust whistle, also leather seating, storage trunk. Very few of these Stoddard Daytons remain and are seldom offered for sale. This car is being offered with confirmation, but family is committed to sell, so come prepared to purchase and add a great vehicle to your collection.



RARE 1905 CADILLAC MODEL K

1 cyl. engine with tulip body, original top covering and bows with original upholstery, brass driving lights and rear stop light, originally sold locally. THIS CAR SELLS ABSOLUTE W/NO RESERVE.



1934 FORD 1 TON WRECKER

Original V-8 engine in great mechanical condition with the original Holmes crank hoist, a great parade or advertising vehicle. THIS VEHICLE SELLS ABSOLUTE W/NO RESERVE.



1956 FORD CROWN VICTORIA 2 DR

Beautiful red with white in color restored with newer interior. A real 50's collector car and fun car to show, lots of chrome. THIS VEHICLE SELLS ABSOLUTE W/NO RESERVE.

1960 FORD THUNDERBIRD 2 DR HT: This one is unrestored but the right model, you can restore it to your liking. THIS CAR SELLS ABSOLUTE W/NO RESERVE.

1979 LINCOLN VERSAILLES: Mr. Elson saw this car as a future collector item, original car with low 40,000 mileage. THIS CAR SELLS ABSOLUTE W/NO RESERVE.

STARTING AT 9:31 A.M. WITH CAR PARTS: Power steering unit for 1956 Ford, pair of matching chrome spotlights for '56 Ford bumper & guards, set of open wheeled fenders for early 1900's vintage car, 70's Ford A/C unit in box, Mustang A/C unit in box, 30's or 40's vintage Packard engine bare block, luggage racks, hubcaps, wire wheels, gaskets, manifolds, tires & wheels, T-Bird parts and some Mustang parts, various used interior parts and sheet metal parts, fender skirts, some nos. Ford parts, moldings, mirrors, headlight rims, crescent Carbite tank, old car heaters, sm. amt. of repair books, 2 old maps 1 w/Shell advertising, Ford antifreeze can, sm. amt. of Ford awards and a few pictures. Mr. Elson was a Ford dealer for many years and an avid car collector. Still finding parts in the barn at the farm. Also selling a few tools and office equip., incl. a Backyard Buddy auto lift, HVLP paint unit, battery charger, jump box, floor jack, jack stands, and office equip. desk, cabinets, incl. 1 fireproof, fax machine, etc.

AUCTIONEERS NOTE: "Red" Elson was a well liked Ford dealer and avid car collector for many years. This offering is a chance to add to your collection, items being sold to settle estate. Come early, running 2 rings part of the day, porta-johns and lunch stand on site. Call for free auction mailer. Note: Commercial real estate will be offered at 12:31.

TERMS: Cash or good check w/proper ID incl. valid drivers lic., out of state buyers on vehicle purchases must provide a bank letter of credit guaranteeing funds made to Bayman Auction Service for the John Elson Auction dated within 3 days of auction. All items sell absolute with no reserve except 1908 Stoddard Dayton being sold subject to owners confirmation of final bid price. Titles will be transferred and/or delivered within 10 business days if you are an out of state buyer.

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AUCTIONEERS: BOB BAYMAN 937-773-8809 JOE HARKER 937-773-5702 ANTHONY BAYMAN 937-778-8017 • 937-606-0536

Statements made auction day take precedence over all previous advertising and oral statements.
All items believed to be advertised correctly but are not guaranteed.



7 The results of the first run are shown on the Hunter's display screen. With its initial orientation, this particular tire yielded an RFV of 36 lbs. and an imbalance of 3.75 oz. (inner) and 2.50 oz. (outer). The Hunter recommended rotating the tire 90°, and predicted an improvement to 17 lbs. RFV. Mike reoriented the tire and ran it again. The RFV improved to 19 lbs. and imbalance decreased to 1.75 oz. (inner) and 2.0 oz. (outer). The other three tires would show even better results.

8 Chris prepares one of the J78 tires for reorientation on the rim, in accordance with the results of the Hunter testing. Two of the other tires required reorientation ranging from 120° to 180°. The fourth tire required no reorientation, and had only 9 lbs. RFV!

9 When we were finished, our four tire and wheel assemblies had RFV values of 9, 14, 16, and 19 lbs. This compares favorably against the initial values that were as high as 36 lbs. Mike and Chris recommend keeping RFV below 20 lbs. to avoid vibration complaints. Of course, the true test of the results would be how the ol' deuce would ride down the road. ■

SOURCES

WETMORE'S INC.
TIRE SERVICE

23459 WOODWARD AVE., FERNDALE, MI 48220-1343
(284) 544-2100

COKER TIRE
CHATTANOOGA, TN

(800) 251-6336 WWW.COKER.COM