



## Reducing Friction Related to Alignment

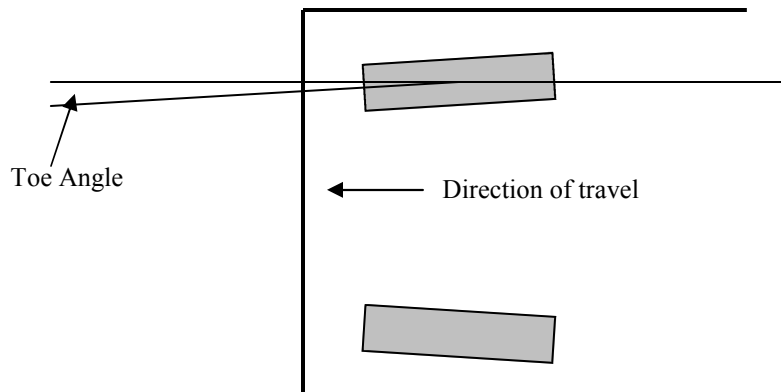
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### Rolling friction due to toe setting:

Toe is a suspension setting which has an important effect on fuel economy. Various Mercedes models use different toe settings depending on the anticipated use of the car and less often because of the suspension design. For example, a 115 chassis 240D is an economy car. A 116 chassis 450 SEL is a performance car. The toe setting is used as a tradeoff between different design goals. Rolling friction of the tires and bearings tends to pull the suspension slightly backward at higher speed and the toe setting should compensate for this. More importantly, the greater the toe setting, the more stable the car will feel at high speed.

Toe specifications for various Mercedes Chassis

Chassis Type	Toe Angle	Sideways movement, ft per mile
114, 115	15'	23
107, 108, 109, 111, 113	20'	31
123	25'	38
116	35'	54



This stable feel comes at a cost. A positive toe setting means that the tires are pointed very slightly inward. This inward angle means that both tires are slightly skidding sideways to overcome the positive toe setting. This effect can be very significant.

If the toe of a 107 chassis 450SL is set precisely at the recommended 20 minutes of angle, then both front wheels will have to be dragged sideways about 30 feet every mile! For cars designed for very high economy, like a Honda Insight, narrow tires are used with very little positive toe.

When tuning your car for maximum economy, set the toe for an absolute minimum amount, approximately **5 to 10** minutes of angle. The suspension components which contribute to accurate toe setting (suspension bushings, ball joints, tie rods, etc.) should be carefully checked for excessive play so that the toe can be precisely set. When setting the toe precisely your technician should lower the car back onto the suspension, roll the car back and forth a few tire revolutions, then raise the car to check the toe again.

Once the toe has been accurately set then a coast-down test should be performed to accurately measure the total amount of chassis drag.