








A5 BRAKES 6th Edition

Chapter 10 Drum Brakes

Opening Your Class

| KEY ELEMENT | EXAMPLES |
|---|--|
| Introduce Content | This course or class covers operation and service of Automotive Brakes . 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. |
| 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 | Ch10 Drum Brakes |
|--|--|
|        | <p>1. SLIDE 1 DRUM BRAKES</p> <p>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. SLIDE 4 EXPLAIN Figure 10-1 Typical brake system components showing disc brakes on the front and drum brakes on the rear.</p> <p>5. SLIDE 5 EXPLAIN Figure 10-2 An exploded view of a typical drum brake assembly.</p> <p><u>DEMONSTRATION: SHOW DRUM BRAKE COMPONENTS & OPERATION</u></p> <p><u>DISCUSSION: ASK STUDENTS TO TALK ABOUT 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> <p><u>ON-VEHICLE NATEF TASK: RESEARCH APPLICABLE DRUM BRAKE VEHICLE AND SERVICE INFORMATION, SUCH AS BRAKE SYSTEM OPERATION, VEHICLE SERVICE HISTORY, SERVICE PRECAUTIONS AND TSB</u></p> <p>6. SLIDE 6 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.</p> <p>7. SLIDE 7 EXPLAIN Figure 10-4 labyrinth seal is created between lip of backing plate and groove in brake drum.</p> <p>8. SLIDE 8 EXPLAIN Figure 10-5 keystone anchor allows the brake shoes to self-center in the drum</p> |

ICONS

Ch10 Drum Brakes







DEMO



9. **SLIDE 9 EXPLAIN Figure 10-6** Piston stops prevent the wheel cylinder from coming apart.
10. **SLIDES 10-11 EXPLAIN** Drum Brake Parts
12. **SLIDE 12 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.
13. **SLIDE 13 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

14. **SLIDE 14 EXPLAIN Figure 10-9** Steel brake shoes are made from two stampings welded together—the web and the lining table.
15. **SLIDE 15 EXPLAIN Figure 10-10** Tapered ends on the linings help to reduce brake noise & **Figure 10-11** Typical drum brake shoe & names of the parts.
16. **SLIDE 16 EXPLAIN Drum Brake Shoes**
17. **SLIDE 17 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 & **Figure 10-13** Primary shoe lining may vary depending on the application
18. **SLIDE 18 EXPLAIN Figure 10-14** Riveted brake linings are quiet and reliable at high temperatures.
19. **SLIDE 19 EXPLAIN Figure 10-15** Many brake linings are bonded.
20. **SLIDES 20-21 EXPLAIN EDGE CODES**
22. **SLIDE 22 EXPLAIN Figure 10-16** Typical drum brake lining edge codes, showing the coefficient of friction codes for cold and hot circled.

| ICONS | Ch10 Drum Brakes |
|---|---|
|  | <p>23. SLIDE 23 EXPLAIN Figure 10-17 A typical drum brake assembly showing the support plate (backing plate), brake shoes, and springs.</p> <p>24. SLIDE 24 EXPLAIN Figure 10-18 A single spring-steel spring is used on some drum brakes.</p> <p>25. SLIDES 25-26 EXPLAIN Drum Brake Parts</p> <p>27. SLIDE 27 EXPLAIN Figure 10-19 Various types and styles of hold-down springs. The hold down pins are commonly called nails</p> <p>28. SLIDE 28 EXPLAIN Figure 10-20 mechanical brake linkage is part of most drum brake assemblies.</p> <p>29. SLIDE 29 EXPLAIN Figure 10-21 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.</p> |
|  | <p>30. SLIDES 30-31 EXPLAIN Non-Servo Brake Design</p> <p>32. SLIDE 32 EXPLAIN Figure 10-22 Self-energizing action can increase or decrease the stopping power of a brake shoe.</p> <p>33. SLIDE 33 EXPLAIN Figure 10-23 A leading-trailing non-servo brake.</p> |
|  | <p><u>DEMONSTRATION:</u> 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</p> |
|  | <p><u>DEMONSTRATION:</u> SHOW STUDENTS THE 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</p> |

| ICONS | Ch10 Drum Brakes |
|-------|------------------|
|-------|------------------|



DEMO



34. **SLIDE 34 EXPLAIN** Figure 10-24 A typical dual-servo drum brake.
35. **SLIDE 35 EXPLAIN** Figure 10-25 A typical dual-servo brake adjusting link assembly commonly called a starwheel adjuster.
36. **SLIDE 36 EXPLAIN** Figure 10-26 Dual-servo brake operation. The primary shoe on the left exerts a force on the secondary shoe on the right.
37. **SLIDE 37 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 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?





VIDEO: DRUM BRAKE ADJUSTERS

[WWW.MYAUTOMOTIVELAB.COM](http://www.myautomotivelab.com)

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=DRUM%20BRAKE%20ADJUSTERS&CLIP=PANDC/CHET/2012/AUTOMOTIVE/A5-B8.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/XML/A5-B8.ADB.XML](http://media.pearsoncmg.com/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=DRUM%20BRAKE%20ADJUSTERS&CLIP=PANDC/CHET/2012/AUTOMOTIVE/A5-B8.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/XML/A5-B8.ADB.XML)

- 38. **SLIDES 38-39 EXPLAIN** Automatic Brake Adjusters
- 40. **SLIDE 40 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.
- 41. **SLIDE 41 EXPLAIN** Automatic Brake Adjusters
- 42. **SLIDE 42 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.
- 43. **SLIDE 43 EXPLAIN Figure 10-30** A link-actuated starwheel adjuster. This type of adjuster makes the adjustment when the brakes are released.
- 44. **SLIDE 44 EXPLAIN Figure 10-31** The operation of a typical self-adjuster. Notice that the adjuster actually moves the starwheel.
- 45. **SLIDE 45 EXPLAIN Figure 10-32** cable-actuated starwheel adjuster with an overtravel spring
- 46. **SLIDE 46 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.
- 47. **SLIDE 47 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.
- 48. **SLIDE 50 EXPLAIN** Automatic Brake Adjusters
- 51. **SLIDE 51 EXPLAIN Figure 10-35** A lever-latch ratchet automatic adjuster.
- 52. **SLIDE 52 EXPLAIN Figure 10-36** A strut-quadrant ratchet automatic adjuster.
- 53. **SLIDES 53-58 EXPLAIN SUMMARY**

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

| ICONS | Ch10 Drum Brakes |
|---|---|
|   | <p>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.</p> <p>161. SLIDES 161-170 EXPLAIN Automatic Brake Adjusters</p> |