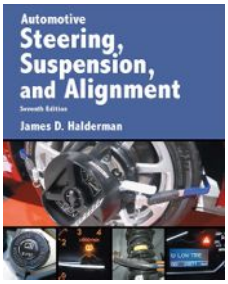
Automotive Steering, Suspension, and Alignment



CHAPTER 20

Vibration and Noise Diagnosis and Correction

FIGURE 20.1 Many vehicles, especially those equipped with four-cylinder engines, use a dampener weight attached to the exhaust system or differential, as shown, to dampen out certain frequency vibrations.

FIGURE 20.2 The exhaust was found to be rubbing on the frame rail during a visual inspection.

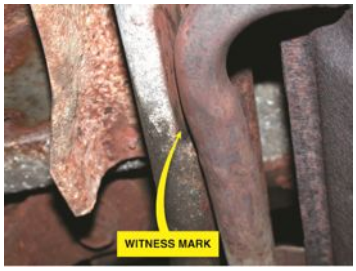


FIGURE 20.3 A chart showing the typical vehicle and engine speeds at which various components will create a noise or vibration and under what conditions.

FIGURE 20.4 Vibration created at one point is easily transferred to the passenger compartment. MacPherson strut suspensions are more sensitive to tire imbalance than SLA-type suspensions.

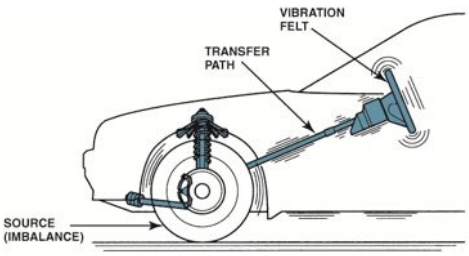


FIGURE 20.5 Hertz means *cycles* per *second*. If six cycles occur in one second, then the frequency is 6 Hz. The amplitude refers to the total movement of the vibrating component.

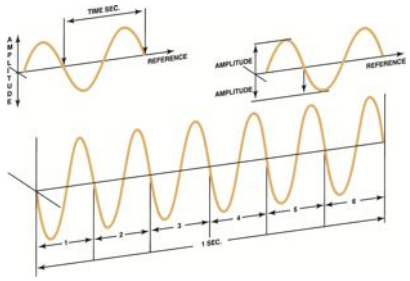


FIGURE 20.6 Every time the end of a clamped yardstick moves up and down, it is one cycle. The number of cycles divided by the time equals the frequency.

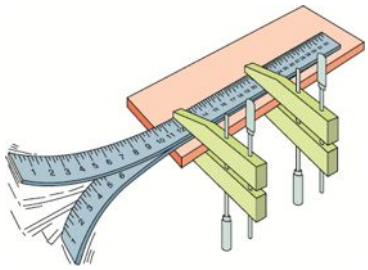


FIGURE 20.7 Determining the rolling circumference of a tire.

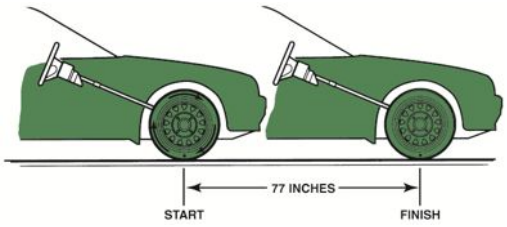


FIGURE 20.8 An electronic vibration analyzer.

FIGURE 20.9 Properly balancing all wheels and tires solves most low-frequency vibrations.

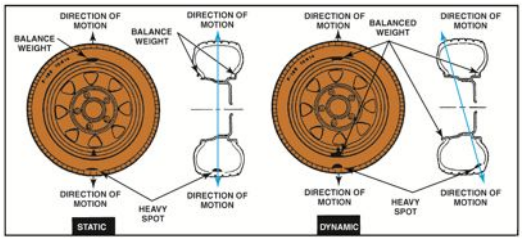


FIGURE 20.10 An out-of-balance tire showing scallops or bald spots around the tire. Even if correctly balanced, this cupped tire would create a vibration.

FIGURE 20.11 Another cause of a vibration that is often blamed on wheels or tires is a bent bearing hub. Use a dial indicator to check the flange for runout.

FIGURE 20.12 When checking the balance of a driveshaft, make reference marks around the shaft so that the location of the unbalance may be viewed when using a strobe light.

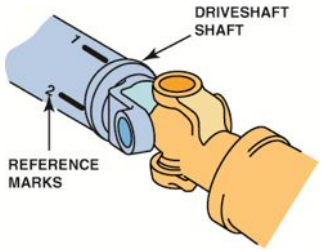


FIGURE 20.13 Using a strobe balancer to check for driveline vibration requires that an extension be used on the magnetic sensor.

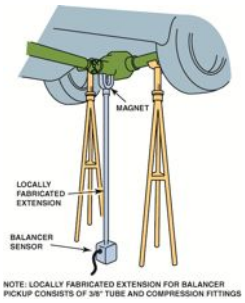


FIGURE 20.14 Typical procedure to balance a driveshaft using hose clamps.

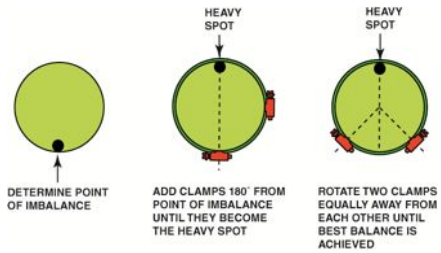


FIGURE 20.15 Two clamps were required to balance this front driveshaft of a four-wheel-drive vehicle.

FIGURE 20.16 Tire wear caused by improper alignment or driving habits, such as high-speed cornering, can create tire noise. Notice the feather-edged outer tread blocks.

FIGURE 20.17 This bearing was found on a vehicle that had been stored over the winter. This corroded bearing produced a lot of noise and had to be replaced.

FIGURE 20.18 Chassis ear microphones attached to various suspension components using the integral clamps.