

Rowley Load Split Calculator

Assume all cars understeer to a certain degree and that any changes in suspension setup will increase or reduce understeer.

Rather than predicting an absolute handling balance, the value of the calculator is to highlight the effect of a **change** in setup that changes the front-rear load split difference (FRLSD), highlighted in orange, and hence handling balance

The table has been set up to show absolute values of load split at front and rear (ie magnitude but not sign) If after a change in suspension setup the FRLSD becomes greater, then the degree of understeer will be reduced as the rear split has increased relative to the front. If it reduces then the degree of understeer will have been increased. FRLSD will become negative if the front split is greater than the rear.

Case A Symmetrical Loading with 50% load on the Right and 50% Wedge

The car behaves in the same way on left and right hand turns .

Straight line braking and acceleration are achieved best due to equal wheel loads

The handling balance of the car will be influenced by the difference between Front and Rear Splits

In the symmetrical case the Front Split is 600 N and the rear Split is 1000 N (ie 2 x WT) for both left and right hand turns. The difference between front and rear splits is 400N in each case.

The overall grip of the car will be influenced by the magnitude of the difference between Left and Right splits. In this case the difference is **21.2 %** (39.4% and 60.6% in each direction of turn)

Case B Asymmetrical Static Loading Left to Right with 52.6% on the Right and 50% Static Wedge

The initial loading is not symmetrical (due to an offset driving position for example) but the Wedge is still 50% so the balance of the car is the same in left and right hand turns.

The overall grip of the car will be worse in Left Turns, than the symmetrical Case A, on Left turns as the difference between the total Left Split and Right split is now greater at **26.4 %** (with 36.8% for (LF+RF) and 63.2% for (RF+RR)

On Right turns, however, the overall grip should be better as the difference between the total Left Split and Right Split is less at **15.8%** with 42.1% for (RF + RR) and 57.9 % for (LF+RF).

Case C Asymmetrical Static Loading Left to Right with 53.3% on the Right and 48.7% Static Wedge

The car again behaves differently in left and right hand turns.

The initial loading is not symmetrical (due to an offset driving position longitudinally and laterally) but the Wedge is now 48.7% and so the handling balance will be different in each direction of turn.

In Left Turns the difference between Front and Rear splits is now 600 N. The difference in grip front to rear will be significantly greater than in Case A when this difference was just 400 N and so less understeer would be expected than would have been experienced in Case A. In right turns the opposite occurs with a difference of only 200N difference between Front and Rear Splits so understeer I would be expected to be higher.

The overall grip of the car will be different in each direction of turn as the total load difference is 53.3% on the right for static load. On Left turns the difference between the Left Split and Right split is **27.8%** (with 36.1% for (LF + RF) and 63.9 % for (RF + RR) and on Right turns the difference between the total Left Split and Right Split is now **14.6%** (with 42.7% for (RF + RR) and 57.3 % for (LF+RF).