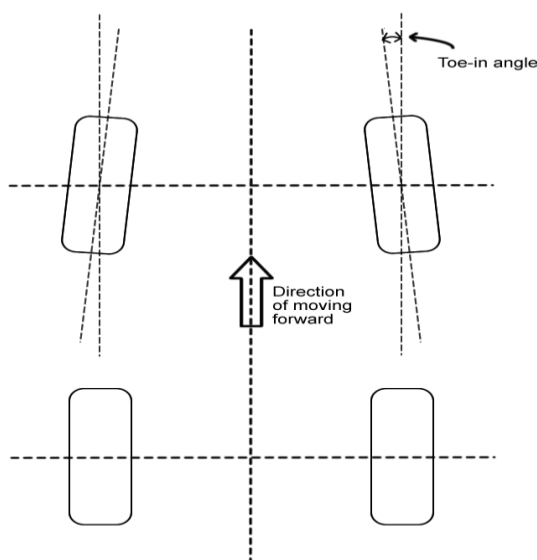




WHEEL ALIGNMENT

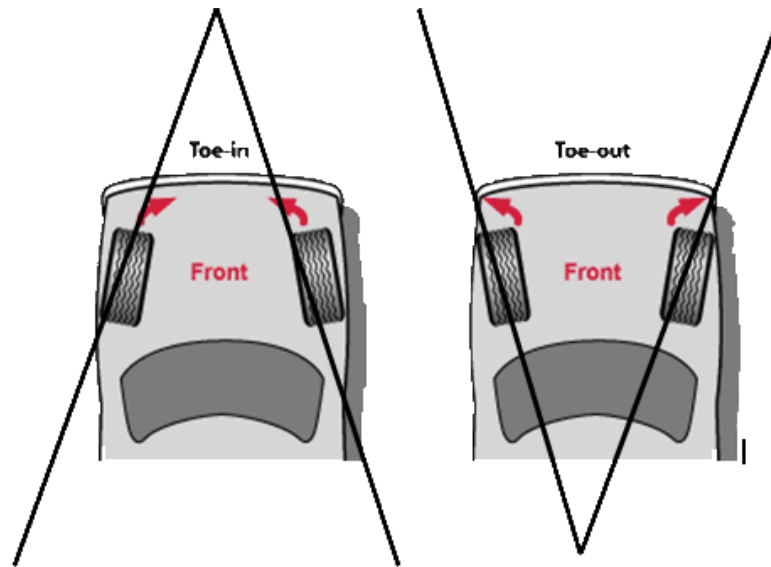
The wheel alignment refers to the positioning of the front wheels and steering mechanism that gives the vehicle directional stability, promotes ease of steering and reduces tyre wear to a minimum. A vehicle is said to have directional stability or control if it can run straight down a road, enter and leave a turn easily and resist road shocks. The front wheel alignment depends upon the following terms – Camber, Caster, Kingpin inclination, toe-in and toe-out on turns. The front wheel geometry or steering geometry refers to the angular relationship between the front wheels, the front wheel attaching parts and the vehicle frame. All the above terms are included in the front wheel geometry. The various factors that affect the wheel alignment of the vehicles are given below

- Factors pertaining to wheel
 - ✚ Balance of wheels
 - ✚ Inflation of tyres
 - ✚ Brake adjustment
- Steering Geometry
 - ✚ Camber
 - ✚ Caster
 - ✚ Toe-in and Toe-out
 - ✚ King pin inclination
- Steering linkages
- Suspension System





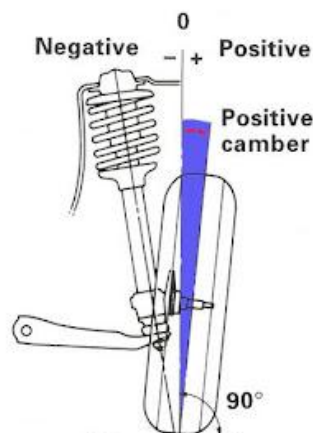
WHEEL ALIGNMENT



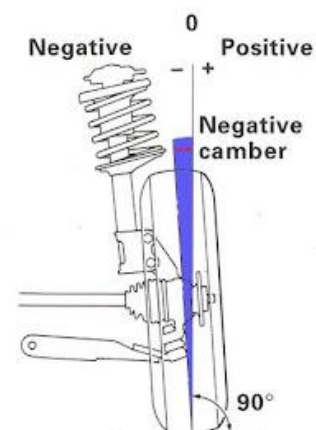
CAMBER:

The angle between the centerline of the tyre and the vertical line when viewed from the front of the vehicle is known as camber. When the angle is turned outward, so that the wheels are farther apart at the top than at the bottom, the camber is positive. When the angle is inward, so that the wheels are closer together at the top than at the bottom, the camber is negative. Any amount of camber, positive or negative, tends to cause uneven or more tyre wear on one side than on the other side. Camber should not exceed 2° .

Positive Camber



Negative Camber



PROCEDURE:

- ✚ Turn the wheel to 30° LHS
- ✚ Adjust the spirit level such that the bubble occupies the center position.
- ✚ Note the reading of the 60° scale.
- ✚ Turn the wheel to 30° RHS and the above procedure is repeated and the value is noted.

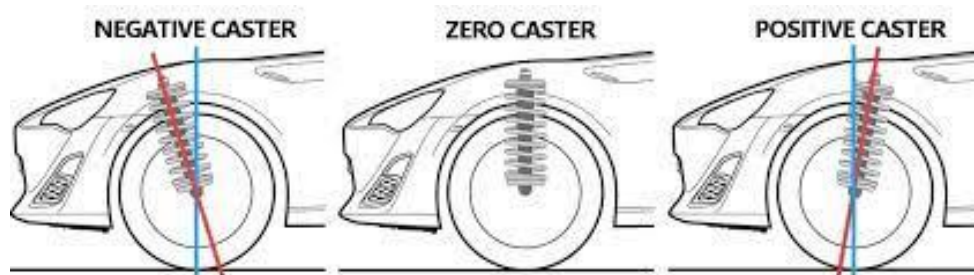
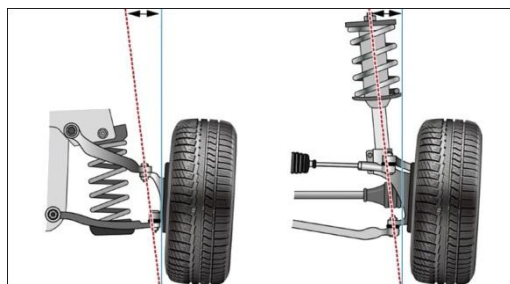


WHEEL ALIGNMENT

- ✚ The difference between the two readings gives the camber angle.

CASTER:

The angle between the vertical line and the kingpin centerline in the plane of the wheel (when viewed from the side) is called the Caster angle. When the top of the king pin is backward, the caster angle is positive and when it is forward the caster angle is negative. The caster angle in modern vehicles range from 2 to 8 degrees.



PROCEDURE:

- ✚ Park the car on the turning table
- ✚ Turn the wheel alignment gauge to 90° .
- ✚ Fix the wheel alignment gauge on the wheel.
- ✚ Turn the wheel to 25° in RHS.
- ✚ Adjust the bubble to its original position
- ✚ Note the reading on the 50-degree scale and the noted value will give the caster angle.



WHEEL ALIGNMENT



KING-PIN INCLINATION:

The angle between the vehicle line and the centre of king pin (or) steering axle, when viewed from the front of known as king –pin inclination in combination with castor is used to provide directional stability in modern cars, by tending to return the wheels to straight effort particularly when the vehicle is stationary. It reduces tyre wear also the king-pin inclination in modern range from 4° to 8°.

PROCEDURE:

- ✚ Park the car on the turning table.
- ✚ Fix the wheel alignment gauge in the wheel.
- ✚ Turn the wheel to 30 0 RHS and adjust the sprit level such that the bubble occupies centre position.

TOE-IN AND TOE- OUT:

The front wheels are usually turned in slightly in front so that the distance between the front ends (A) is slightly less than the difference between the back ends (B) , when viewed from the top the difference between these distance is called toe in. the amount of toe-in is usually 3 to 5 mm. The toe in is provided to ensure parallel rolling at the front wheels to stabilize steering and prevent side slipping and excessive tyre wear.



WHEEL ALIGNMENT



Toe out is the difference in angle between the two front wheels and the car frame during turns steering system is designed to turn the inside wheel through a larger angle. Then the outside wheel when braking in a turn, the condition causes the wheels to toe-out on turn due to different in their turning angle, the toe-out is screwed by knuckle, knobs and fitness arms.

PROCEDURE:

- ✚ The toe-out bar is positioned front the front of the vehicle such that the pointer to where the wheel and the distance between the wheel is found the scale on the bar is kept as(A)
- ✚ Similarly the distance between the front wheels on the rear side is keep it as (B).
- ✚ From the reading, we can find toe-in and toe-out. If $A > B$ then it is toe-out, if $B > A$, then it is toe-in.