

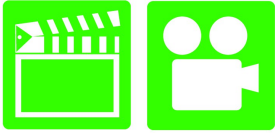
Automotive Maintenance and Light Repair, 1ST Edition

Chapter 49 REAR SUSPENSION & 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.	Explain the chapter learning objectives to the students. <ul style="list-style-type: none">— Prepare for ASE Suspension and Steering (A4) certification test content area “B” (Suspension System Diagnosis and Repair).— Describe the various types and styles of rear suspension— Explain the differences among the different types of rear axles.— List the steps necessary to replace rear shock absorbers.— Explain how to replace rear leaf and coil springs.
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



Ch49 REAR SUSPENSION & SERVICE

1. SLIDE 1 CH49 REAR SUSPENSION & SERVICE

2. SLIDES 2-3 EXPLAIN OBJECTIVES

Check for **ADDITIONAL VIDEOS & ANIMATIONS**
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Suspension System (55 Links)

4. SLIDES 4-5 EXPLAIN Solid Rear Axles

6. SLIDE 6 EXPLAIN Figure 49-1 Solid axles are used on rear-wheel-drive vehicles as well as front-wheel-drive vehicles.

7. SLIDES 7-8 EXPLAIN Solid Rear Axles

9. SLIDE 9 EXPLAIN Figure 49-2 solid axle supports the springs, so the axle and suspension components are unsprung weight. When one wheel rides over a bump, the force of impact transfers through the solid axle to the opposite side, leading to unstable handling

10. SLIDE 10 EXPLAIN Figure 49-3 When the axle housing reacts against the force of axle shaft rotation, the front of the differential tilts upward, creating axle windup.

DISCUSSION: DISCUSS WHAT HOTCHKISS DRIVES ARE AND WHY THEY ARE CALLED HOTCHKISS DRIVES

11. SLIDES 11-12 EXPLAIN REAR LEAF SUSPENSIONS

13. SLIDE 13 EXPLAIN Figure 49-4 typical rear-wheel-drive pickup truck rear suspension equipped with leaf springs. This type of arrangement is called a Hotchkiss drive and the drive train forces are controlled by the rear suspension components.

14. SLIDE 14 EXPLAIN Figure 49-5 An exploded view of a beam axle with multi-leaf springs

ICONS

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DEMO



QUESTION



QUESTION



QUESTION

DEMONSTRATION: SHOW EXAMPLES OF LEAF SPRINGS

DISCUSSION: ASK THE STUDENTS TO DISCUSS WHY SOME REAR SUSPENSIONS USE ONE SET OF TRAILING ARMS WHILE OTHER REAR SUSPENSIONS USE TWO SETS.

NATEF MLR TASK A4B20: INSPECT REAR SUSPENSION SYSTEM LEAF SPRING(S), BUSHINGS, CENTER PINS/BOLTS, AND MOUNTS

15. SLIDE 15 EXPLAIN Figure 49-6 A trailing arm rear suspension with a solid axle used on a front-wheel-drive vehicle.

16. SLIDE 16 EXPLAIN Figure 49-7 Camaro and Firebird rear suspension systems use a torque arm to control axle windup. If rubber torque arm bushings (cushions) are worn, a loud “bang” could be heard and felt when accelerating suddenly.

BROKEN PANHARD ROD WILL CAUSE TIRES TO HIT WHEEL HOUSE WHEN CORNERING: FIGURE 49-7

DISCUSSION: ASK THE STUDENTS TO DISCUSS HOW THE LENGTH OF A PANHARD ROD WILL AFFECT REAR AXLE MOVEMENT: FIGURE 49-7

17. SLIDE 17 EXPLAIN Figure 49-8 A typical beam axle rear suspension, which uses trailing arms and coil springs along with a track rod, also called a Panhard rod, to control side-to-side axle movement.

18. SLIDES 18-19 EXPLAIN Semi-Trailing Arm Rear Suspensions

20. SLIDE 20 EXPLAIN Figure 49-9 Ford rear suspension uses upper & lower semi-trailing arms to mount rear axle & watts linkage to control side-to-side movement.

DISCUSSION: DISCUSS WHICH IS BETTER: REAR SUSPENSION WITH A TRAILING ARM OR A REAR SUSPENSION WITH A SEMITRAILING ARM.

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21. **SLIDES 21-22 EXPLAIN** Independent Rear Suspensions
23. **SLIDE 23 EXPLAIN Figure 49-10** An independent rear suspension provides a better ride because less weight is unsprung and the suspension is able to react quickly to bumps in the road without affecting the opposite side.
24. **SLIDE 24 EXPLAIN Figure 49-11** A typical short/long-arm independent rear suspension.
25. **SLIDE 25 EXPLAIN Figure 49-12** independent rear suspension uses a MacPherson strut, two parallel lower transverse control arms, and a trailing arm.
26. **SLIDE 26 EXPLAIN Figure 49-13** toe-control rod provides an extra brace to keep the rear wheels straight ahead during braking and acceleration on this modified-strut-type independent rear suspension.
27. **SLIDE 27 EXPLAIN Figure 49-14** upper drawing shows a transverse- leaf spring- type independent rear suspension that uses an “H”-shaped lower control arm. The lower drawing shows a transverse leaf spring suspension that uses 2 parallel lower links & trailing arm



DISCUSSION: DISCUSS WHICH IS BETTER: A TRANSVERSE-LEAF-SPRING INDEPENDENT REAR SUSPENSION THAT USES AN H-SHAPED LOWER CONTROL ARM, OR A TRANSVERSE-LEAF SPRING SUSPENSION THAT USES TWO PARALLEL LOWER LINKS AND A TRAILING ARM



28. **SLIDE 28 EXPLAIN** Semi-Independent Rear Suspensions
29. **SLIDE 29 EXPLAIN Figure 49-15** The crossbeam is placed toward the front of the vehicle rather than the centerline of the rear wheels on a semi-independent- type rear suspension.
30. **SLIDE 30 EXPLAIN FIGURE 49-16** A semi-independent rear suspension with MacPherson struts
31. **SLIDES 31-32 EXPLAIN** Rear Suspension Service
33. **SLIDE 33 EXPLAIN Figure 49-17** Check all rubber bushings for excessive cracking.
34. **SLIDE 34 EXPLAIN Figure 49-18** Carefully inspect bump stops for damage during visual inspection.
35. **SLIDE 35 EXPLAIN Figure 49-19** A broken spring was discovered during a routine under-vehicle visual inspection. Notice the witness marks that show that the spring coils have been hitting each other.



ICONS



QUESTION



QUESTION



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36. **SLIDES 36-37 EXPLAIN** Rear Shock Replacement Precautions

38. **SLIDES 38-39 EXPLAIN** Rear Shock Replacement Air Shock Installation

40. **SLIDES 40-41 EXPLAIN** Rear Spring Replacement Rear Coil Springs

42. **SLIDE 42 EXPLAIN Figure 49-20** The shock absorber needs to be disconnected before removing the coil spring. Installation is the reverse of removal procedure.

43. **SLIDE 43 EXPLAIN Figure 49-21** The center bolt is used to hold the leaves of the leaf spring together. However, the hole for the center bolt also weakens the leaf spring. The crack shown is what a technician discovered when the leaf spring was removed during the diagnosis of a sagging rear suspension.

44. **SLIDES 44-46 EXPLAIN** Rear Spring Replacement

DISCUSSION: DISCUSS CAUSES OF LEAF SPRING BREAKAGE OTHER THAN METAL FATIGUE, CORROSION, & OVERLOADING

DEMONSTRATION: SHOW HOW TO USE A PRY BAR FOR REAR SUSPENSION SERVICING

DISCUSSION: ASK THE STUDENTS TO DISCUSS WHY THE TOPS OF SOME REAR SHOCKS ARE FASTENED INSIDE VEHICLES

BE SURE TO CHECK OEM SERVICE INFORMATION BEFORE REMOVING SHOCK ABSORBERS.