
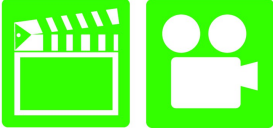










Manual Drive Train and Axles 1st Edition

Chapter 5 Clutch Diagnosis and Service

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. Prepare to take the ASE certification test A3 Manual Transmission and Axles in content area "A" (Clutch Diagnosis and Repair).2. Discuss clutch pedal free travel and clutch fluid level.3. Explain the diagnosis of common clutch problems and recommend the proper repair procedures.4. Explain how to remove and replace a clutch assembly.5. Discuss the inspection of used clutch components to determine if they are usable.
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	Ch05 Clutch Diagnosis and Service
	<p>1. SLIDE 1 CLUTCH DIAGNOSIS & SERVICE 2. SLIDES 2-3 EXPLAIN OBJECTIVES</p>
	<p>Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED</p>
	<p>4. SLIDES 4-5 EXPLAIN Clutch Pedal Free Travel</p>
	<p><u>DEMONSTRATION:</u> SHOW HOW AN IMPROPERLY ADJUSTED CLUTCH LINKAGE WILL CAUSE THE CLUTCH TO SLIP OR NOT DISENGAGE.</p>
	<p><u>DEMONSTRATION:</u> SHOW THE STUDENTS HOW SOUND IN THE CLUTCH AREA CHANGES WHEN THE CLUTCH IS RELEASED AND ENGAGED.</p>
	<p><u>DEMONSTRATION:</u> SHOW HOW TO PROPERLY CHECK CLUTCH-PEDAL FREE TRAVEL. USE A DIAL INDICATOR TO MEASURE FOR FREE TRAVEL</p>
	<p><u>DEMONSTRATION:</u> SHOW HOW TO MAKE THE PROPER ADJUSTMENT ON THE CLUTCH LINKAGE FOR SEVERAL TYPES OF SYSTEMS.</p>
	<p>EVEN A GOOD CLUTCH SYSTEM MAKES NOTICEABLE NOISE CHANGES DURING RELEASE AND ENGAGEMENT.</p>
	<p>THERE IS MORE TRANSMITTED FEEL IN A LEVER SYSTEM THAN IN A HYDRAULIC OR CABLE SYSTEM.</p>
	<p><u>HANDS-ON TASK:</u> HAVE THE STUDENTS GO THROUGH OEM RECOMMENDATIONS FOR ADJUSTING CLUTCH. HAVE THEM FOLLOW OEM SPECS FOR PEDAL'S FREE PLAY.</p>

ICONS

Ch05 Clutch Diagnosis and Service



6. SLIDE 6 EXPLAIN Clutch Fluid Level

7. SLIDE 7 EXPLAIN FIGURE 5-2 typical clutch master cylinder and reservoir mounted on the bulkhead on the driver's side of the vehicle.

DEMONSTRATION: SHOW SEVERAL CLUTCH MASTER CYLINDERS. & SEVERAL SLAVE CYLINDERS.

NATEF TASK CHECK AND ADJUST CLUTCH MASTER CYLINDER FLUID LEVEL

NATEF TASK CHECK FOR SYSTEM LEAKS.

8. SLIDES 8-11 EXPLAIN Clutch Problems and Repairs

NATEF TASK DIAGNOSE CLUTCH CONCERNS; DETERMINE NECESSARY ACTION

NATEF TASK INSPECT CLUTCH LINKAGE; PERFORM NECESSARY ACTION.

12. SLIDES 12-15 EXPLAIN Removing and Replacing Clutch Assembly











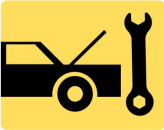
DEMONSTRATION: SHOW HOW TO MARK A DRIVE SHAFT'S RELATIONSHIP TO THE PINION FLANGE BEFORE REMOVING THE SHAFT.




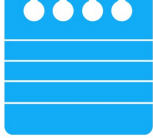



DISCUSSION: DISCUSS WHAT IT MEANS TO KEEP DRIVE SHAFT IN PHASE WHEN REMOVED

16. SLIDES 16-18 EXPLAIN Clutch Component Inspection

19. SLIDE 19 EXPLAIN FIGURE 5-8 thickness of clutch disc facing can be measured using a Vernier caliper.

20. SLIDE 20 EXPLAIN FIGURE 5-9 overall disc thickness can be measured using a Vernier caliper by

ICONS	Ch05 Clutch Diagnosis and Service
	<p>first compressing the marcel spring using pliers. BRAKE CLEANER USED FOR BRAKES WORKS VERY WELL TO CLEAN CLUTCH COMPONENTS.</p>
	<p>YOU CAN USE AN OLD TRANSMISSION INPUT SHAFT AS AN ALIGNMENT TOOL IF A SHAFT OF RIGHT TYPE IS AVAILABLE.</p>
	<p>DISCUSSION: DISCUSS REASON FOR DISCONNECTING BATTERY, BEFORE REPLACING THE CLUTCH.</p>
	<p>CLUTCH REPLACEMENT & BLEEDING WWW.MYAUTOMOTIVELAB.COM <small>HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=REPLACING%20CLUTCH%20COMPONENTS%207%20BLEEDING%20SYSTEM&CLIP=PANDC/CHET/2012/AUTOMOTIVE/MANUAL_TRANSMISSION/REPLACING_CLUTCH_COMPONENTS_BLEEDING.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/MANUAL_TRANSMISSION/XML/REPLACING_CLUTCH_COMPONENTS_BLEEDING.XML</small></p>
	<p>CLUTCH REPLACEMENT & BLEEDING WWW.MYAUTOMOTIVELAB.COM <small>HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=REPLACING%20CLUTCH%20COMPONENTS%207%20BLEEDING%20SYSTEM&CLIP=PANDC/CHET/2012/AUTOMOTIVE/MANUAL_TRANSMISSION/REPLACING_CLUTCH_COMPONENTS_BLEEDING.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/MANUAL_TRANSMISSION/XML/REPLACING_CLUTCH_COMPONENTS_BLEEDING.XML</small></p>
	<p>DEMONSTRATION: SHOW PROPER WAY TO LUBRICATE BUSHING, RELEASE BEARING, OUTPUT SHAFT SPLINES, AND RELEASE BEARING SUPPORT.</p>
	<p>SEARCH INTERNET: STUDENTS SEARCH WWW.YOUTUBE.COM FOR A VIDEO ON CLUTCH REPLACEMENT & HAVE THEM REPORT OUT AT NEXT CLASS ON WHAT WAS DIFFERENT IN PROCEDURE FROM WHAT THEY LEARNED IN CLASS.</p>
	<p>MINUTE TRANSMISSION JACK WWW.MYAUTOMOTIVELAB.COM <small>HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=TRANSMISSION%20JACK&CLIP=PANDC/CHET/2012/AUTOMOTIVE/AUTO_SHOP_SAFETY/CLIP30TRANSJACK1.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/AUTO_SHOP_SAFETY/XML/CLIP30TRANSJACK1.XML</small></p>
	<p>NATEF TASK INSPECT HYDRAULIC CLUTCH SLAVE AND MASTER CYLINDERS; DETERMINE NECESSARY ACTION</p>
 	

ICONS	Ch05 Clutch Diagnosis and Service
	<p><u>NATEF TASK</u> INSPECT, RELEASE, AND REPLACE (THROW OUT) BEARING, PRESSURE PLATE AND CLUTCH DISC; DETERMINE NECESSARY ACTION.</p>
	<p><u>NATEF TASK</u> BLEED CLUTCH HYDRAULIC SYSTEM.</p>
	<p><u>NATEF TASK</u> INSPECT FLYWHEEL; DETERMINE NECESSARY ACTION.</p>
	<p>CHECK PILOT BUSHING OR BEARING FOR CLEARANCE WITH INPUT SHAFT OF TRANSMISSION BEFORE & AFTER INSTALLING BUSHING. INSIDE DIAMETER OF A BUSHING CAN CHANGE SLIGHTLY AFTER INSTALLATION. INADEQUATE CLEARANCE MAY RESULT IN DAMAGE TO BUSHING OR INABILITY TO INSTALL SHAFT INTO BUSHING.</p>
	<p><u>NATEF TASK</u> INSPECT ENGINE BLOCK, BELL HOUSING, AND ALIGNMENT DOWELS; DETERMINE NECESSARY ACTION.</p>
	<p><u>NATEF TASK</u> MEASURE FLYWHEEL RUNOUT AND CRANKSHAFT ENDPLAY; DETERMINE NECESSARY ACTION.</p>
	<p>21. SLIDES 21-22 EXPLAIN Summary</p>