BAKER COLLEGE
STUDENT LEARNING OUTCOMES

DSL 2210 Heavy Brake Service
4 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Summarize Air Supply and Service Systems.
    a. Identify poor stopping, air leaks, premature wear, pulling, grabbing, dragging, or balance problems caused by supply and service system malfunctions.
        i. Determine needed action.
        ii. Perform needed repairs.
    b. Observe air system build-up time.
        i. Determine needed action.
        ii. Perform needed repairs.

2. Test Air Supply and Service Systems.
    a. Drain air reservoir/tanks; check for oil, water, and foreign material.
        i. Determine needed action.
        ii. Perform needed repairs.
    b. Inspect air compressor drive gear, belts and coupling.
        i. Repair as needed.
    c. Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets.
        i. Repair or replace as needed.

3. Examine Air Supply and Service Systems
    a. Examine air system pressure controls: governor, unloader assembly valves, filters, lines, hoses, and fittings.
        i. Adjust or replace as needed.
    b. Inspect air system lines, hoses, fittings, and couplings.
        i. Replace as needed.
    c. Perform inspection and testing of air tank relief (safety) valves, one-way (single) check valves, two-way (double) check valves, manual and automatic drain valves.

        i. Replace as needed.
    d. Examine air drier systems, filters, valves, heaters, wiring, and connectors.
        i. Determine needed action.
        ii. Perform needed repairs.
    e. Examine brake application (foot/treadle) valve, fittings, mounts, and pedal operation.
        i. Determine needed action.
        ii. Perform needed repairs.
    f. Examine stop light circuit switches, wiring, and connectors.
        i. Determine needed action.
        ii. Perform needed repairs.
    g. Test hand brake (trailer) control valves, lines, fittings, and mountings.
        i. Determine needed action.
        ii. Perform needed repairs.
    h. Test brake relay valves.
        i. Replace as needed.
    i. Test quick release valves.
        i. Replace as needed.
    j. Test tractor protection valve.
        i. Determine needed action.
        ii. Perform needed repairs.
    k. Test emergency (spring) brake control/modulator valves.
        i. Determine needed action.
        ii. Perform needed repairs.
    l. Test low pressure warning devices, wiring, and connectors.
        i. Determine needed action.
        ii. Perform needed repairs.
    m. Perform inspection and testing of air pressure gauges, lines, and fittings.
        i. Replace as needed.

4. Examine Mechanical/Foundation Brakes
    a. Identify poor stopping, brake noise, premature wear, pulling, grabbing, or dragging problems caused by the foundation brake, slack adjuster, and brake chamber problems.
        i. Determine needed action.
        ii. Perform needed repairs.

5. Examine Mechanical/Foundation Brakes
    a. Test service brake chambers, diaphragm, clamp, spring, pushrod, clevis, and mounting brackets.
        i. Determine needed action.

        ii. Perform needed repairs.
    b. Identify type of slack adjusters.
        i. Inspect slack adjuster for proper operation.
        ii. Determine needed action.

6. Examine Mechanical/Foundation Brakes
    a. Inspect camshafts, tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs.
        i. Replace as needed.
    b. Inspect air disc brake caliper assemblies.
        i. Determine needed repairs.
        ii. Clean air disc brake caliper assemblies.
        iii. Adjust air disc brake caliper assemblies.
    c. Inspect brake shoes or pads.
        i. Measure brake shoes or pads.
        ii. Perform needed action.
    d. Inspect brake drums or rotors.
        i. Measure brake drums or rotors.
        ii. Perform needed action.

7. Examine Parking Brakes
    a. Test parking (spring) brake chamber diaphragm and seals.
        i. Replace parking (spring) brake chamber.
        ii. Dispose of removed chambers in accordance with local regulations.
    b. Test parking (spring) brake check valves, lines, hoses, and fittings.
        i. Replace as needed.
    c. Test parking (spring) brake application and release valve.
        i. Replace as needed.
    d. Manually release (cage) and reset (uncage) parking (spring) brakes in accordance with manufacturers' recommendations.
    e. Test anti compounding brake function.

8. Examine Hydraulic Brakes – Hydraulic System 1
    a. Identify poor stopping, premature wear, pulling, dragging, balance, or pedal feel problems caused by the hydraulic system.
        i. Determine needed action.
        ii. Perform needed repairs.
    b. Test master cylinder for internal/external leaks and damage.
        i. Replace as needed.
    c. Inspect hydraulic system brake lines, flexible hoses, and fittings for leaks and damage.

i. Replace as needed.

9. Examine Hydraulic Brakes – Hydraulic System 2
    a. Test metering (hold-off), load sensing/proportioning, proportioning, and combination valves.
        i. Replace as needed.
    b. Test brake pressure differential valve and warning light circuit switch, bulbs/LEDs, wiring, and connectors.
        i. Repair as needed.
        ii. Replace as needed.
    c. Inspect brake caliper assemblies.
        i. Replace as needed.
    d. Inspect brake fluid
        i. Bleed and/or flush system.
        ii. Determine proper fluid type.

10. Examine Hydraulic Brakes – Mechanical/Foundation Brakes 1
    a. Identify poor stopping, brake noise, premature wear, pulling, grabbing, dragging, or pedal feel problems caused by mechanical components.
        i. Determine needed action.
    b. Inspect rotors.
        i. Measure rotors.
        ii. Perform needed action.
    c. Inspect disc brake pads, and mounting hardware.
        i. Measure disc brake pads, and mounting hardware.
        ii. Perform needed action.
    d. Check parking brake operation.
        i. Inspect parking brake application and holding devices.
        ii. Adjust as needed.
        iii. Replace as needed.

11. Examine Hydraulic Brakes – Power Assist Units
    a. Identify stopping problems caused by the brake assist (booster) system.
        i. Determine needed action.
    b. Test hydraulic brake assist (booster), hoses, and control valves.
        i. Determine proper fluid type.
        ii. Determine needed repairs.
    c. Check emergency (back-up, reserve) brake assist system.

12. Evaluate Air and Hydraulic Antilock Brake Systems (ABS) and Automatic Traction Control (ATC)

a. Observe antilock brake system (ABS) warning light operation (includes trailer and dash mounted trailer ABS warning light).
    i. Determine needed action.
b. Diagnose antilock brake system (ABS) electronic control(s) and components using self-diagnosis and/or electronic service tool(s).
    i. Determine needed action.
c. Identify poor stopping and wheel lock-up problems caused by failure of the antilock brake system (ABS).
    i. Determine needed action.
d. Test operation of antilock brake system (ABS) air, hydraulic, electrical, and mechanical components.
    i. Perform needed action.
e. Test antilock brake system (ABS) wheel speed sensors and circuits.
    i. Adjust as needed.
    ii. Replace as needed.
f. Bleed the ABS hydraulic circuits.
g. Observe automatic traction control (ATC) warning light operation.
    i. Determine needed action.
h. Diagnose automatic traction control (ATC) electronic control(s) and components using self-diagnosis and/or specified test equipment (scan tool, PC computer).
    i. Determine needed action.
i. Verify power line carrier (PLC) operations.

13. Analyze Wheel Bearings
    a. Inspect wheel bearings and races/cups, seals and wear rings, spindle/tube, and retaining hardware.
    b. Clean wheel bearings and races/cups, seals and wear rings, spindle/tube, and retaining hardware.
    c. Lubricate wheel bearings and races/cups.
    d. Replace seals and wear rings, and retaining hardware.
    e. Verify end play with dial indicator method.
        i. Demonstrate TMC method.
    f. Identify unitized/preset hub bearing assemblies.
        i. Inspect unitized/preset hub bearing assemblies.
        ii. Replace unitized/preset hub bearing assemblies as needed.

These SLOs are approved for experiential credit.

Effective: Fall 2017