











Automotive Maintenance and Light Repair, 1ST Edition

Chapter 69 Automatic Transmission/Transaxle In-Vehicle Service

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers Automotive Maintenance and Light Repair . 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.	<p>Explain the chapter learning objectives to the students.</p> <ul style="list-style-type: none"> ⎵ Prepare for ASE Automatic Transmission/Transaxle (A2) certification test content area "A" (General Transmission/Transaxle Diagnosis), content area "B" (Transmission/Transaxle Maintenance and Adjustment), content area "C" (In-Vehicle Transmission/Transaxle Repair), and content area "D" (Off-Vehicle Transmission/Transaxle Repair). ⎵ Describe what to look for regarding the operation of an automatic transmission or transaxle during a test drive. ⎵ Explain how to test an automatic transmission/transaxle using a scan tool. ⎵ Discuss how to locate automatic transmission fluid leaks. ⎵ Explain how to perform a system pressure test. ⎵ Describe how to replace or flush automatic transmission fluid. ⎵ Describe how to perform on-vehicle transmission adjustments.
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.

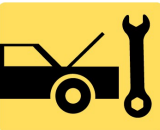
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     <p>QUESTION</p>     <p>QUESTION</p> 	<p>1. SLIDE 1 CH69 Automatic Transmission/Transaxle In-Vehicle Service</p> <p>2. SLIDES 2-4 EXPLAIN OBJECTIVES</p> <p>Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE REGULARLY UPDATED</p> <p>DISCUSSION: HAVE THE STUDENTS DISCUSS HOW IMPORTANT PROPER FLUID CONDITION AND LEVEL ARE FOR CORRECT TRANSMISSION OPERATION. CAN YOU DIAGNOSE TRANSMISSION CONDITION BASED ON FLUID CONDITION?</p> <p>5. SLIDES 5-8 EXPLAIN Transmission Problem Diagnosis</p> <p>9. SLIDE 9 EXPLAIN Figure 69-1 typical automatic transmission dipstick (fluid level indicator). Many use a clip to keep it from being forced upward due to pressure changes inside the automatic transmission. A firm seal also helps keep water from getting into the fluid, which can cause severe damage to the clutches and bands.</p> <p>10. SLIDE 10 EXPLAIN Figure 69-2 “Add” mark on most automatic transmission dipsticks indicates the level is down 0.5 quart (0.5 liter). Always follow the instructions stamped or printed on the dipstick.</p> <p>HANDS-ON TASK: FIGURE 69-2: HAVE STUDENTS CHECK FLUID LEVEL IN AN AUTOMATIC TRANSMISSION OR TRANSAXLE. HAVE THEM READ THE INFORMATION ON DIPSTICK & FOLLOW ANY DIRECTIONS STAMPED THERE. MAKE SURE THEY IDENTIFY CORRECT FLUID FOR TRANSMISSION.</p> <p>DISCUSSION: DISCUSS THINGS THAT CONTAMINATE FLUID. HOW COULD WATER OR COOLANT GET INTO THE TRANSMISSION? WHAT WOULD THIS DO TO AN AUTOMATIC TRANSMISSION?</p> <p>HANDS-ON TASK: USING THE CORRECT SERVICE INFORMATION OR OWNER’S MANUAL, HAVE STUDENTS FIND THE PROPER PROCEDURE FOR CHECKING FLUID LEVEL IN A SPECIFIC VEHICLE. IS THERE A DIPSTICK?</p>

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QUESTION



QUESTION



11. SLIDES 11-31 EXPLAIN Transmission Problem Diagnosis

DIAGNOSING ELECTRONIC TRANS **WWW.MYAUTOMOTIVELAB.COM**

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=DIAGNOSING%20ELECTRONIC%20TRANSMISSIONS&CLIP=PANDC/CHET/2012/AUTOMOTIVE/AUTO_TRANSMISSION/A2T4.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/AUTO_TRANSMISSION/XML/A2T4.XML](http://media.pearsoncmg.com/ph/chet/chet_myLABS/akamai/template/video640x480.php?title=diagnosing%20electronic%20transmissions&clip=pandc/chet/2012/automotive/auto_transmission/a2t4.mov&caption=chet/myLABS/akamai/2012/automotive/auto_transmission/xml/a2t4.xml)

DISCUSSION: DISCUSS IMPORTANCE OF TAKING A TEST DRIVE AND ASKING THE VEHICLE OWNER A LOT OF QUESTIONS TO HELP WITH THE DIAGNOSTIC PROCEDURE. AFTER CHECKING FLUID LEVEL AND CONDITION, WHAT ARE THE DIAGNOSTIC STEPS TO TAKE?

DEMONSTRATION: DEMONSTRATE HOW A SCAN TOOL CAN BE USED TO COMMAND SHIFTS IN AN ELECTRONICALLY CONTROLLED TRANSMISSION.

HANDS-ON TASK: HOOK UP A SCAN TOOL TO A 1996, OR NEWER, VEHICLE AND SCAN FOR ENGINE/TRANSMISSION DTCS. NOTE ANY CODES PRESENT. TALK ABOUT DTCS. JUST BECAUSE A CODE IS SET DOES NOT MEAN THAT COMPONENT IS BAD. CORRECT DIAGNOSIS AFTER A CODE IS SET IS IMPORTANT.










DISCUSSION: AFTER DEMONSTRATING HOW TO COMMAND TRANSMISSION TO SHIFT WITH A SCAN TOOL, HAVE STUDENTS DISCUSS RESULTS OF TEST. DID TRANSMISSION SHIFT AS EXPECTED? IF NOT, WHAT SYSTEM OF THE TRANSMISSION IS NOT WORKING CORRECTLY?

32. SLIDE 32 EXPLAIN Figure 69-3 This 4-cylinder General Motors vehicle has a stall speed of about 2350 RPM. Notice that the gear selector is in drive and the speedometer is reading zero.

33. SLIDES 33-35 EXPLAIN Transmission Diagnosis

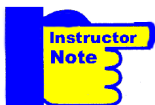
36. SLIDES 36-40 EXPLAIN Fluid Leak Diagnosis

41. SLIDE 41 EXPLAIN Figure 69-4 Sometimes location of a transmission fluid leak is easy to see, but with others it can be difficult to find the exact location. Look closely

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	<p>at places where O-rings or gaskets are used, as these are the most common areas where fluid leaks occur.</p> <p>42. SLIDES 42-46 EXPLAIN Fluid Leak Diagnosis</p> <p>47. SLIDE 47 EXPLAIN Figure 69-10 A black light being used to locate the source of an automatic transmission fluid leak.</p>
	<p>HANDS-ON TASK: RAISE VEHICLE ON A LIFT USING ALL SAFETY PROCEDURES. HAVE THE STUDENTS INSPECT THE AUTOMATIC TRANSMISSION OR TRANSAXLE FOR ANY FLUID LEAKS. HAVE THEM REPORT THEIR FINDINGS, ALONG WITH RECOMMENDED SERVICE.</p>
	<p>DEMONSTRATION: SHOW HOW TO ADD DYE TO TRANSMISSION AND USE A BLACK LIGHT TO DIAGNOSE SOURCE OF A FLUID LEAK. WARN STUDENTS THAT ENGINE COOLANT WILL OFTEN GLOW LIKE DYE, WHICH COULD RESULT IN MISDIAGNOSIS. FIGURE 69-10</p>
	<p>48. SLIDES 48-55 EXPLAIN Fluid Leak Diagnosis</p>
 	<p>NATEF MLR TASK A1B2 INSPECT FOR LEAKAGE AT EXTERNAL SEALS, GASKETS, AND BUSHINGS.</p>
	<p>56. SLIDES 56-61 EXPLAIN In-Vehicle Service</p> <p>62. SLIDE 62 EXPLAIN Figure 69-6 Draining the fluid from an automatic transaxle by allowing the fluid to flow into a container after most of the retaining bolts have been removed.</p> <p>63. SLIDE 63 EXPLAIN Figure 69-7 This is a normal amount of wear material in the bottom of an automatic transmission pan.</p>
  <p>QUESTION</p>	<p>DISCUSSION: DISCUSS NEED TO WATCH FOR FALLING PARTS WHEN REPLACING A TRANSMISSION FILTER. SOME MODELS USE CHECK VALVE THAT WILL FALL WHEN THE FILTER IS REMOVED. WHAT COULD HAPPEN IF THIS CHECK VALVE IS NOT INSTALLED CORRECTLY?</p>

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DISCUSSION: DISCUSS IMPORTANCE OF CORRECTLY INSTALLING FILTER IN AN AUTOMATIC TRANSMISSION. WHAT WILL HAPPEN IF FILTER SUCKS AIR?

64. SLIDE 64 EXPLAIN In-Vehicle Service

65. SLIDE 65 EXPLAIN Figure 69-8 Always check that the filter is secured by a clip or other fastener to keep it from dropping out of location.

66. SLIDES 66-70 EXPLAIN In-Vehicle Service

67. SLIDE 67 EXPLAIN Figure 69-9 fluid exchange machine uses the engine and the transmission pump to force the fluid into the machine where the old fluid is used to push against a diaphragm, which then forces new fluid back through the transmission. A sight glass is used to show the technician the fluid, so the process can be stopped when only clean, new fluid is seen flowing through the cooler line.

IF A FLUSH MACHINE IS NOT AVAILABLE, A LONG HOSE CAN BE ATTACHED TO THE COOLER OUTLET TO A BUCKET. THE ENGINE IS STARTED, AND NEW FLUID IS DUMPED IN UNTIL CLEAN FLUID COMES OUT OF THE HOSE. FIGURE 69-9

68. SLIDE 68 EXPLAIN Figure 69-10 In this case, the cork-rubber gasket is glued to the pan and is ready to be installed. Retaining bolts need to be tightened in sequence, but be aware that overtightening will cause a leak. Also, some OEMS recommend using only RTV sealer, but never use an RTV sealer & gasket together

HANDS-ON TASK: HAVE THE STUDENTS IDENTIFY THE TRANSMISSION OR TRANSAXLE IN A SPECIFIC VEHICLE. USING A SERVICE MANUAL OR AN OIL-PAN SHAPE CHART MAY BE HELPFUL FOR THEIR IDENTIFICATION PROCESS.

NATEF MLR TASK A1B4 DRAIN AND REPLACE FLUID AND FILTER(S).

69. SLIDES 69-77 EXPLAIN In-Vehicle Service

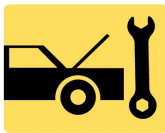
78. SLIDE 78 EXPLAIN Figure 69-11 Adjusting the intermediate band on a Ford A4LD transmission

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79. SLIDES 79-80 EXPLAIN In-Vehicle Service

DISCUSSION: DISCUSS WHAT CONTROLS TRANSMISSION SHIFTING ON BOTH HYDRAULIC AND ELECTRICAL AUTOMATIC TRANSMISSIONS AND TRANSAXLES. WHAT SHOULD ALL DIAGNOSTIC TESTS START WITH?

DEMONSTRATION: SHOW THE STUDENTS HOW TO CUT OPEN A FILTER THAT HAS BEEN REMOVED FROM AN AUTOMATIC TRANSMISSION/TRANSAXLE. OFTEN, BROKEN INTERNAL PARTS WILL GET CAUGHT IN THE FILTER AND YOU MAY NOT SEE THEM IN THE OF THE PAN.

HANDS-ON TASK: HAVE STUDENTS REMOVE OIL PAN FROM AN AUTOMATIC TRANSMISSION AND CHANGE FILTER. REMIND THE STUDENTS THAT THE OLD OIL CAN BE VERY HOT AND CAUSE BURNS. MAKE SURE STUDENTS HAVE THE CORRECT TYPE AND AMOUNT OF ATF BEFORE THEY BEGIN.

NATEF MLR TASK A1B1 INSPECT, ADJUST, AND REPLACE EXTERNAL MANUAL VALVE SHIFT LINKAGE, TRANSMISSION RANGE SENSOR/SWITCH, AND PARK/NEUTRAL POSITION SWITCH.

NATEF MLR TASK A1B3 INSPECT POWER TRAIN MOUNTS.