Modern Automotive Technology
Chapter 70
Steering System Diagnosis
And Repair
Learning Objectives

- Describe common steering system problems.
- Properly inspect and determine the condition of a steering system.
- Explain basic steering column repair operations.
- Adjust both worm gears and rack-and-pinion gears.
- Describe service and repair procedures for a rack-and-pinion steering gear.
- Service power steering belts, hoses, and fluid.
- Explain how to complete basic power steering tests.
- Use safe work procedures.
Chapter 70

1. You should **Bleed** a power steering system to ensure that all of the air is out of the lines, pump, and gearbox.

2. A power steering **Pressure Test** checks the operation of the power steering pump, pressure relief valve, control valve, hoses, and power piston.
Bleeding the System

- When hydraulic components are serviced, bleed any air out of the system.
- Idle the engine and turn the steering wheel fully from side to side.
- Check the fluid level often.
- Cycling the system will force air from the steering gear, back to the reservoir.
Pressure Test Connections

Connect to gearbox hose

Connect to pump

Power steering pressure gauge set

To steering gear

Shut-off valve

Power steering pump

Pressure gauge
3. To make a Worm Bearing Preload Adjustment, start by disconnecting the pitman arm (if the gearbox is installed in the vehicle).

4. Pitman shaft Over-Center Clearance controls the amount of play between the pitman shaft gear and the teeth on the ball nut.
Worm Bearing Preload Adjustment

Compare the required force to specs

If needed, tighten or loosen the adjustment nut
Over-Center Clearance Adjustment

Loosen the locknut and bottom the adjustment screw lightly.
Over-Center Clearance Adjustment

Adjust over-center screw as needed.

Center position

Socket on worm shaft

Locknut loosened
Chapter 70

5. A **Dry Park Test** is an effective way to check play in the steering linkage or rack-and-pinion mechanism.

6. A **Wheel Puller** is used to remove a steering wheel from its shaft.
Dry Park Test

With the vehicle on the ground, rotate the steering wheel back and forth while someone watches for part wear.
Tighten the puller down against the steering shaft to remove the wheel
Chapter 70

7. **Hard Steering** is when the turning the steering wheel requires higher than normal effort.

8. **Belt Squeal** is a loud screeching sound produced by a slipping belt.
Steering System Inspection

- Check for looseness in all ball sockets
- Damaged adjuster tube
- Worn outer tie-rod
- Worn inner tie-rod
- Bent center link
- Worn Pitman arm splines
- Misadjusted nut
- Wear in steering gearbox
- Loose mounting bolt
- Worn joint in tie-rod
- Wiggling idler arm up and down to check wear
- Idler arm mount bolt
Belt Adjustment

Loosen the adjusting bolts, carefully pry the component outward and tighten the adjusting bolts.
When changing a belt, pry on a recommended point and adjust tension to specs.

10. Steering Wheel Play is the most frequent steering system problem.
Adjust the Rack Guide to Eliminate Steering Wheel Play
Power Rack-and-Pinion Service

Adjust with wrench

Hold spanner wrench
Checking the Fluid

Check most systems at operating temperature, with the engine off
Learning Objectives

- Describe common steering system problems.
- Properly inspect and determine the condition of a steering system.
- Explain basic steering column repair operations.
- Adjust both worm gears and rack-and-pinion gears.
- Describe service and repair procedures for a rack-and-pinion steering gear.
- Service power steering belts, hoses, and fluid.
- Explain how to complete basic power steering tests.
- Use safe work procedures.