Dakota County Technical College

ASEP 1108: Brake Systems

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 1

Lab Hours/Week: 2

OJT Hours/Week: *.*

Prerequisites: None

Corequisites: None

MnTC Goals: None

This course covers theory and practice of servicing brake systems on General Motor's cars. Included will be disc/drum brakes, power brakes, diagonal split, anti-lock brakes, and four-wheel disc brakes. Prerequisites: ASEP1101

B. COURSE EFFECTIVE DATES: 03/16/1998 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

D. LEARNING OUTCOMES (General)

1. Comply with personal and environmental safety practices
2. Identify and interpret brake system concern; determine necessary action
3. Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins
4. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals)
5. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law)
6. Measure brake pedal height; determine necessary action
7. Check master cylinder for internal and external leaks and proper operation; determine necessary action
8. Remove, bench bleed, and reinstall master cylinder
9. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action
10. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action
11. Fabricate and/or install brake lines (double flare and ISO types); replace hoses, fittings, and supports as needed
12. Select, handle, store, and fill brake fluids to proper level
13. Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves
14. Inspect, test, and/or replace components of brake warning light system
15. Bleed (manual, pressure, vacuum or surge) brake system
16. Flush hydraulic system
17. Diagnose poor stopping, noise, pulling, grabbing, dragging, or pedal pulsation concerns; determine necessary action
18. Remove, clean (using proper safety procedures), inspect, and measure brake drums; determine necessary action
19. Refinish brake drum
20. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble
21. Remove, inspect, and install wheel cylinders
22. Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings
23. Install wheel, torque lug nuts, and make final checks and adjustments
24. Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action
25. Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing; determine necessary action
26. Clean and inspect caliper mounting and slides for wear and damage; determine necessary action
27. Remove, clean, and inspect pads and retaining hardware; determine necessary action
28. Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts
29. Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks
30. Clean, inspect, and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace
31. Remove and reinstall rotor
32. Refinish rotor according to manufacturer's recommendations

33. Adjust calipers equipped with an integrated parking brake system
34. Install wheel, torque lug nuts, and make final checks and adjustments
35. Test pedal free travel with and without engine running; check power assist operation
36. Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster
37. Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; determine necessary action
38. Inspect and test hydro-boost system and accumulator for leaks and proper operation; determine necessary action
39. Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action
40. Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust wheel bearings
41. Check parking brake cables and components for wear, rusting, binding, and corrosion; clean, lubricate, or replace as needed
42. Check parking brake operation; determine necessary action
43. Check operation of parking brake indicator light system
44. Check operation of brake stop light system; determine necessary action
45. Replace wheel bearing and race
46. Inspect and replace wheel studs
47. Remove and reinstall sealed wheel bearing assembly
48. Identify and inspect antilock brake system (ABS) components; determine necessary action
49. Diagnose poor stopping, wheel lock-up, abnormal pedal feel or pulsation, and noise concerns caused by the antilock brake system (ABS); determine necessary action
50. Diagnose antilock brake system (ABS) electronic control(s) and components using self-diagnosis and/or recommended test equipment; determine necessary action
51. Depressurize high-pressure components of the antilock brake system (ABS)
52. Bleed the antilock brake system's (ABS) front and rear hydraulic circuits
53. Remove and install antilock brake system (ABS) electrical/electronic and hydraulic components
54. Test, diagnose and service ABS speed sensors, toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data)
55. Diagnose antilock brake system (ABS) braking concerns caused by vehicle modifications (tire size, curb height, final drive ration, etc.)
56. Identify traction control system components

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted