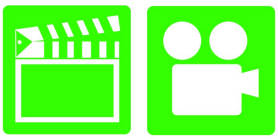
Manual Drive Train and Axles 1st Edition

Chapter 17 Vibration and Noise Diagnosis and Correction

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of **Manual Drive Trains and Axles.** It correlates material to task lists specified by ASE and NATEF.
Motivate Learners	Explain how the knowledge of how something works translates into the ability to use that knowledge to figure why the engine does not work correctly and how this saves diagnosis time, which translates into more money.
State the learning objectives for the chapter or course you are about to cover and explain this is what they should be able to do as a result of attending this session or class.	Explain the chapter learning objectives to the students. 1. Prepare for Suspension and Steering (A4) ASE certification test content area "C" (Related Suspension and Steering Service). 2. List the possible vehicle components that can cause a vibration or noise. 3. Explain the vibration speed ranges and the method to determine the frequency of the vibration. 4. Discuss the methods for measuring driveshaft U-Joint phasing and balancing the driveshaft. 5. Diagnose and correct noise problems.
Establish the Mood or Climate	Provide a *WELCOME,* Avoid put downs and bad jokes.
Complete Essentials	Restrooms, breaks, registration, tests, etc.
Clarify and Establish Knowledge Base	Do a round robin of the class by going around the room and having each student give their backgrounds, years of experience, family, hobbies, career goals, or anything they want to share.

ICONS	Ch17 Vibration & Noise Diagnosis Correction
	**1. SLIDE 1 VIBRATION & NOISE DIAGNOSIS CORRECTION** **2. SLIDES 2-3 EXPLAIN OBJECTIVES**
	**Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/** **WEB SITE IS CONSTANTLY UPDATED**
	**Drive Shaft (27 Links)**
	**4. SLIDE 4 EXPLAIN** Vehicle Components that Cause Vibration or Noise
	**DISCUSSION: HOST A DISCUSSION ON WHAT TO LOOK FOR DURING A ROAD TEST FOR A VIBRATION. WHICH SUSPENSIONS ARE MORE PRONE TO VIBRATIONS?**
	**5. SLIDE 5 EXPLAIN Figure 17–4** 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. **6. SLIDE 6 EXPLAIN** Vibration Speed Ranges and Frequency of the Vibration
	**7. SLIDE 7 EXPLAIN Figure 17–5** 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. **8. SLIDE 8 EXPLAIN Figure 17–6** 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. If the yardstick moves up and down 10 times (10 cycles) in two seconds, the frequency is 5 Hertz (10 ÷ 2 = 5).
	**Greater angle, greater change in velocity** **Causes torque losses** **Due to friction, heat, & vibration** **Results in wear** **Speed difference on outset of U-joint varies with speed** **Both U-joints operating at about same angle** **Prevent excessive drive line vibration.** **THE WORD CYCLE COMES FROM THE SAME ROOT**

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	AS THE WORD CIRCLE. A CIRCLE BEGINS AND ENDS AT THE SAME POINT, AS THUS, SO DOES A CYCLE. ALL VIBRATIONS CONSIST OF REPETITIVE CYCLES.
	**Clamp a yardstick to edge of a table, leaving about 50 cm (20 in) hanging over edge of table. Pull down on the edge of stick and release while observing the movement of stick. The motion of stick occurs in repetitive cycles. The cycle begins at midpoint, continues through the lowest extreme of travel, then back past midpoint, through upper extreme of travel, and back to midpoint where cycle begins again. The cycle occurs over and over again at same rate, or frequency. In this case, about 10 cycles in one minute. If we measure frequency to reflect the number of complete cycles that yardstick made in one minute, the measure would be 10 cycles x 60 seconds = 600 cycles per minute (cpm).**
	**9. SLIDE 9 EXPLAIN Figure 17–7** Determining the rolling circumference of a tire.
	**RWD Driveshaft Operation**
	**10. SLIDE 10 EXPLAIN Figure 17–8** An electronic vibration analyzer.
	**11. SLIDES 11-13 EXPLAIN** Measuring Driveshaft U-Joint Phasing and Balancing the Driveshaft
	**14. SLIDE 14 EXPLAIN Figure 17–12** 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. **15. SLIDE 15 EXPLAIN Figure 17–13** Using a strobe balancer to check for driveline vibration requires that an extension be used on the magnetic sensor. Tall safety stands are used to support the rear axle to keep the driveshaft angles the same as when vehicle is on road. **16. SLIDE 16 EXPLAIN Figure 17–14** Typical procedure to balance a driveshaft using hose clamps.

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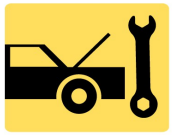
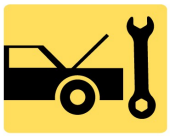
	17. **SLIDE 17 EXPLAIN Figure 17–15** Two clamps were required to balance this front driveshaft of a four-wheel-drive vehicle. Be careful when using hose clamps that the ends of the clamps do not interfere with the body or other parts of the vehicle
	**DEMONSTRATION: SHOW HOW TO BALANCE A DRIVESHAFT USING HOSE CLAMPS**
  QUESTION	**DISCUSSION: DISCUSS THE EFFECTS OF AN OUT-OF-BALANCE DRIVESHAFT. (EXAMPLES: DRIVER COMPLAINTS AND DAMAGE TO OTHER PARTS)**
 	**HANDS-ON NATEF TASK: HAVE THE STUDENTS' COMPLETE NATEF TASK SHEET: CHECK BALANCE AND PHASING; MEASURE DRIVE SHAFT ANGLES.**
	**HANDS-ON-TASK HAVE STUDENTS LOCATE SERVICE INFORMATION TO BALANCE DRIVESHAFT THEN BALANCE DRIVESAFT ON A LAB VEHICLE**
	18. **SLIDES 18-20 EXPLAIN** Diagnosing and Correcting Noise Problems
	21. **SLIDES 21-23 EXPLAIN** Summary