



BAKER COLLEGE
STUDENT LEARNING OUTCOMES

DSL 2310 Heavy Duty Suspension/Steering
4 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Analyze Steering Systems on medium and heavy-duty trucks – Steering Column 1.
 - a. Identify causes of fixed and driver adjustable steering column and shaft noise, looseness, and binding problems.
 - i. Determine needed action.
 - b. Service steering shaft U-joint(s), slip joints, bearings, bushings, and seals.
 - i. Phase shaft.

2. Analyze Steering Systems on medium and heavy-duty trucks – Steering Column 2.
 - a. Check cab mounting and adjust ride height.
 - b. Remove the steering wheel (includes steering wheels equipped with electrical/electronic controls and components).
 - i. Install/center the steering wheel.
 - ii. Inspect steering angle sensor.
 - iii. Test steering angle sensor.
 - iv. Replace steering angle sensor.
 - v. Calibrate steering angle sensor.
 - c. Disable/enable supplemental restraint system (SRS) in accordance with manufacturers' procedures.

3. Evaluate Steering Systems on medium and heavy-duty trucks – Steering Units 1.
 - a. Identify causes of power steering system noise, steering binding, darting/oversteer, reduced wheel cut, steering wheel kick, pulling, non-recovery, turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems.
 - i. Determine needed action.
 - b. Determine recommended type of power steering fluid.
 - i. Check level and condition.

- ii. Determine needed action.
 - c. Flush and refill power steering system.
 - i. Purge air from system.
- 4. Evaluate Steering Systems on medium and heavy-duty trucks – Steering Units 2.
 - a. Perform power steering system pressure, temperature, and flow tests.
 - i. Determine needed action.
 - b. Service power steering reservoir including filter, seals, and gaskets.
 - c. Inspect power steering pump drive gear and coupling.
 - i. Replace as needed.
 - d. Inspect power steering pump, mountings and brackets.
 - i. Determine needed action.
- 5. Examine Steering Systems on medium and heavy-duty trucks – Steering Units 3.
 - a. Inspect power steering system cooler, lines, hoses, clamps/mountings, hose routings, and fittings.
 - i. Determine needed action.
 - b. Inspect integral type power steering gear(s) (single and/or dual) and mountings.
 - i. Determine needed action.
- 6. Evaluate Steering Systems on medium and heavy-duty trucks – Steering Linkage.
 - a. Align pitman arm.
 - i. Replace as needed.
 - b. Adjust steering (wheel) stops.
 - i. Verify relief pressures.
 - c. Lubricate steering components.
- 7. Evaluate Suspension Systems on medium and heavy-duty trucks 1.
 - a. Inspect front axles and attaching hardware.
 - i. Determine needed action.
 - b. Inspect kingpins, steering knuckle bushings, locks, bearings, seals, and covers.
 - i. Service kingpins, steering knuckle bushings, locks, bearings, seals, and covers.
 - ii. Determine needed action.
 - c. Inspect shock absorbers, bushings, brackets, and mounts.
 - i. Replace as needed.
 - d. Inspect leaf springs, center bolts, clips, pins and bushings, shackles, Ubolts, insulators, brackets and mounts.
 - i. Determine needed action.
- 8. Evaluate Suspension Systems on medium and heavy-duty trucks 2.

- a. Inspect axle aligning devices such as radius rods, track bars, stabilizer bars, torque arms, related bushings, mounts, shims, and cams.
 - i. Determine needed action.
 - b. Inspect tandem suspension equalizer components.
 - i. Determine needed action.
 - c. Test air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings.
 - i. Determine needed action.
9. Examine Suspension Systems on medium and heavy-duty trucks 3.
- a. Inspect air springs, mounting plates, springs, suspension arms, and bushings.
 - i. Replace as needed.
 - b. Adjust ride height.
 - i. Determine needed action.
 - c. Identify rough ride problems.
 - i. Determine needed action.
10. Interpret Wheel Alignment Diagnosis, Adjustment, and Repair on medium and heavy-duty trucks.
- a. Identify causes of vehicle wandering, pulling, shimmy, hard steering, and off-center steering wheel problems.
 - i. Determine needed action.
 - b. Check camber.
 - i. Determine needed action.
 - c. Check caster.
 - i. Adjust as needed.
 - d. Adjust toe settings.
 - e. Check rear axle(s) alignment (thrustline/centerline) and tracking.
 - i. Determine needed action.
 - f. Identify turning/Ackerman angle (toe-out-on-turns) problems.
 - i. Determine needed action.
 - g. Check front axle alignment (centerline).
 - i. Determine needed action.
11. Examine Wheels and Tires on medium and heavy-duty trucks 1.
- a. Identify tire wear patterns.
 - i. Check tread depth and pressure
 - ii. Determine needed action.
 - b. Identify wheel/tire vibration, shimmy, pounding, hop (tramp) problems.
 - i. Determine needed action.

12. Examine Wheels and Tires on medium and heavy-duty trucks 2.
 - a. Remove steering and drive axle wheel/tire assemblies.
 - b. Install steering and drive axle wheel/tire assemblies.
 - i. Torque mounting hardware to specifications with torque wrench.
 - c. Inspect tire for proper application, (size, load range, position, and tread design).
 - i. Determine needed action.
 - d. Inspect wheel/rims for proper application, hand hole alignment, load range, size, and design.
 - i. Determine needed action.
 - e. Check operation of tire pressure monitoring system (TPMS).
 - i. Determine needed action if applicable.

13. Analyze Frame and Coupling Device on medium and heavy-duty trucks.
 - a. Inspect fifth wheel, pivot pins, bushings, locking mechanisms, and mounting hardware.
 - i. Service as necessary.
 - b. Inspect sliding fifth wheel, tracks, stops, locking systems, air cylinders, springs, lines, hoses, and controls.
 - i. Service as necessary.
 - c. Inspect frame and frame members for cracks, breaks, corrosion, distortion, elongated holes, looseness, and damage.
 - i. Determine needed repairs.
 - d. Inspect frame hangers, brackets, and cross members in accordance with manufacturers' recommended procedures.
 - i. Determine needed repairs.
 - e. Inspect pintle hooks and draw bars, if applicable.
 - i. Determine needed action.

Big Ideas

Steering systems

Suspension systems

Wheels and Tires

Frame and coupling device

Essential Questions

1. What can you find when analyzing the steering system column, linkage, and steering units on medium and heavy-duty trucks?
2. How do you evaluate the steering system column, linkage, and steering units on medium and heavy-duty trucks?

3. What can you find when analyzing the suspension systems on medium and heavy-duty trucks?
4. How do you evaluate the suspension systems on medium and heavy-duty trucks?
5. How do you diagnose wheel alignments on medium and heavy-duty trucks?
6. What can you find when examining wheels and tires on medium and heavy-duty trucks?
7. How do you analyze the frame and coupling device on medium and heavy-duty trucks?

These SLOs are approved for experiential credit.

Effective: Fall 2021