MEDIUM/HEAVY TRUCK STEERING & SUSPENSION
Course Syllabus

Course Number: TRUK-0891  OHLAP Credit: No
OCAS Code: None
Course Length: 105 Hours
Career Cluster: Transportation, Distribution, and Logistics
Career Pathway: Medium/Heavy Diesel Truck Repair
Career Major(s): Diesel Service Technician

Pre-requisite(s): In this course students will identify and describe various steering systems used on diesel-powered vehicles and have an opportunity to inspect, diagnose, and repair steering problems. They will also make needed repairs on the suspension system and perform wheel alignments.

PTTTS Truck Web-Bases Training Online Courses

Course Objectives: A. Listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action. (Steering and Suspension – IV)

B. Identify and Describe Various Steering Systems Used on Diesel Powered Vehicles.
   1. Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations. (Steering and Suspension – IV)
   2. Identify components of a heavy-duty truck's steering system.
   3. Describe the procedure for inspecting front axle components for wear.
   4. Discuss the effects toe, camber, caster, axle inclination, turning radius, and axle alignment have on tire wear, directional stability, and handling.
   5. Compare the components and operation of a worm and roller with those of a recirculating ball type steering gear.
   6. Describe how to check and adjust a manual steering gear's preload and backlash.
   7. Identify the components of a power steering gear and pump and explain the operation of a power steering system.
   8. Identify the components and operation of a pneumatic steering system.

C. Diagnose and Repair Manual Steering Systems.
   1. Inspect and replace steering shaft U-joint(s), slip joints, bearings, bushings, and seals; phase shaft U-joints.
   2. Inspect, service, repair, or replace manual steering gear bushings, bearings, shafts, seals, gaskets, and mounting bolts.
D. Diagnose and Repair Power Steering Systems.
1. Diagnose fixed and driver adjustable steering column and shaft noise, looseness, and binding problems; determine needed action. (P1-IV.A.1.1)
2. Inspect steering shaft U-joint(s), slip joints, bearings, bushings, and seals; phase shaft U-joints; determine needed action. (P1-IV.A.1.2)
3. Diagnose power steering system noise, steering binding, darting/oversteer, reduced wheelcut, steering wheel kick, pulling, non-recovery, turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems; determine needed action. (P1-IV.A.2.1)
4. Determine recommended type of power steering fluid; check level and condition; determine needed action. (P1-IV.A.2.2)
5. Flush and refill power steering system; purge air from system. (P2-IV.A.2.3)
6. Perform power steering system pressure, temperature, and flow tests; determine needed action. (P2-IV.A.2.4)
7. Inspect, service, or replace power steering reservoir including filter, seals, and gaskets. (P2-IV.A.2.5)
8. Inspect and reinstall/replace pulleys, tensioners and drive belts; adjust drive belts and check alignment. (P1-IV.A.2.6)
9. Inspect, replace as required, power steering pump drive gear and coupling. (P3-IV.A.2.7)
10. Inspect, adjust, or replace power steering pump, mountings, and brackets. (P3-IV.A.2.8)
11. Inspect and replace power steering system cooler, lines, hoses, clamps/mountings, hose routings, and fittings. (P3-IV.A.2.9)
12. Inspect, adjust, or replace linkage-assist type power steering cylinder or gear (dual system). (P3-IV.A.2.10)
13. Inspect, adjust, repair, or replace integral type power steering gear and mountings. (P1-IV.A.2.11)
15. Inspect power steering gear, seals, and gaskets; replace as needed.
16. Check and adjust cab mounting ride height. (P3-IV.A.1.3)
17. Center the steering wheel as needed. (P1-IV.A.1.4)
18. Disable and enable supplemental restraint system (SRS) in accordance with manufacturers’ procedures. (P2-IV.A.1.5)

E. Inspect and Service Steering Linkages.
1. Inspect and align pitman arm; replace as needed. (P1-IV.A.3.1)
2. Inspect, drag link (relay rod) and tie rod ends; adjust or replace as needed. (P1-IV.A.3.2)
3. Inspect and replace idler arm, bearings, and bushings.
4. Inspect steering arm and levers, and linkage pivot joints; replace as needed. (P1-IV.A.3.3)
5. Inspect clamps and retainers on cross tube/relay rod/centerlink/tie rod; position or replace as needed. (P1-IV.A.3.4)
6. Check and adjust wheel stops. (P1-IV.A.3.5)
7. Lubricate steering linkage joints as needed. (P1-IV.A.3.6)

F. Inspect, Diagnose and Repair Suspension System.
1. Listen to and verify operator’s concern; review past maintenance and repair documents; determine necessary action. (Steering and Suspension - IV)
2. Identify types of suspension systems used on today’s heavy-duty trucks.
3. Match basic components of various suspension systems with their functions.
4. Troubleshoot suspension system components to isolate and locate defects.
5. Explain the relationship between axle alignment and suspension system alignment.
6. Diagnose rough ride problems.
7. Inspect front axles, U-bolts, and nuts; determine needed action. (P1-IV.B.1)
8. Inspect and service king pin, steering knuckle bushings, locks, bearings, seals, and covers; determine needed action. (P1-IV.B.2)
9. Inspect shock absorbers, bushings, brackets, and mounts; replace as needed. (P1-IV.B.3)
10. Inspect leaf springs, center bolts, clips, eye bolts and bushings, shackles, slippers, insulators, brackets, and mounts; determine needed action. (P1-IV.B.4)
11. Inspect and service torsion bars, bell cranks, ratchets, bushings, bearings, and mounting brackets; determine needed repairs.
12. Inspect torque arms, bushings and mounts; determine needed action. (P1-IV.B.5)
13. Inspect axle aligning devices such as radius rods, track bars, stabilizer bars, and related bushings, mounts, shims, and cams; determine needed action. (P1-IV.B.6)
14. Inspect walking beams, center (cross) tube, bushings, mounts, load pads, and saddles/caps; replace as needed. (P3-IV.B.7)
15. Inspect and test air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings; adjust, repair or replace as needed. (P1-IV.B.8)
16. Inspect and test air springs, mounting plates, springs, suspension arms and bushings; replace as needed. (P1-IV.B.9)
17. Measure vehicle ride height; determine needed action. (P1-IV.B.10)
18. Diagnose rough ride problems; determine needed action. (P3-IV.B.11)

G. Perform Wheel Alignment.
1. Diagnose vehicle wandering, pulling, shimmy, hard steering, and off-center steering wheel problem(s); adjust and repair as needed. (P1-IV.C.1)
2. Check camber; determine needed action. (P2-IV.C.2)
3. Check caster; adjust as needed. (P2-IV.C.3)
4. Check toe; adjust as needed. (P1-IV.C.4)
5. Check rear axle(s) alignment (thrustline/centerline) and tracking; adjust or repair as needed. (P2-IV.C.5)
6. Diagnose turning/Ackerman angle (toe-out-on-turns) problems; determine needed action. (P3-IV.C.6)
7. Check front axle alignment (centerline); adjust or repair as needed. (P2-IV.C.7)

Teaching Methods: The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.
Grading Procedures:
1. Students are graded on theory and shop practice and performance.
2. Each course must be passed with seventy (70%) percent or better.
3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.

Description of Classroom, Laboratories, and Equipment:
Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.

Available Certifications/College Credit:
The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

College Credit Eligibility:
The student must maintain a grade point average of 2.0 or better.