

Manual Drive Train and Axles 1st Edition

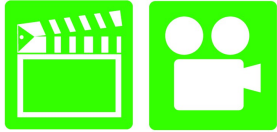
Chapter 9 Drive Shafts and CV Joints

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. <ol style="list-style-type: none">1. Describe driveshaft design and balance.2. Describe the function and operation of U-joints.3. Describe how CV joints work.4. Discuss the two types of CV joints.
Establish the Mood or Climate	Provide a <i>WELCOME</i> , 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

Ch09 Drive Shafts and CV Joints



1. SLIDE 1 DRIVE SHAFTS & CV JOINTS

2. SLIDE 2 EXPLAIN OBJECTIVES

Check for **ADDITIONAL VIDEOS & ANIMATIONS**
@ <http://www.jameshalderman.com/>
WEB SITE IS CONSTANTLY UPDATED

3. SLIDE 3 EXPLAIN Driveshaft Design and Balance

4. **SLIDE 4 EXPLAIN FIGURE 9-4** This driveshaft was found to be dented during a visual inspection and has to be replaced.

DRIVE SHAFT OPERATION

WWW.MYAUTOMOTIVELAB.COM

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYAUTOMOTIVELAB_2/ANIMATIONS/A8_ANIMATION/CHAPTER96_FIG_96_1/INDEX.HTM](http://media.pearsoncmg.com/ph/chet/chet_myautomotivelab_2/animations/a8_animation/chapter96_fig_96_1/index.htm)

RWD Driveshaft Operation

RWD Drivetrain

5. **SLIDE 5 EXPLAIN FIGURE 9-5** A center support bearing is used on many vehicles with long two-part driveshafts.





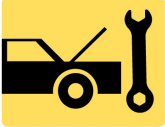

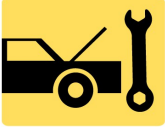


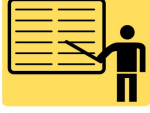
6. **SLIDE 6 EXPLAIN FIGURE 9-6** Some driveshafts use rubber between an inner and outer housing to absorb vibrations and shocks to the driveline.



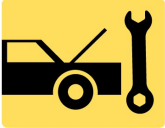




DISCUSSION: DISCUSS WHY SOME DRIVESHAFTS HAVE A CENTER SUPPORT BEARING.

DEMONSTRATION: SHOW CENTER SUPPORT BEARING FOR A TWO-PIECE DRIVESHAFT.

DISCUSSION: DISCUSS THE ADVANTAGES AND DISADVANTAGES OF ALUMINUM DRIVESHAFTS.

DEMONSTRATION: SHOW DRIVESHAFT MADE OF STEEL AND ANOTHER ONE MADE OF ALUMINUM. SHOW THEM PARTS OF DRIVESHAFT, INCLUDING TUBE, SLIP YOKE, END YOKE, & BALANCE WEIGHTS.

ICONS	Ch09 Drive Shafts and CV Joints
	<p>DISCUSSION: DISCUSS THE EFFECTS OF AN OUT-OF-BALANCE DRIVESHAFT. (EXAMPLES: DRIVER COMPLAINTS AND DAMAGE TO OTHER PARTS)</p>
	<p>7. SLIDE 7 EXPLAIN Function and Operation of U-Joints</p> <p>8. SLIDE 8 EXPLAIN FIGURE 9–9 joint angle is the difference between the angles of the joint.</p> <p>9. SLIDE 9 EXPLAIN FIGURE 9–10 angle of this rear Cardan U-joint is noticeable.</p>
	<p>DEMONSTRATION: SHOW UNIVERSAL JOINTS ON BOTH ENDS OF A DRIVESHAFT LET IT ROTATE EVEN THOUGH THE TWO ENDS OF THE SHAFT ARE OUT OF ALIGNMENT.</p>
	<p>DEMONSTRATION: SHOW UNIVERSAL JOINTS ON BOTH ENDS OF A DRIVESHAFT LET IT ROTATE EVEN THOUGH THE TWO ENDS OF THE SHAFT ARE OUT OF ALIGNMENT.</p>
 	<p>HANDS-ON-TASK & DISCUSSION: HAVE THE STUDENTS USE INTERNET TO RESEARCH LIFE OF GIROLAMO CARDANO. DISCUSS HIS LIFE AND HIS INVENTION OF THE CARDAN JOINT, A TYPE OF UNIVERSAL JOINT IN A SHAFT THAT ENABLES THE JOINT TO ROTATE WHEN OUT OF ALIGNMENT.</p>
	<p>SEARCH INTERNET: STUDENTS USE INTERNET TO RESEARCH HOW A TORQUE TUBE SYSTEM WORKS. ASK THEM TO WRITE A REPORT DESCRIBING HOW A TORQUE TUBE DIFFERS FROM HOTCHKISS SYSTEM</p>
	<p>16. SLIDE 16 EXPLAIN FIGURE 9–15 A tripod fixed joint. This type of joint is found on some Japanese vehicles. If the joint wears out, it is to be replaced with an entire drive axle shaft assembly</p>
	<p>CV Joint</p>
	<p>17. SLIDE 17 EXPLAIN FIGURE 9–16 The fixed outer joint is required to move in all directions because the wheels must turn for steering as well as move up and down during suspension movement. The inner joint has to be able to not only move up and down but also plunge in and out as the suspension moves up and down</p>

ICONS	Ch09 Drive Shafts and CV Joints
	<p>DISCUSSION: DISCUSS THE ADVANTAGE OF A CONSTANT VELOCITY JOINT</p>
	<p>DEMONSTRATION: SHOW OUTER CV JOINT. SHOW THEM THE MAIN COMPONENTS OF THE JOINT</p>
	<p>HANDS-ON-TASK HAVE THE STUDENTS IDENTIFY THE MAJOR COMPONENTS OF THE CV JOINT ASSEMBLY, USING A DIAGRAM SIMILAR TO FIGURE 64-13</p>
	<p>DEMONSTRATION: SHOW OUTER CV JOINT AND DEMONSTRATE HOW IT TRANSMITS TORQUE EQUALLY TO THE DRIVE WHEELS AT ANGLES UP TO 40 DEGREES.</p>
	<p>DEMONSTRATION: SHOW INNER CV JOINT. SHOW HOW THE INNER (PLUNGE) CV JOINT CAN MOVE IN AND OUT, UNLIKE THE OUTER (FIXED) CV JOINT.</p>
	<p>DISCUSSION: DISCUSS THE DIFFERENCE BETWEEN INNER AND OUTER CV JOINTS. WHAT IS THE MAJOR DIFFERENCE?</p>
	<p>18. SLIDES 18-19 EXPLAIN Summary</p>