AUTOMOTIVE Youth Educational Systems YES The Passport to a Rewarding Automotive Career

ASE CERTIFIED

Modern Automotive Technology Chapter 74

Wheel Alignment

North Montco Technical Career Center

Learning Objectives

- Explain the principles of wheel alignment.
- List the purpose of each wheel alignment setting.
- Perform a pre-alignment inspection of tires steering, and suspension systems.
- Describe caster, camber, and toe adjustment.
- Explain toe-out on turns, steering axis inclination, and tracking.
- Describe the use of different types of wheel alignment equipment.

Pre-Alignment Inspection

- Check for the following:
  - incorrect tire inflation
  - loose wheel bearings
  - wheel or tire runout
  - worn tires
  - tires of different sizes and types
  - worn steering or suspension components
  - incorrect curb height and weight
  - incorrect cradle adjustment

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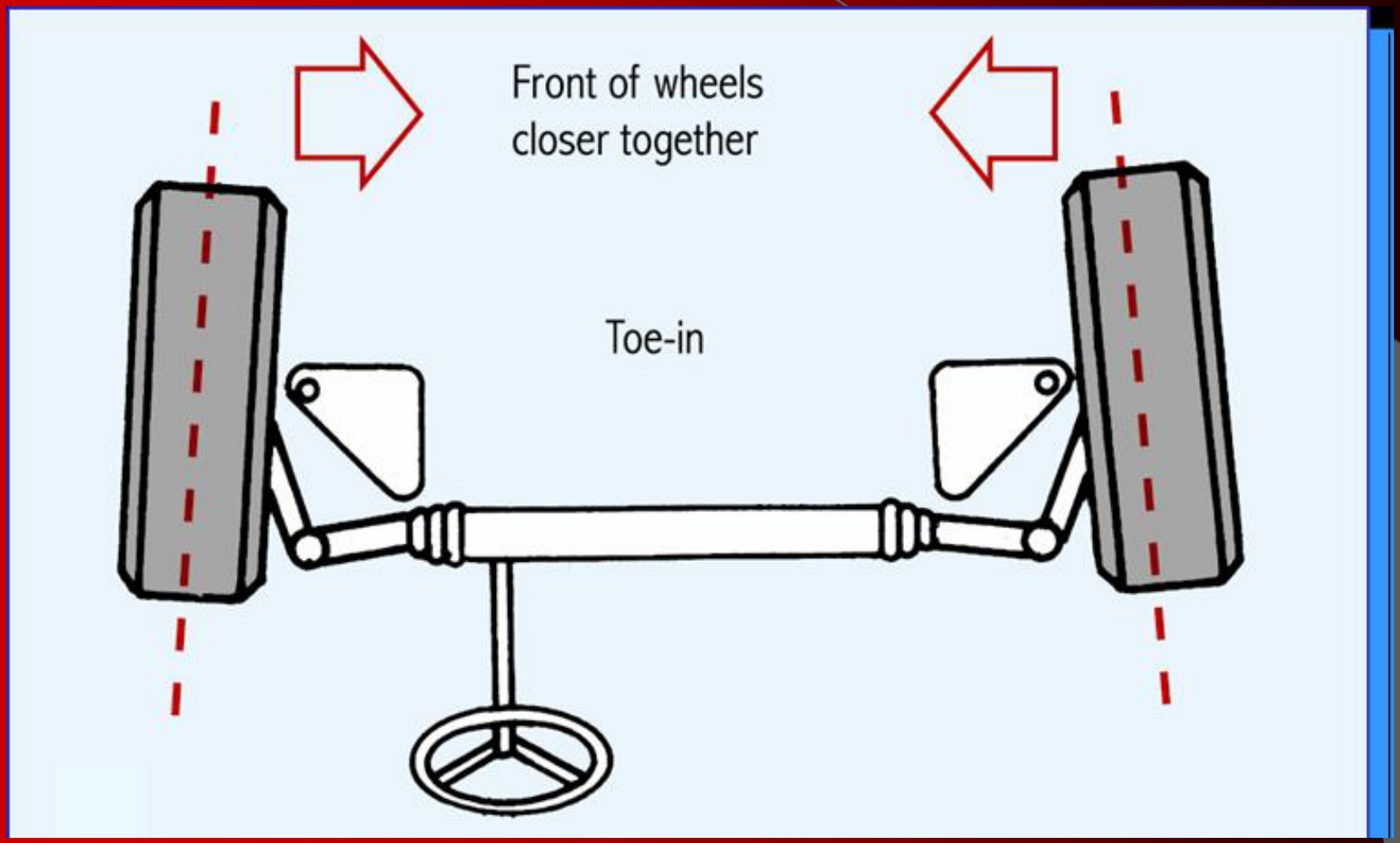
1. Toe-In is caused when the wheels are closer at the front than at the rear.

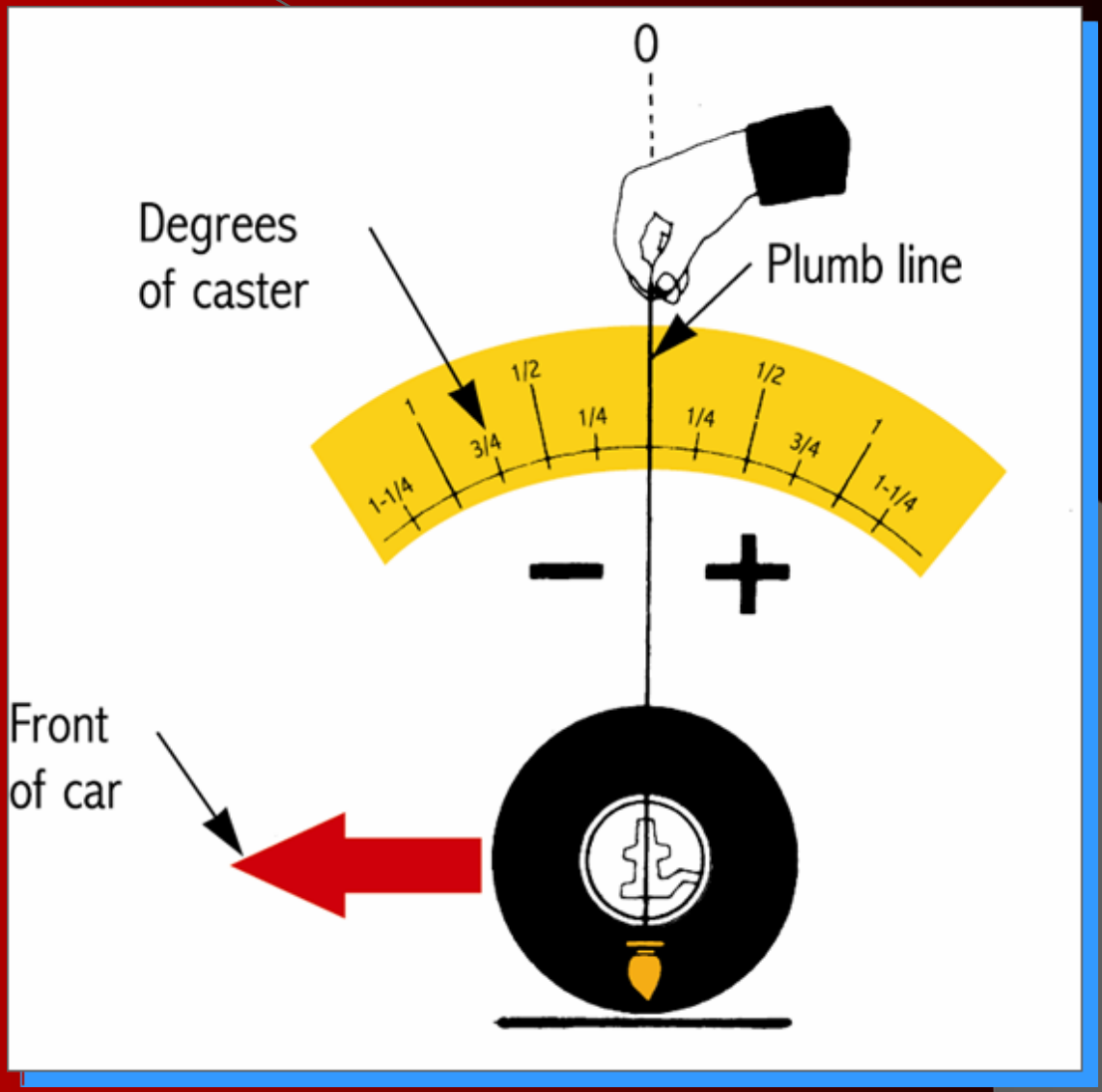
2. When the wheels are turned, Positive Caster lifts the vehicle and helps keep the wheels traveling in a straight line.

Toe-In

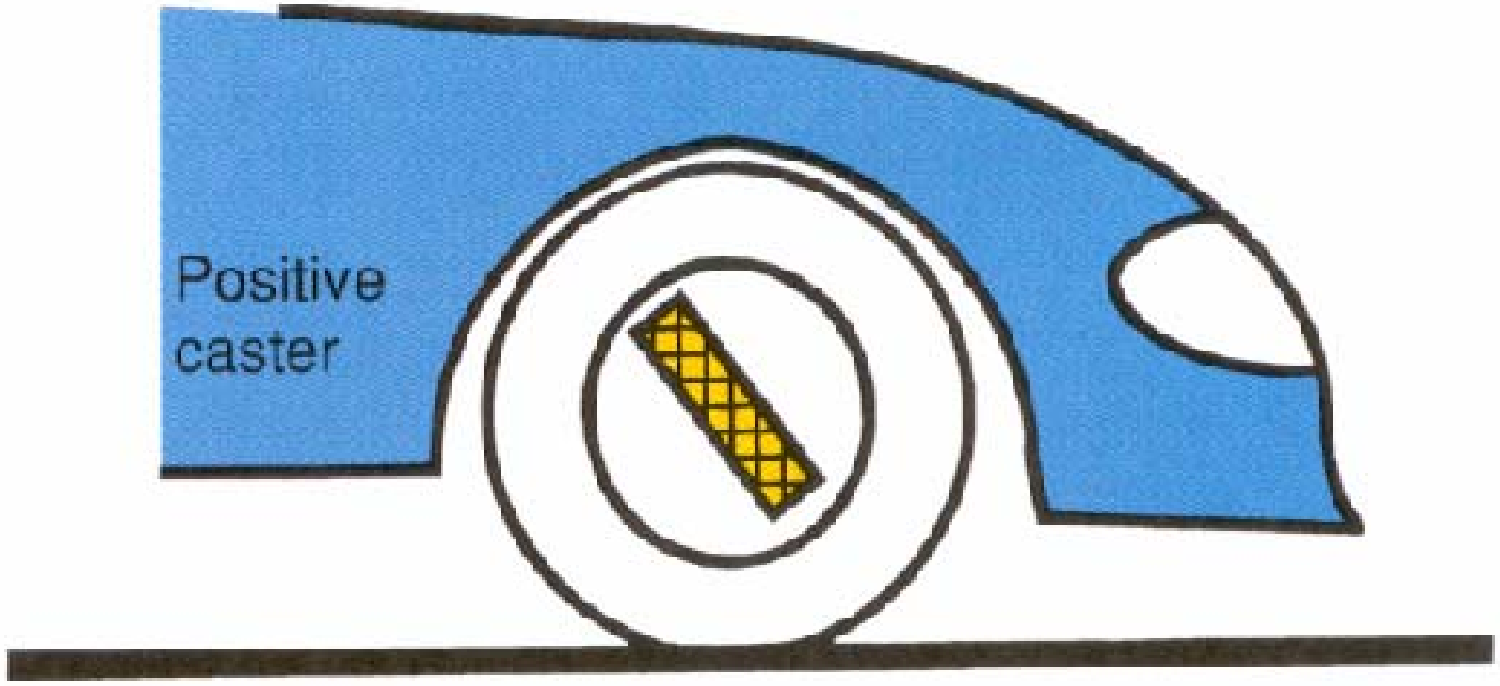


Caster Measurement

Measured in degrees, from true vertical



Positive Caster



Most common on vehicles with power steering

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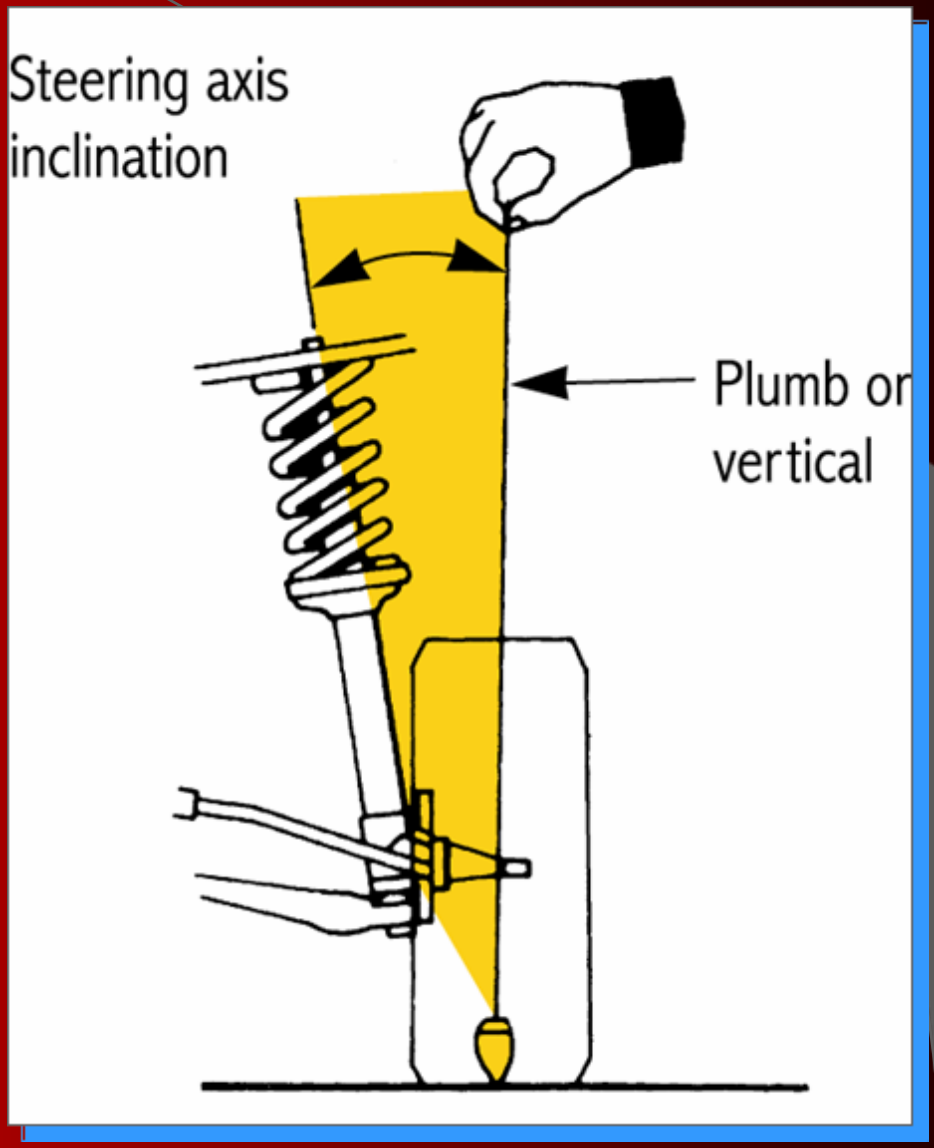
3. Steering Axis Inclination (SAI) is the angle, away from the vertical, formed by the inward tilt of the ball joints, king pin, or MacPherson strut tube.

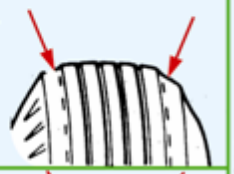
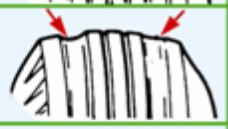
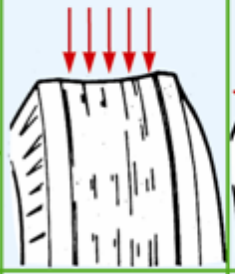
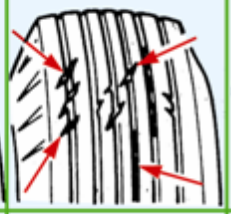
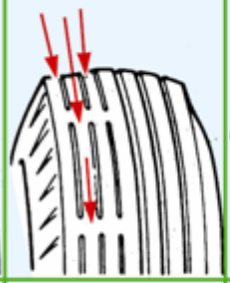
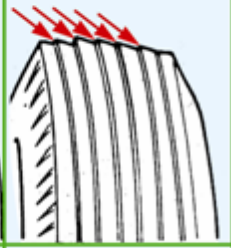
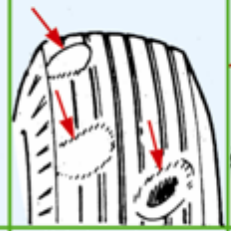
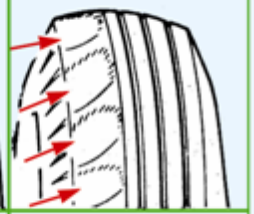
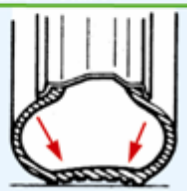
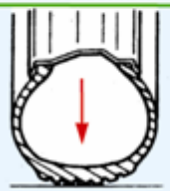
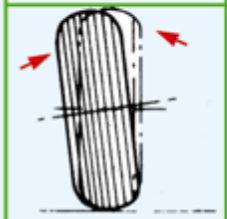
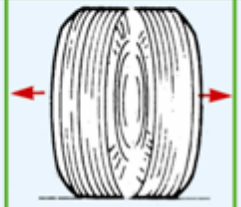
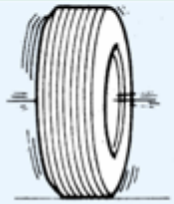
4. Incorrect toe will cause Feathered Edging to form on the tire tread.

Steering Axis Inclination (SAI)

If the angle is incorrect, part replacement is needed



Reading Tire Wear

	Rapid wear at shoulders	Rapid wear at center	Cracked treads	Wear on one side	Feathered edge	Bald spots	Scalloped wear
CONDITION	1.  2. 						
CAUSE	Underinflation or lack of rotation 	Overinflation or lack of rotation 	Under inflation or excessive speed	Excessive camber 	Incorrect toe 	Unbalanced wheel  or tire defect	Lack of rotation of tires or worn or out of alignment suspension
CORRECTION	Adjust pressure to specifications when tires are cool, rotate tires			Adjust camber to specifications	Adjust toe in to specifications	Dynamic or static balance wheels	Rotate tires and check alignment

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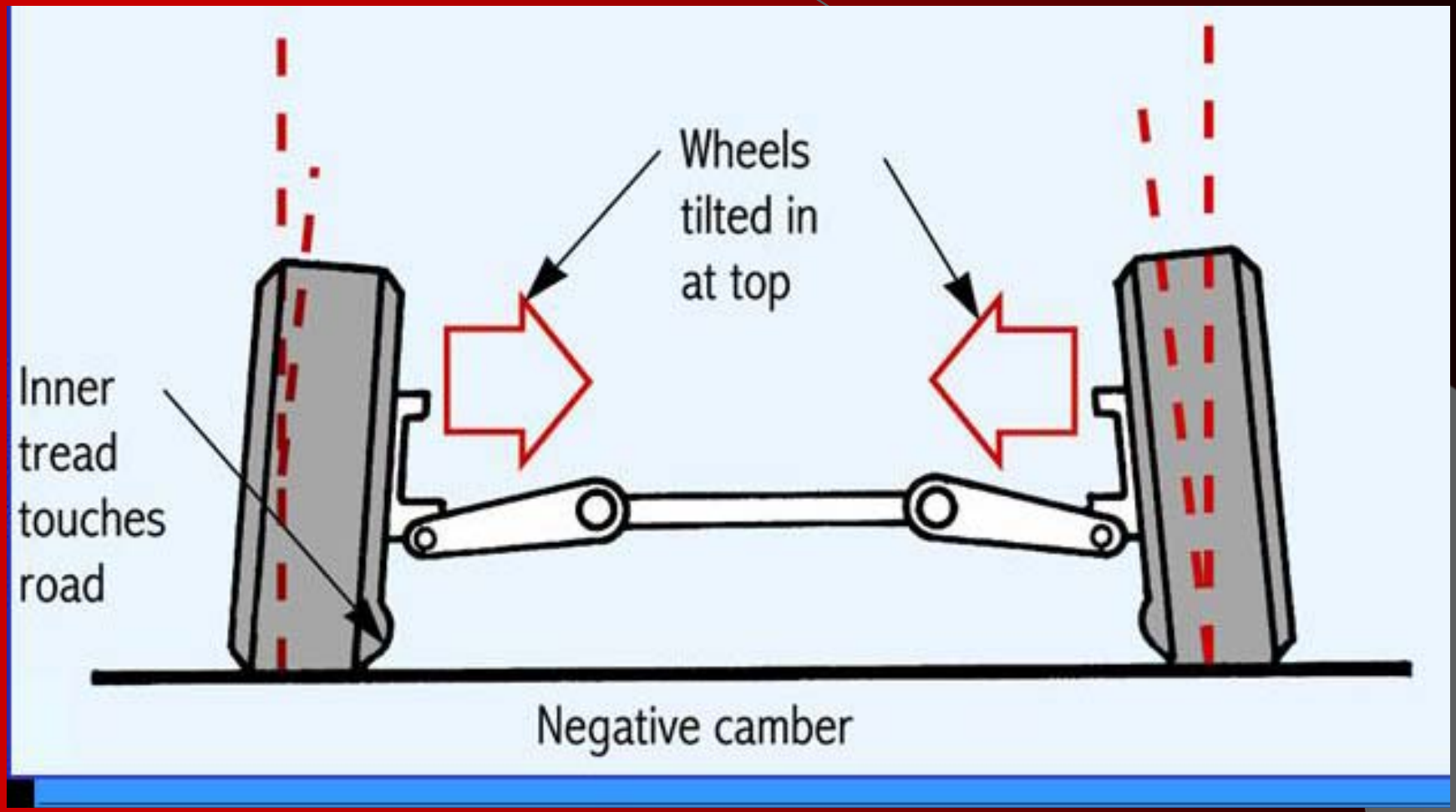
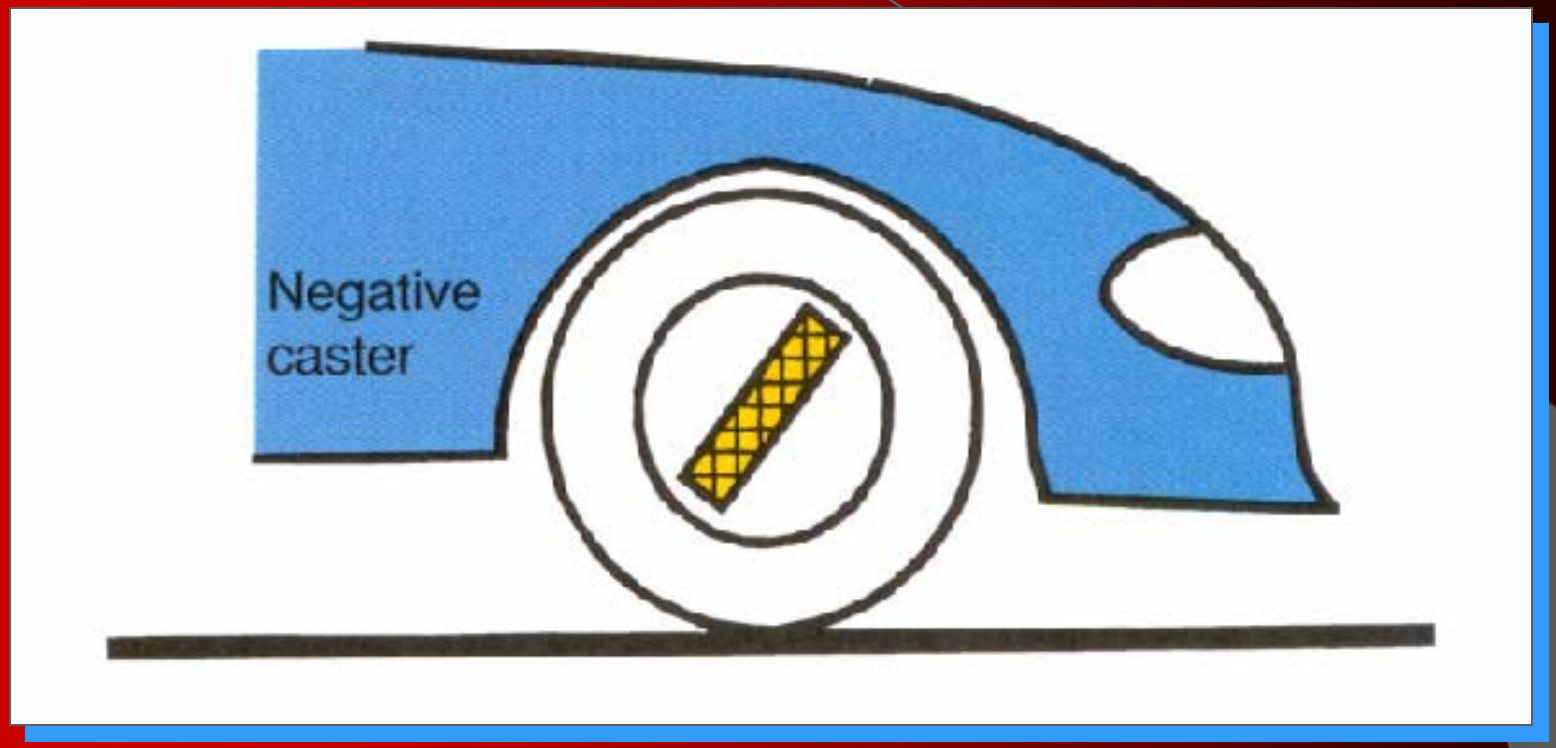
5. Negative Camber causes the tops of the wheels to tilt inward when viewed from the front.

6. Negative Caster tilts the top of the steering knuckle toward the front of the vehicle.

Negative Camber



Negative Caster



Reduces steering effort

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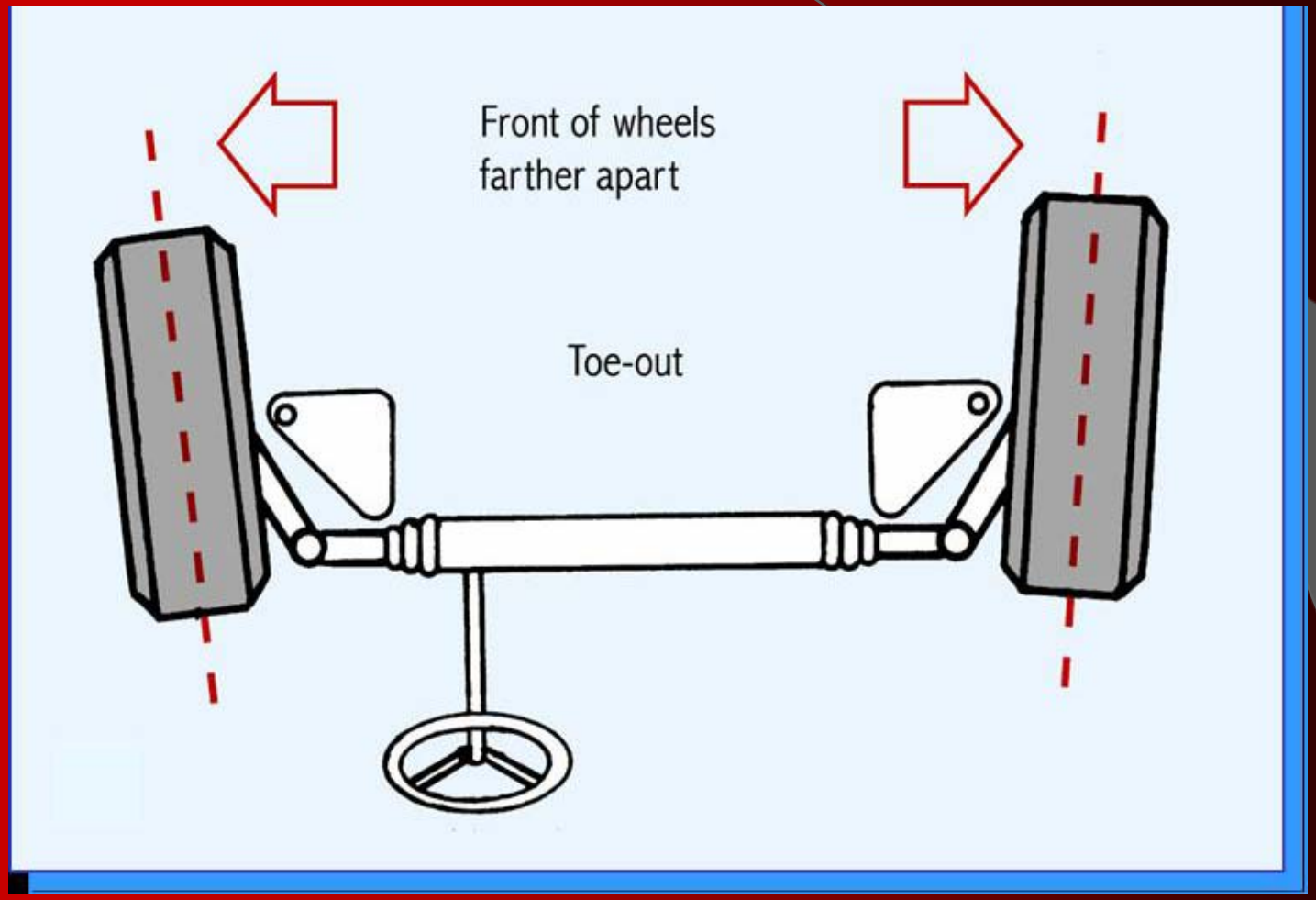
7. Toe-Out results when the fronts of the wheels are farther apart than the rear.

8. Incorrect camber produces wear On One Side of the tire tread.

Toe-Out



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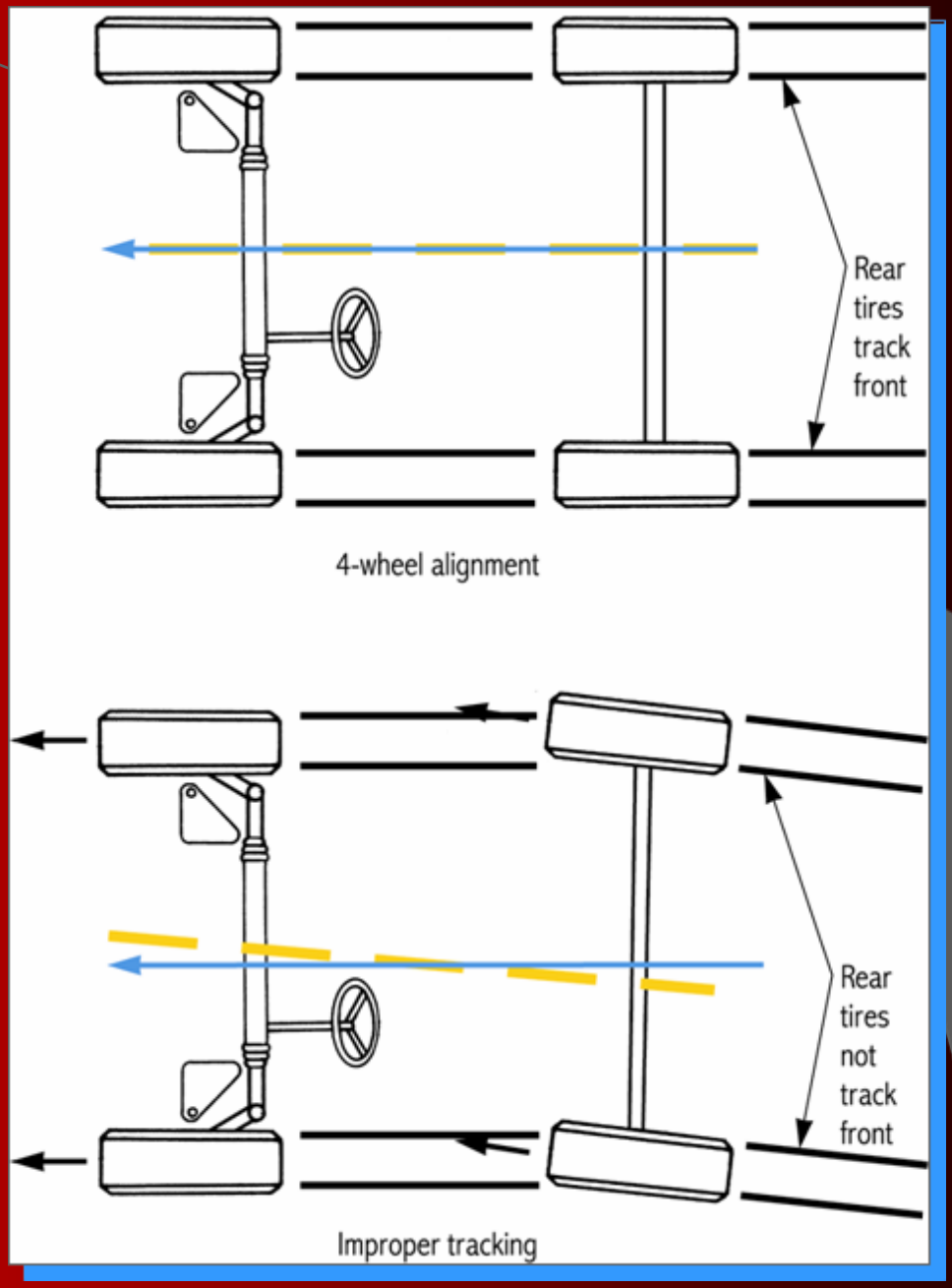
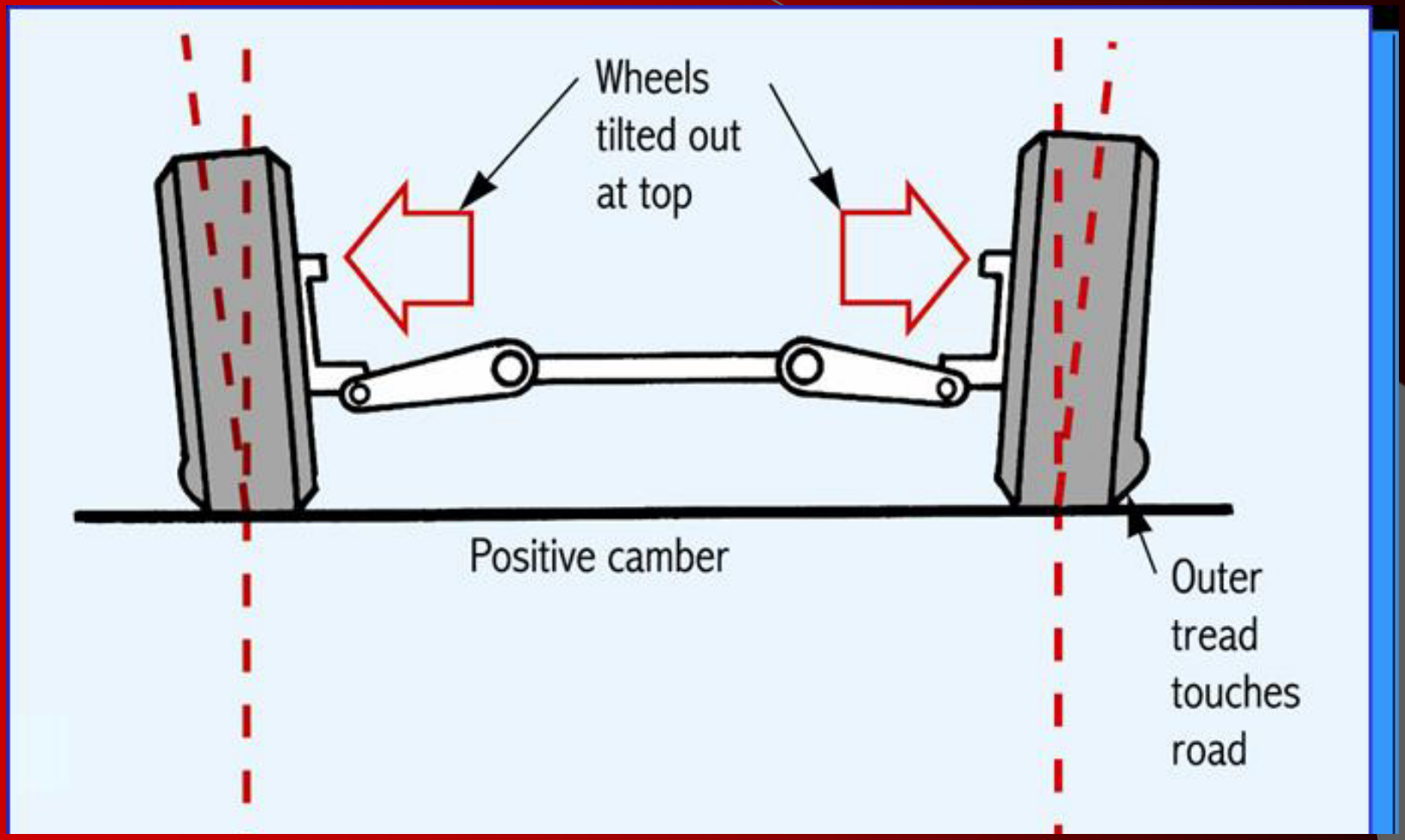
9. Tracking refers to the position or direction of the two front wheels in relation to the two rear wheels.

10. Positive Camber results when the tops of the wheels tilt outward when viewed from the front.

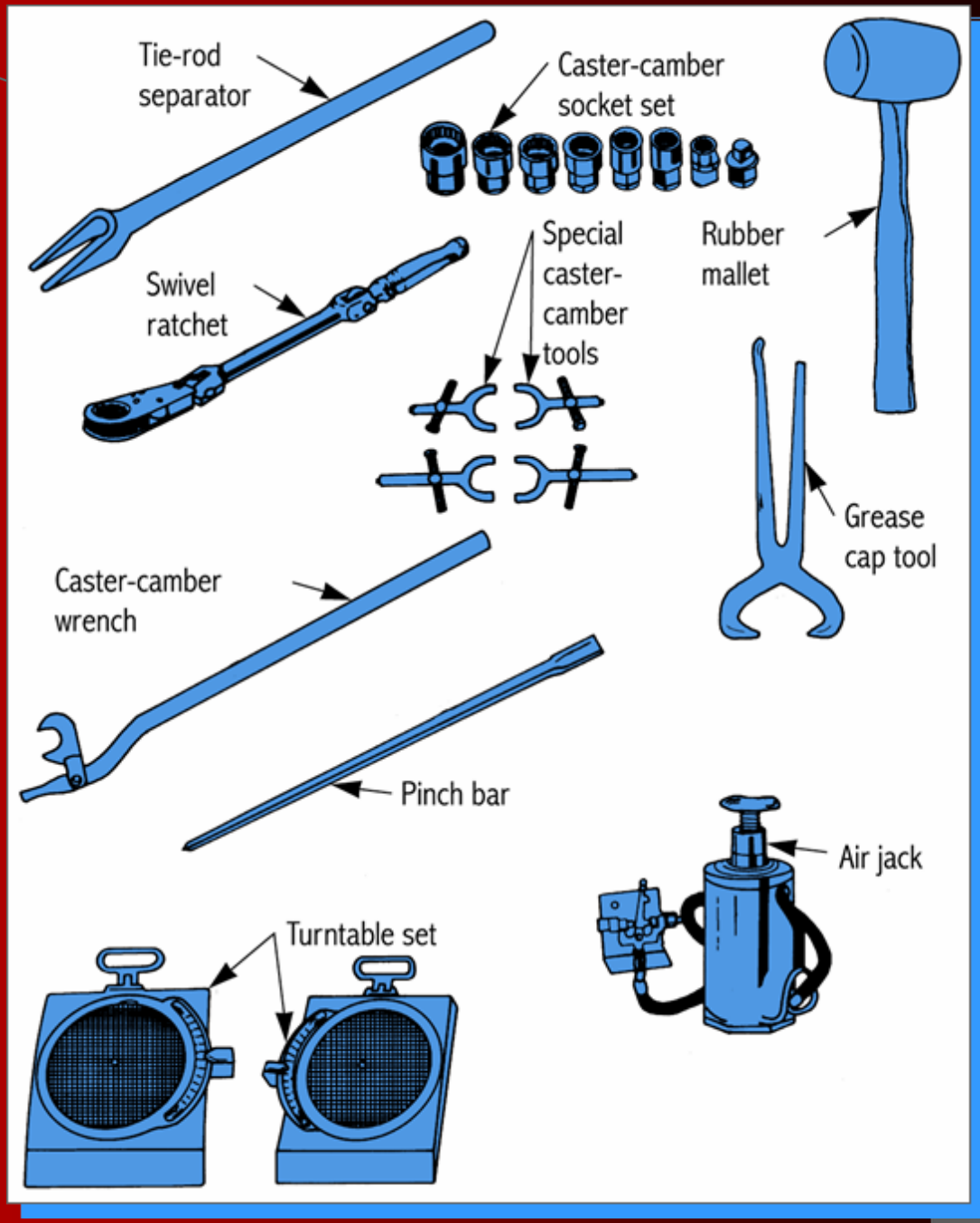
Tracking


Rear tires track front
4-wheel alignment
Rear tires not track front
Improper tracking

Positive Camber



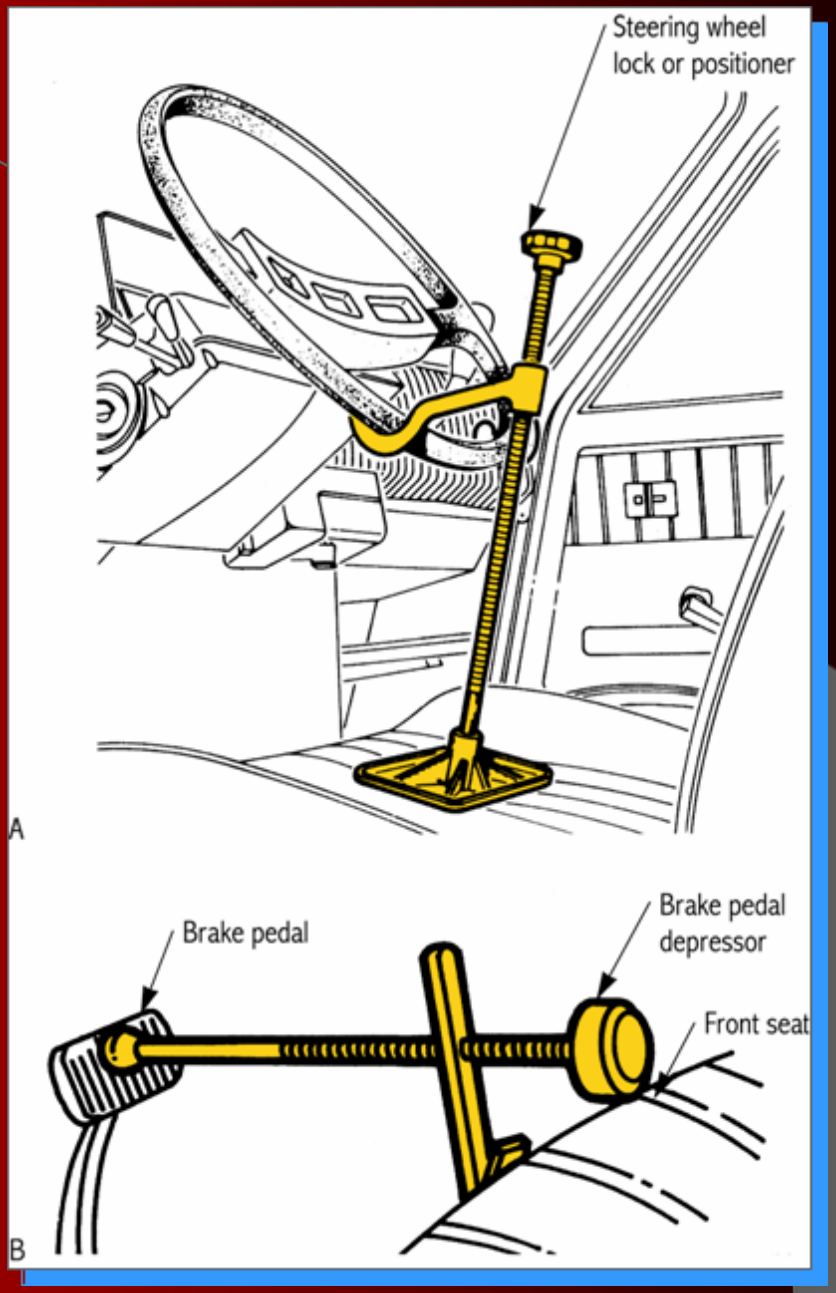
Wheel Alignment Tools



Wheel Alignment Tools

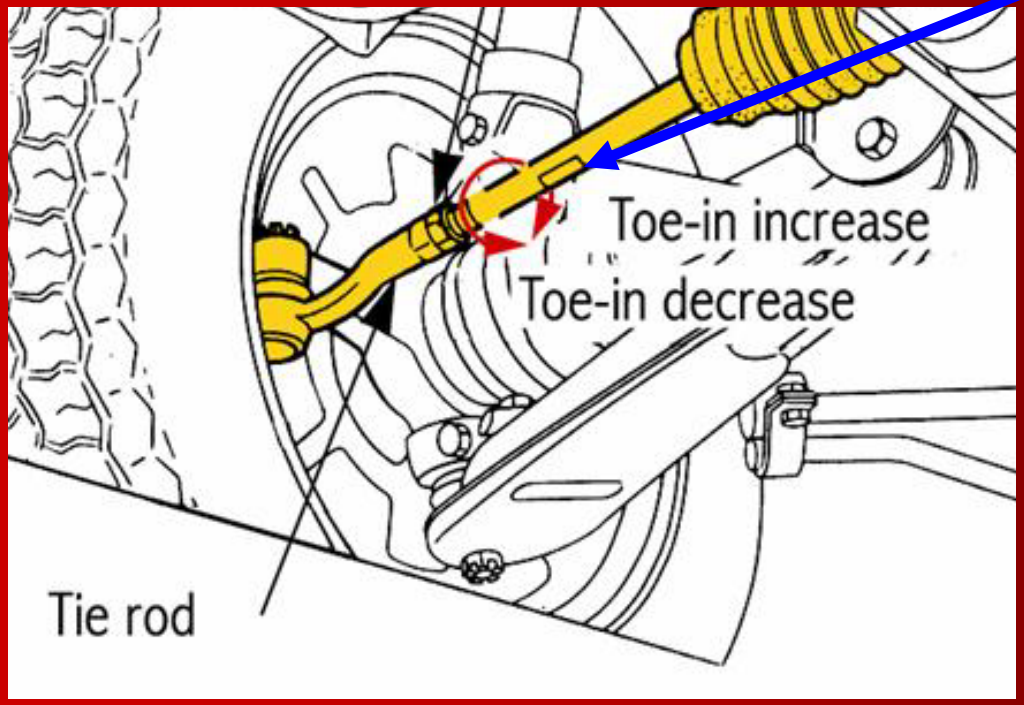
A. Steering wheel lock

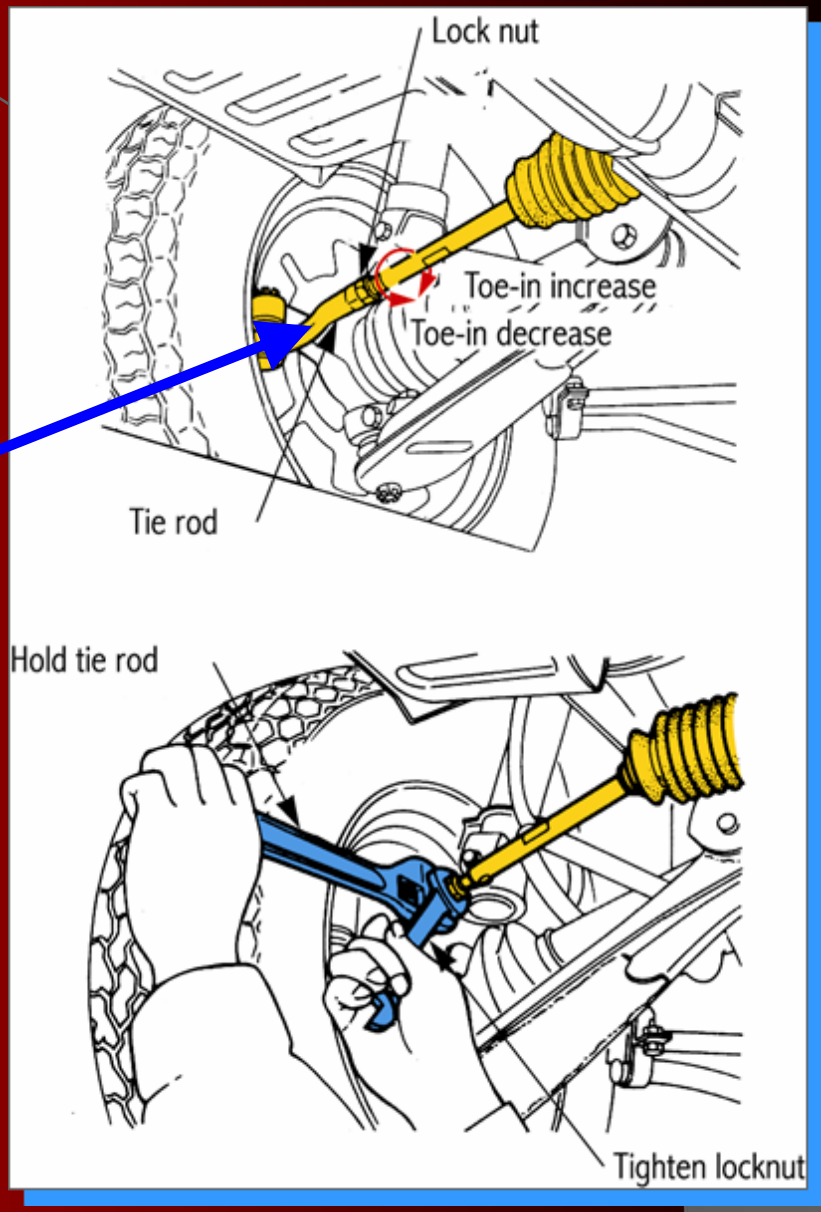
B. Brake pedal depressor



Toe Adjustment

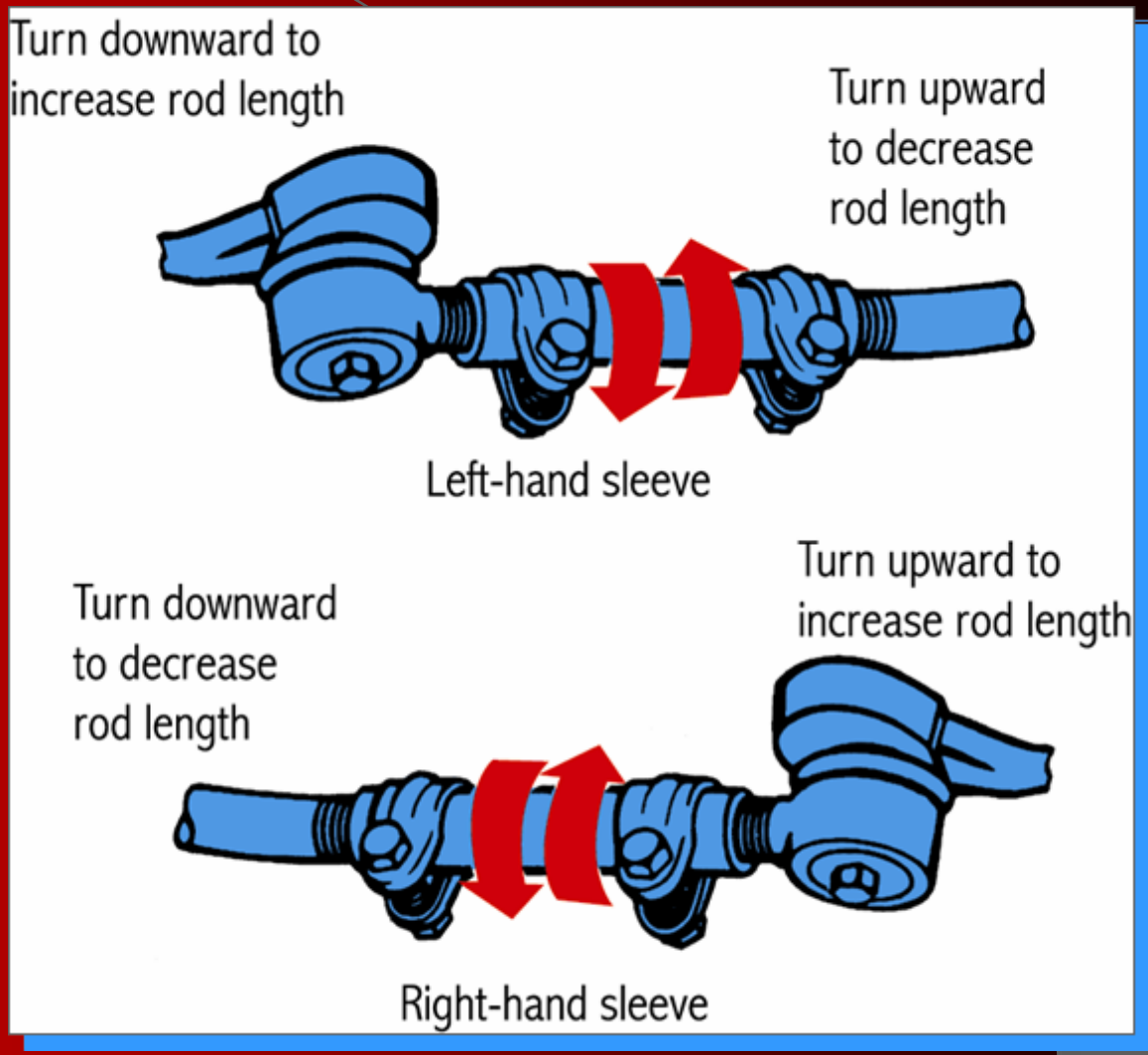
Changing tie-rod length on a rack-and-pinion unit





Toe Adjustment

Changing tie-rod length on linkage type steering



Alignment Rack

Alignment Console

Learning Objectives

- Explain the principles of wheel alignment.
- List the purpose of each wheel alignment setting.
- Perform a pre-alignment inspection of tires steering, and suspension systems.
- Describe caster, camber, and toe adjustment.
- Explain toe-out on turns, steering axis inclination, and tracking.
- Describe the use of different types of wheel alignment equipment.