Western Technical College

32412351 Diesel Truck Brake Systems

Course Outcome Summary

Course Information

Description	This course is a practical study in performing diagnosis and repair of heavy truck braking systems.
Career Cluster	Transportation, Distribution and Logistics
Instructional Level	Technical Diploma Courses
Total Credits	3
Total Hours	108

Textbooks

Fundamentals of Medium/Heavy Duty Commercial Vehicle Systems. 2nd Edition. Copyright 2020. Wright, Gus and Owen C. Duffy. Publisher: Jones & Bartlett Publishers. **ISBN-13**: 978-1-284-15093-3. Required.

Learner Supplies

Safety glasses with side eye protection that meet Z87 OSHA guidelines. **Vendor:** To be discussed in class. Required.

Six inch ankle high, quality leather work shoes - $75.00-100.00. **Vendor:** To be discussed in class. Required.

Uniform: Four black/grey shirts with embroidered name. **Vendor:** Campus Shop. Required.

Success Abilities

1. Cultivate Passion: Enhance Personal Connections

2. Cultivate Passion: Expand a Growth-Mindset
3. Cultivate Passion: Increase Self-Awareness
4. Live Responsibly: Develop Resilience
5. Live Responsibly: Embrace Sustainability
6. Live Responsibly: Foster Accountability
7. Refine Professionalism: Act Ethically
8. Refine Professionalism: Improve Critical Thinking
9. Refine Professionalism: Participate Collaboratively
10. Refine Professionalism: Practice Effective Communication

High Impact Practices

1. Learning Community: these courses are designed to enhance your learning experience in which a cohort of peers complete two or more courses that are linked through projects, themes, or program emphasis.

Program Outcomes

1. Diagnose, repair and service brake systems

Course Competencies

1. Evaluate air supply and service systems.

Assessment Strategies

1.1. Written Product
1.2. Skill Demonstration
1.3. Written Objective Test

Criteria

You will know you are successful when:

1.1. you attend class regularly.
1.2. you arrive for class on time.
1.3. you listen attentively during class.
1.4. you pass written exams at level indicated by the instructor.
1.5. you meet criteria for successful completion of written products; lab sheets, presentations,and case studies.

Learning Objectives

1.a. Identify poor stopping, air leaks, premature wear, pulling, grabbing, dragging, or balance problems caused by supply and service system malfunctions; determine needed action.
1.b. Check air system build-up time; determine needed action.
1.c. Drain air reservoir/tanks; check for oil, water, and foreign material; determine needed action.
1.d. Inspect air compressor drive gear, belts, and coupling; adjust or replace as needed.
1.e. Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets; repair or replace as needed.
1.f. Inspect and test air system pressure controls: governor, unloader assembly valves, filters, lines, hoses, and fittings; adjust or replace as needed.
1.g. Inspect air system lines, hoses, fittings, and couplings; repair or replace as needed.
1.h. Inspect and test air tank relief (safety) valves, one-way (single) check valves, two-way (double) check valves, manual and automatic drain valves; replace as needed.
1.i. Inspect and clean air drier systems, filters, valves, heaters, wiring, and connectors; repair or replace as needed.
1.j. Inspect and test brake application (foot/treadle) valve, fittings, and mounts; check pedal operation;

replace as needed.
1.k. Inspect and test stop light circuit switches, wiring, and connectors; repair or replace as needed.
1.l. Inspect and test hand brake (trailer) control valve, lines, fittings, and mountings; repair or replace as needed.
1.m. Inspect and test brake relay valves; replace as needed.
1.n. Inspect and test quick release valves; replace as needed.
1.o. Inspect and test tractor protection valve; replace as needed.
1.p. Inspect and test emergency (spring) brake control/modulator valve(s); replace as needed.
1.q. Inspect and test low pressure warning devices, wiring, and connectors; repair or replace as needed.
1.r. Inspect and test air pressure gauges, lines, and fittings; replace as needed.
1.s. Test one-way and double-check valves.
1.t. Inspect coupling air lines, holders, and gladhands.

2. Perform mechanical/foundation and parking air brake inspection and repair.

Assessment Strategies

2.1. Written Product
2.2. Skill Demonstration
2.3. Written Objective Test

Criteria

You will know you are successful when:

2.1. you wear personal protective equipment.
2.2. you follow safety procedures.
2.3. you select the correct tools, equipment, instruments, materials, and supplies.
2.4. you perform critical steps in the right order from start to finish.
2.5. you are able to verbalize sound reasoning for the decisions made throughout the process.

Learning Objectives

2.a. Identify poor stopping, brake noise, premature wear, pulling, grabbing, or dragging problems caused by the foundation brake, slack adjuster, and brake chamber problems; determine needed action.
2.b. Inspect and test service brake chambers, diaphragm, clamp, spring, pushrod, clevis, and mounting brackets; repair or replace as needed.
2.c. Identify type, inspect and service slack adjusters; perform needed action.
2.d. Inspect camshafts, tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs; replace as needed.
2.e. Inspect, clean, and adjust air disc brake caliper assemblies; determine needed repairs.
2.f. Inspect and measure brake shoes or pads; perform needed action.
2.g. Inspect and measure brake drums or rotors; perform needed action.
2.h. Inspect and test parking (spring) brake chamber diaphragm and seals; replace parking (spring) brake chamber; dispose of removed chambers in accordance with local regulations.
2.i. Inspect and test parking (spring) brake check valves, lines, hoses, and fittings; replace as needed.
2.j. Inspect and test parking (spring) brake application and release valve; replace as needed.
2.k. Manually release (cage) and reset (uncage) parking (spring) brakes in accordance with manufacturers' recommendations.

3. Investigate hydraulic brake systems.

Assessment Strategies

3.1. Written Product
3.2. Skill Demonstration
3.3. Written Objective Test

Criteria

You will know you are successful when:

3.1. you attend class regularly.
3.2. you arrive for class on time.
3.3. you listen attentively during class.
3.4. you pass written exams at level indicated by the instructor.
3.5. you meet criteria for successful completion of written products; lab sheets, presentations, and case studies.

Learning Objectives

3.a. Identify poor stopping, premature wear, pulling, dragging, balance, or pedal feel problems caused by the hydraulic system; determine needed action.
3.b. Inspect and test master cylinder for internal/external leaks and damage; replace as needed.
3.c. Inspect hydraulic system brake lines, flexible hoses, and fittings for leaks and damage; replace as needed.
3.d. Inspect and test metering (hold-off), load sensing/proportioning, proportioning, and combination valves; replace as needed.
3.e. Inspect and test brake pressure differential valve and warning light circuit switch, bulbs/LEDs, wiring, and connectors; repair or replace as needed.
3.f. Inspect disc brake caliper assemblies; replace as needed.
3.g. Inspect/test brake fluid; bleed and/or flush system; determine proper fluid type.

4. Perform mechanical/foundation hydraulic brake inspection and repair.

Assessment Strategies

4.1. Written Product
4.2. Skill Demonstration
4.3. Written Objective Test

Criteria

You will know you are successful when:

4.1. you wear personal protective equipment.
4.2. you follow safety procedures.
4.3. you select the correct tools, equipment, instruments, materials, and supplies.
4.4. you perform critical steps in the right order from start to finish.
4.5. you are able to verbalize sound reasoning for the decisions made throughout the process.

Learning Objectives

4.a. Identify poor stopping, brake noise, premature wear, pulling, grabbing, dragging, or pedal feel problems caused by mechanical components; determine needed action.
4.b. Inspect and measure rotors; perform needed action.
4.c. Inspect and measure disc brake pads; inspect mounting hardware; perform needed action.
4.d. Check parking brake operation; inspect parking brake application and holding devices; adjust and replace as needed.
4.e. Identify stopping problems caused by the brake assist (booster) system; determine needed action.

5. Analyze ABS and ATC systems.

Assessment Strategies

5.1. Written Product
5.2. Skill Demonstration
5.3. Written Objective Test

Criteria

You will know you are successful when:

5.1. you attend class regularly.
5.2. you arrive for class on time.
5.3. you listen attentively during class.
5.4. you pass written exams at level indicated by the instructor.
5.5. you meet criteria for successful completion of written products; lab sheets, presentations, case studies.

Learning Objectives

5.a. Observe antilock brake system (ABS) warning light operation (includes trailer and dash mounted trailer ABS warning light); determine needed action.
5.b. Identify poor stopping and wheel lock-up problems caused by failure of the antilock brake system (ABS); determine needed action.
5.c. Bleed the ABS hydraulic circuits.
5.d. Check antilock brake system wiring, connectors, seals, and harness for damage and proper routing.

6. Perform wheel bearing inspection and replacement.

Assessment Strategies

6.1. Written Product
6.2. Skill Demonstration
6.3. Written Objective Test

Criteria

You will know you are successful when:

6.1. you wear personal protective equipment.
6.2. you follow safety procedures.
6.3. you select the correct tools, equipment, instruments, materials, and supplies.
6.4. you perform critical steps in the right order from start to finish.
6.5. you are able to verbalize sound reasoning for the decisions made throughout the process.

Learning Objectives

6.a. Clean, inspect, lubricate, and replace wheel bearings and races/cups; replace seals and wear rings; inspect spindle/tube; inspect and replace retaining hardware; adjust wheel bearings. Verify end play with dial indicator method.
6.b. Identify, inspect, or replace unitized/preset hub bearing assemblies.