

Automotive Chassis Systems 7th Edition












Chapter 10 Drum Brakes

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of Automotive Chassis Systems . 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. Discuss the advantages and disadvantages of drum brakes.2. Identify drum brake component parts.3. Explain the function and types of drum brake shoes.4. Describe the operation of non-servo brakes.5. Explain the operation of dual-servo brakes.6. Discuss automatic brake adjusters. <p>This chapter will help you prepare for the Brakes (A5) ASE certification test content area "B" (Drum Brakes Service).</p>
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.

NOTE: This lesson plan is based on Automotive Chassis Systems 7th Edition Chapter Images found on Jim's web site @ www.jameshalderman.com

LINK CHP 10: [Chapter Images](#)

ICONS	Ch10 Drum Brakes
           <p data-bbox="350 1446 456 1472">QUESTION</p>	<p data-bbox="602 302 1052 333">1. SLIDE 1 DRUM BRAKES</p> <p data-bbox="602 436 1401 552">Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED</p> <p data-bbox="602 583 740 615"><u>Videos</u></p> <p data-bbox="561 709 1463 856">At the beginning of this class, you can download the crossword puzzle & Word Search from the links below to familiarize your class with the terms in this chapter & then discuss them</p> <p data-bbox="602 877 1336 909"><u>Word Search Puzzle(Microsoft Word) (PDF)</u></p> <p data-bbox="602 930 1346 961"><u>Word Search Puzzle (Microsoft Word) (PDF)</u></p> <p data-bbox="602 1003 1438 1108">2. SLIDE 2 EXPLAIN Figure 10-1 Typical brake system components showing disc brakes on the front and drum brakes on the rear.</p> <p data-bbox="602 1129 1390 1192">3. SLIDE 3 EXPLAIN Figure 10-2 An exploded view of a typical drum brake assembly.</p> <p data-bbox="561 1203 1308 1276"><u>DEMONSTRATION: SHOW DRUM BRAKE COMPONENTS & OPERATION</u></p> <p data-bbox="561 1346 1468 1761"><u>DISCUSSION: DISCUSS ADVANTAGES OF DISC BRAKES AND THEIR PRIMARY USE TODAY. INVITE STUDENTS TO EXPLAIN HOW SELF-ENERGIZING ACTION ENABLES DRUM BRAKES TO APPLY MORE STOPPING POWER FOR THE SAME AMOUNT OF FORCE AS DISC BRAKES. ALSO ASK STUDENTS TO DISCUSS THE SERVO ACTION OF SOME DRUM BRAKE SYSTEMS THAT ALLOWS ONE BRAKE SHOE TO HELP APPLY OTHER TO AUGMENT STOPPING POWER. ASK STUDENTS TO DISCUSS HOW DRUM BRAKES ARE ALSO USED AS PARKING BRAKES</u></p>

ICONS



Ch10 Drum Brakes

ON-VEHICLE NATEF TASK: RESEARCH APPLICABLE DRUM BRAKE VEHICLE AND SERVICE INFORMATION, SUCH AS BRAKE SYSTEM OPERATION, VEHICLE SERVICE HISTORY, SERVICE PRECAUTIONS AND TSB

4. **SLIDE 4 EXPLAIN** Figure 10-3 backing plate is the foundation of every drum brake. There are normally six pads where the brake shoes contact the backing plate.
5. **SLIDE 5 EXPLAIN** Figure 10-4 labyrinth seal is created between lip of backing plate and groove in brake drum.
6. **SLIDE 6 EXPLAIN** Figure 10-5 keystone anchor allows the brake shoes to self-center in the drum
7. **SLIDE 7 EXPLAIN** Figure 10-6 Piston stops prevent the wheel cylinder from coming apart.

Wheel Cylinder Operation (View) (Download)

8. **SLIDE 8 EXPLAIN** Figure 10-7 Cross-section of a wheel cylinder that shows all of its internal parts. The brake line attaches to fluid inlet. Cup extender prevents cup seal lip from collapsing when brakes are released.
9. **SLIDE 9 EXPLAIN** Figure 10-8 pushrods are held in place by the rubber dust boots. As the wheel cylinder pistons move outward, the pushrods transfer the movement to the brake shoes.

DEMONSTRATION: SHOW STUDENTS A DISASSEMBLED DRUM BRAKE AND DESCRIBE ITS COMPONENT PARTS

10. **SLIDE 10 EXPLAIN** Figure 10-9 Steel brake shoes are made from two stampings welded together, web and the lining table.
11. **SLIDE 11 EXPLAIN** Figure 10-10 Tapered ends on the linings help to reduce brake noise
12. **SLIDE 12 EXPLAIN** Figure 10-11 Typical drum brake shoe & names of the parts
13. **SLIDE 13 EXPLAIN** Figure 10-12 primary (forward facing) brake shoe often has a shorter lining than secondary shoe (rearward facing). The color of primary and secondary lining can also be different due to differences in friction and wear requirements
14. **SLIDE 14 EXPLAIN** Figure 10-13 Primary shoe lining may vary depending on the application

ICONS

Ch10 Drum Brakes



15. **SLIDE 15 EXPLAIN Figure 10-14** Riveted brake linings are quiet and reliable at high temperatures.
16. **SLIDE 16 EXPLAIN Figure 10-15** Many brake linings are bonded.
17. **SLIDE 17 EXPLAIN Figure 10-16** typical drum brake assembly showing the support plate (backing plate), brake shoes, and springs.
18. **SLIDE 18 EXPLAIN Figure 10-17** A single spring-steel spring is used on some drum brakes.
19. **SLIDE 19 EXPLAIN Figure 10-18** Various types and styles of hold-down springs. The hold down pins are commonly called nails
20. **SLIDE 20 EXPLAIN Figure 10-19** mechanical brake linkage is part of most drum brake assemblies.
21. **SLIDE 21 EXPLAIN Figure 10-20** aluminum brake drum with a cast iron friction surface. The cooling fins around the outside help dissipate the heat from the friction surface to the outside air.
22. **SLIDE 22 EXPLAIN Figure 10-21** Self-energizing action can increase or decrease the stopping power of a brake shoe.
23. **SLIDE 23 EXPLAIN FIGURE 10.22** A double-trailing non-servo drum brake.
24. **SLIDE 24 EXPLAIN Figure 10-23** A leading-trailing non-servo brake.

DEMONSTRATION: SHOW STUDENTS DRUM BRAKE SHOE ANCHORS, AND DISCUSS HOW THEY PREVENT THE BRAKES SHOES FROM ROTATING WITHIN THE DRUM WHEN THE BRAKES ARE APPLIED.

DEMONSTRATE OR DESCRIBE THE TYPES OF ANCHORS USED IN DRUM BRAKES. SHOW STUDENTS HOW PISTON STOPS PREVENT THE WHEEL CYLINDER FROM COMING APART. POINT OUT WHY YOU MUST REMOVE THE WHEEL CYLINDER FROM BACKING PLATE TO SERVICE CYLINDER WHEN PISTON STOPS ARE USED

DEMONSTRATION: SHOW SHOE SUPPORT PADS ON THE BACKING PLATE THAT HELP MAINTAIN ALIGNMENT OF THE LININGS WITHIN THE BRAKE DRUM. SHOW STUDENTS THE WHEEL CYLINDERS, AND DEMONSTRATE HOW THEY WORK TO FORCE THE BRAKE SHOES OUTWARD AGAINST THE BRAKE DRUM

ICONS

Ch10 Drum Brakes



25. **SLIDE 25 EXPLAIN** Figure 10-24 A typical dual-servo drum brake.
26. **SLIDE 26 EXPLAIN** Figure 10-25 A typical dual-servo brake adjusting link assembly commonly called a starwheel adjuster.
27. **SLIDE 27 EXPLAIN** Figure 10-26 Dual-servo brake operation. The primary shoe on the left exerts a force on the secondary shoe on the right.

[Drum Brake Operation \(View\)](#) ([Download](#))

28. **SLIDE 28 EXPLAIN** Figure 10-27 Dual servo action greatly increases application force on secondary shoe.

DEMONSTRATION: SHOW STUDENTS A DUAL-SERVO DRUM BRAKE SYSTEM AND POINT OUT PHYSICAL DIFFERENCES BETWEEN PRIMARY AND SECONDARY SHOES. WHY DOES SECONDARY SHOE HAVE LONGER LINING WITH A GREATER FRICTION COEFFICIENT? ASK STUDENTS TO DISCUSS THE FUNCTION OF THE PRIMARY AND SECONDARY SHOES IN A DUAL-SERVO BRAKE SYSTEM, HOW THEY OPERATE, AND WHY THEY ARE CONSTRUCTED DIFFERENTLY

DISCUSSION: ASK STUDENTS TO TALK ABOUT HOW DUAL-SERVO DRUM BRAKES WORK. HOW DOES PRIMARY SHOE CREATE A SERVO ACTION THAT FORCES SECONDARY SHOE AGAINST DRUM? WHAT ARE ADVANTAGES & DISADVANTAGES OF THIS TYPE OF DRUM BRAKE DESIGN, AND WHY IS IT THE MOST POPULAR?

DISCUSSION: ASK STUDENTS TO DISCUSS SELF-ENERGIZING ACTION OF NON-SERVO DRUM BRAKE SYSTEM. HOW DO LEADING & TRAILING SHOES WORK WHEN BRAKING FORWARD VEHICLE MOTION? HOW DO THEY WORK WHEN VEHICLE IS BACKING UP? ASK STUDENTS TO TALK ABOUT DOUBLE-TRAILING DRUM BRAKES AND WHERE THEY ARE USED. WHY IS DOUBLE-TRAILING BRAKE POOR PARKING BRAKE CANDIDATE

ICONS

Ch10 Drum Brakes



FOR FORWARD DIRECTION?

DISCUSSION: ASK STUDENTS TO DISCUSS NON-SERVO LEADING-TRAILING BRAKES. WHAT ARE THE ADVANTAGES OF THIS DESIGN AND WHERE IS IT COMMONLY USED?

29. **SLIDE 29 EXPLAIN** Figure 10-28 A cable-actuated starwheel adjuster. This type of adjuster makes the adjustment when the vehicle is being driven in reverse and the brakes are released.
30. **SLIDE 30 EXPLAIN** Figure 10-29 A lever-actuated starwheel automatic adjuster. This type of adjuster makes the adjustment when the vehicle is being driven in reverse and the brakes are applied.
31. **SLIDE 31 EXPLAIN** Figure 10-30 A link-actuated starwheel adjuster. This type of adjuster makes the adjustment when the brakes are released.
32. **SLIDE 32 EXPLAIN** Figure 10-31 The operation of a typical self-adjuster. Notice that the adjuster actually moves the starwheel.
33. **SLIDE 33 EXPLAIN** Figure 10-32 cable-actuated starwheel adjuster with an overtravel spring
34. **SLIDE 34 EXPLAIN** Figure 10-33 A non-servo brake with a lever-actuated starwheel automatic adjuster on a leading shoe. This type of adjuster makes an adjustment as the brakes are applied.
35. **SLIDE 35 EXPLAIN** Figure 10-34 non-servo brake with a lever-actuated starwheel automatic adjuster on the trailing shoe. This type of adjuster makes adjustment as the brakes are released.
36. **SLIDE 36 EXPLAIN** Figure 10-35 A lever-latch ratchet automatic adjuster.
37. **SLIDE 37 EXPLAIN** Figure 10-36 A strut-quadrant ratchet automatic adjuster.

DEMONSTRATION: SHOW STUDENTS EXAMPLES OF SERVO-BRAKE STAR-WHEELS ADJUSTERS AND DISCUSS HOW EACH WORKS.

DISCUSSION: ASK STUDENTS TO DISCUSS HOW SERVO-BRAKE STAR-WHEEL ADJUSTERS USE THE BRAKING MOTION ITSELF TO ADJUST THE BRAKES. ASK STUDENTS TO TALK ABOUT HOW STAR-WHEEL ADJUSTERS WORK ON NON-SERVO SYSTEMS.

