

terms of position. It will see its greatest extension. The most active corners in terms of velocity are the **left front** and **right rear**. The left front is extending; the right rear is compressing.

- ③ **Mid-turn:** Braking has ended. The driver feeds in at least enough power to overcome drag. The car either holds steady speed or gently begins to gain speed. The car is approximately in steady-state cornering. Forward acceleration is negligible. Lateral acceleration is at its maximum. Duration of this phase may be considerable with a smooth driver in a long turn, or it may be negligible if the turn is brief or the driver is abrupt.

Roll position is rightward from static, and stable. Roll velocity is near

zero. If the mid-turn phase lasts a noticeable length of time and steady-state cornering is closely approximated, pitch position will be close to static, and pitch velocity will be near zero.

If steady-state cornering is approximated, all corners of the suspension are active in terms of position, and none are active in terms of velocity. The more the turn is banked, the more the rights are compressed and the less the lefts are extended. In corners around 15 degrees, the lefts neither compress nor extend much, and at steeper angles the lefts compress. As stated earlier, we are not considering such cases here.

The car is sensitive to all of its springs, especially the rights, and none of its shocks.

- ④ **Early exit:** The driver begins to increase power application and allow the car to widen its arc. Lateral acceleration diminishes and forward acceleration increases.

Roll position is rightward from static, and decreasing. Roll velocity is leftward, and increasing. Pitch position is rearward from static, and increasing. Pitch velocity is rearward.

The most active corner in terms of position is the **right rear**. It will see its greatest compression during this phase. The **left front** is also active in terms of position. It will see its greatest extension. In terms of velocity, the most active corners are the **right front** and **left rear**. The right front is extending (de-compressing); the left rear is compressing (de-extending).

- ⑤ **Late exit:** Similar to early exit, except that forward acceleration is now the dominant factor and lateral acceleration is fading into insignificance. Lateral acceleration will be zero at the conclusion of this phase, or very nearly zero, and forward acceleration will be at its maximum.

Roll position is rightward from static, less than before, and diminishing. At the conclusion of this phase, roll position reaches approximately static (car is going straight). Roll velocity is leftward, and decreasing. Pitch position is rearward from static, and increasing. Pitch velocity is rearward.

The most active corners in terms of position are still the **right rear** and **left front**, but the relative significance of right rear compression is diminishing. At some point in this phase, right front and left rear positions reverse from earlier phases: the right front goes into an extended position and the left rear goes into a compressed position. This means that spring changes on these two corners work backwards from the way they worked in previous phases. The most active corners in terms of velocity are still the **right front** and **left rear**.

We pay attention to suspension position because it is the key to spring tuning. We pay attention to suspension velocity because it is the key to shock tuning. Note that early and late exit are similar in terms of suspension velocity, but qualitatively different in terms of suspension position.

Now that we know what the suspension is doing in the turn, we are in a position to predict the effects of spring and shock changes. Remember that the rules in the chart (left) are only as good as how your situation matches the one we're modelling here. If your rear suspension lifts under power or compresses in braking, or you run on steep banking, the rules change.

CHASSIS TROUBLESHOOTING CHART

CAUTION: See the rest of this article for important information on applicability of these rules.

Tuning factors listed are the most influential ones for the phase of cornering specified, but are not the only influential ones

	TO TIGHTEN LOOSE CAR	TO LOOSEN TIGHT CAR
Early Entry	Stiffer right springs, especially RF	Softer right springs, especially RF
	Softer left springs, especially LR	Stiffer left springs, especially LR
	Stiffer RF compression damping	Softer RF compression damping
	Softer LR extension damping	Stiffer LR extension damping
	More front brake	More rear brake
	Less front and rear tyre stagger	More front and rear tyre stagger
	More static diagonal percentage	Less static diagonal percentage
Late Entry	Stiffer RF spring	Softer RF spring
	Softer LR spring	Stiffer LR spring
	Stiffer LF extension damping	Softer LF extension damping
	Softer RR compression damping	Stiffer RR compression damping
	More front brake	More rear brake
	Less front and rear tyre stagger	More front and rear tyre stagger
	Higher front/lower rear roll centre	Lower front/higher rear roll centre
	Stiffer front/softer rear anti-roll bar(s)	Softer front/stiffer rear anti-roll bar(s)
	More static diagonal percentage	Less static diagonal percentage
Mid-turn	Stiffer front springs, especially RF	Softer front springs, especially RF
	Softer rear springs, especially RR	Stiffer rear springs, especially RR
	Stiffer front/softer rear anti-roll bar(s)	Softer front/stiffer rear anti-roll bar(s)
	Higher front/lower rear roll centre	Lower front/higher rear roll centre
	Less rear tyre stagger	More rear tyre stagger
	More static diagonal percentage	Less static diagonal percentage
Early Exit	Softer RR spring	Stiffer RR spring
	Stiffer LF spring	Softer LF spring
	Softer RF extension damping	Stiffer RF extension damping
	Stiffer LR compression damping	Softer LR compression damping
	Less rear tyre stagger	More rear tyre stagger
	Higher front/lower rear roll centre	Lower front/higher rear roll centre
	Stiffer front/softer rear anti-roll bar(s)	Softer front/stiffer rear anti-roll bar(s)
	Aim rear wheels leftward	Aim rear wheels rightward
	More static diagonal percentage	Less static diagonal percentage
Late Exit	Softer right springs, especially RR	Stiffer right springs, especially RR
	Stiffer left springs, especially LF	Softer left springs, especially LF
	Softer RF extension damping	Stiffer RF extension damping
	Stiffer LR compression damping	Softer LR compression damping
	Less rear tyre stagger	More rear tyre stagger
	Aim rear wheels leftward	Aim rear wheels rightward
	More static diagonal percentage	Less static diagonal percentage