

Front End Alignment Camber/Caster

Lesson 12

Remember:

Pretty Please My Dear Aunt Sally

(From left to right; **P**arentheses; **P**ower; **M**ultiply; **D**ivide; **A**dd, **S**ubtract)

You're driving down the highway. The car keeps pulling to the left. Look at your tires and the wearing on the inside edges. What could be the problem?

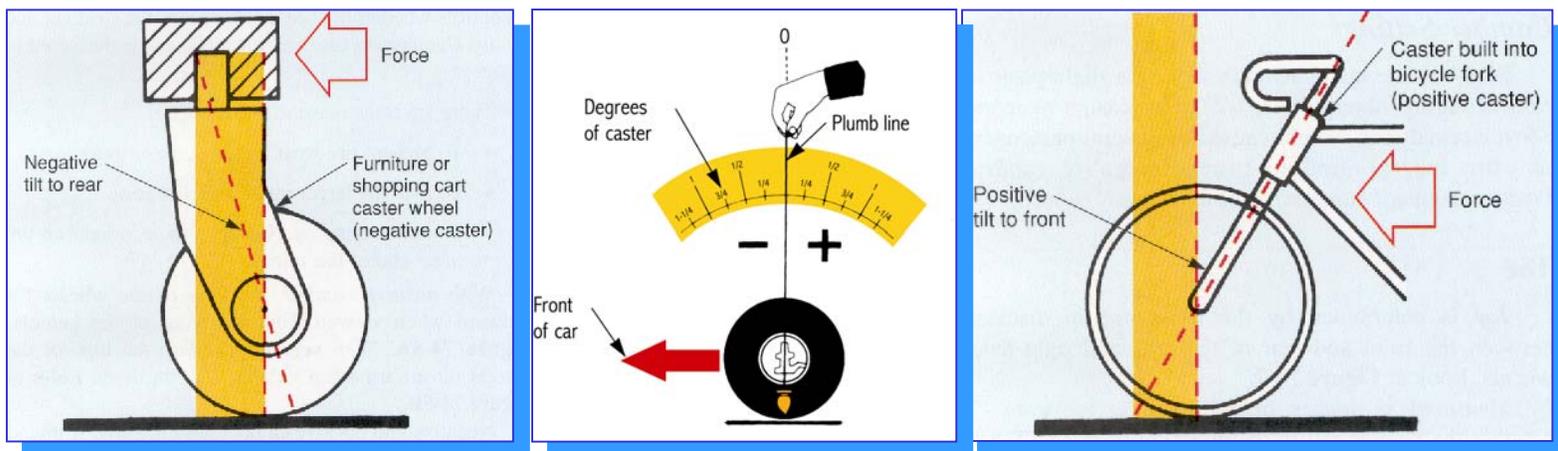
Camber, caster, toe-in/toe-out and angles of a circle, are measurements taken and adjusted during a front wheel alignment. These measurements are critical to tire wear and steerability.

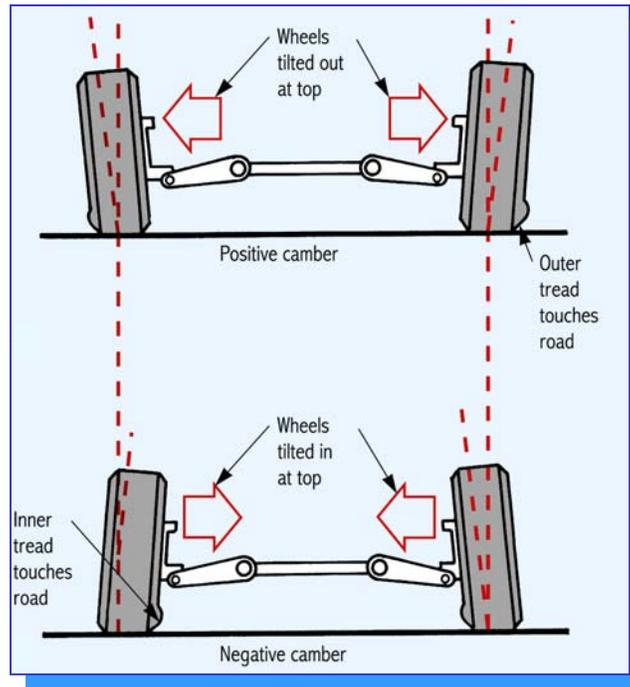
Some of the background math skills needed before you can learn how to make front end alignment adjustments are:

1. Using tolerance specifications to find specification ranges
2. Converting fractional degrees to decimal degrees
3. Converting linear measurements

Then you can understand how the adjustments affect the front end steering.

First, we're just going to focus on camber and caster values, then we'll examine Toe-In/Toe-Out.





Positive and Negative Camber

1. The camber reading of a wheel on a Buick is $-.125^\circ$. How large an adjustment must be made to bring the wheel into specifications? The specifications for camber are $+.60^\circ \pm .50^\circ$.

2. Sometimes we need to convert fractions to decimals and visa versa and fractional degrees to decimal degree. For instance manufacturer specifications calls for a camber reading of $1.3^\circ \text{ P} + .5^\circ$ but the measurement instrumentation reads $1 \frac{3}{4}^\circ \text{ N}$. How much do you have to change the angle to meet manufacturer specifications?

3. Each $\frac{1}{8}$ " shim is equal to $.125^\circ$. Do we need to remove or add shims? How many should be removed or added? What is the total thickness of the shim(s) required to meet the manufacturer specifications? What would the final reading be after making the appropriate adjustments?

4. Change a manufacturer's specification of $\frac{1}{2}^\circ \text{ N}$ minus $\frac{3}{8}^\circ \text{ P}$ caster to decimals.

5. Do these total camber angle readings fall within the limits of: $0^\circ \pm \frac{1}{2}^\circ$?

	Left Wheel	Right Wheel
A:	$1/2^\circ$ P	0°
B:	$1/4^\circ$ P	$3/4^\circ$ P
C:	0°	$3/4^\circ$ N

6. Use an inequality to express the range of values for the following tolerances:

A. $-1.55 + .25$

B. $3.75 + .5$

C. $1.25 + .5$

7. Convert the following fractions to decimals:

A. $3/4$

B. $5/8$

C. $5/6$

D. $25/34$

8. Convert the following decimals to fractions:

A. $.125$

B. 1.45

C. 1.375

D. $.625$

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Lesson 12 Worksheet – Front Alignment: Camber and Caster

Name: _____ AM-1: _____ PM _____ Date: _____

1. Use the information provided above to explain, in writing, what adjustments need to be made to bring the vehicle into proper alignment specifications. Explain the processes used to make any corrections, if needed.

Vehicle Specs:

Alignment Machine Readings:

Camber

L Camber 3.25° P

+2.75 +/- 0.5°

L Caster 1.5° P

Caster

R Camber 1° N

L $+1.00^{\circ}$ P +/- 0.5°

R Caster 0.75° P

R $+1.25^{\circ}$ P +/- 0.5°

L Camber _____

R Camber _____

L Caster _____

R Caster _____

2. Change fractional degrees to decimal degrees:

A. $-1/8^{\circ}$ _____

B. $3/4^{\circ}$ _____

C. $6 \frac{1}{4}^{\circ}$ _____

3. Use an inequality to express the range of values for the following tolerances:

A. $-1.65 \pm .85$ _____

B. $3.75 \pm .25$ _____

C. $.25 \pm .5$ _____

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Lesson 12 Homework – Front Alignment: Camber and Caster

Name: _____ AM-1: _____ PM _____ Date: _____

1. Use the information provided above to explain, in writing, what adjustments need to be made to bring the vehicle into proper alignment specifications. Explain the processes used to make any corrections, if needed.

Vehicle Specs:

Alignment Machine Readings:

Camber

L Camber 1.05° P

+1.25 +/- 0.5⁰

L Caster 2.30° P

Caster

R Camber 1.50° N

L $+1.60^{\circ}$ P +/- 0.5⁰

R Caster 1.75° P

R $+1.15^{\circ}$ P +/- 0.5⁰

L Camber _____

R Camber _____

L Caster _____

R Caster _____

2. Change fractional degrees to decimal degrees:

A. $-1/16^{\circ}$ _____

B. $5/7^{\circ}$ _____

C. $1\ 2/5^{\circ}$ _____

3. Use an inequality to express the range of values for the following tolerances:

A. $-1.05 \pm .65$ _____

B. $3.25 \pm .75$ _____

C. $1.25 \pm .5$ _____