

Race Related

1 Friction Circle

→ Grip / Friction / Traction

→ What Affects Grip?

↳ 3 things that affect grip.

1. Friction coefficient b/w tyred track

2. Size of contact patch

3. Vertical load on the tyre.

↳ Coefficient of friction is determined track surface and compound of tyre.

↳ Also the thing that drove the track before the race can determine the grip.

Another F1 race - High grip due to soft rubber
built on surface

↳ Contact patch - amount of tyre that is actually touching the track surface.

Greater contact (wide tyre) - greater grip.

More weight - more grip.

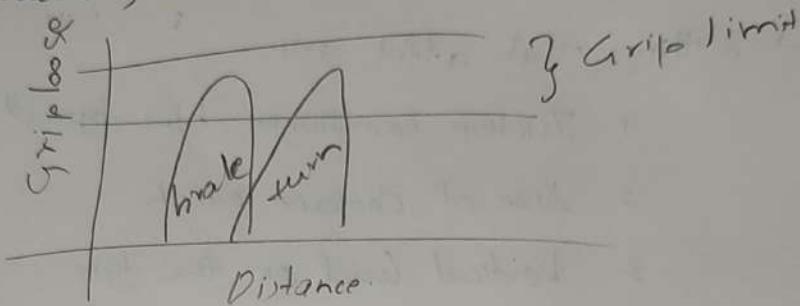
↳ This is why cars with greater down force is quick in corners, more weight is provided without actually doing it.

↳ Drivers move weight ~~is~~ around the car using suspension giving more/less grip.

→ How does it feel to break grip?

↪ Breaking grip doesn't spin car, until the input is smooth and gentle.

↪ Grip limit is not a line, but a band. The car can break traction, slide and come back from it.



↪ Two ways to break grip:

1. Laterally

2. Longitudinally.

Understeer { Car will understeer or oversteer when tyre
Overshoot { breaks grip sideways.

↪ Understeer - front breaks grip - doesn't turn.

Overshoot - rear breaks grip - feels like spin.

Locking up { ↪ Wheel will lockup (under rotate) or spin (wheel spin), when breaks grip longitudinally.

↪ Break with too much force, tyre will not be able to decelerate as much, stops ~~not~~ rotating. → Locking Up.

Tyre locking up - car won't slow down as quick

Could create a flat spot (flat tyre in one area), hence wear down quickly.

- ↳ ~~when~~ Accelerate with too much force, tyre over ~~not~~ rotate (wheel spin).

Wheel Spin - No much acceleration, rear tyre heat up significantly

→ How to Approach the Edge of ~~Grip~~? Grip?

- ↳ Increasing speed through corner in higher rate, increases the potential to go fast or spin ↗
- ↳ Slow to turn, corner the gentle acceleration.

→ How to ensure grip breaks progressively?

- ↳ For first increasing speed through corners gently.

- ↳ Smooth inputs of fluid to brakes, brakes, & steering an throttle also helps to have a constant grip.

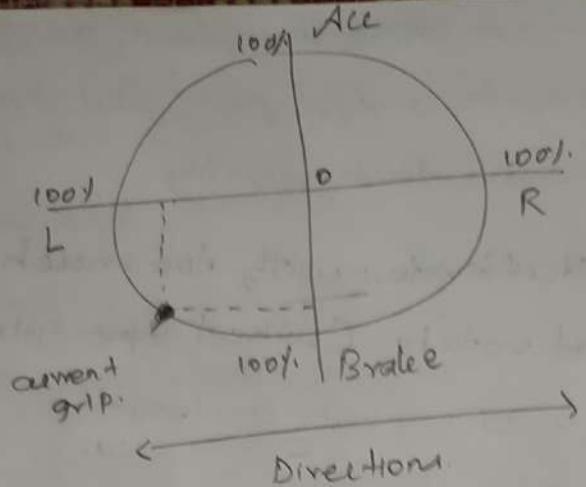
- ↳ Rough inputs breaks grip suddenly, here driver reacts rather than expecting the slide.

→ Combining Lateral and Longitudinal grip.

- ↳ Traction circle represents maximum grip available in any direction:

Breaking, Turning

Acceleration, Combination.



↳ If tyre grip is used 100% in one direction (e.g.: breaking)

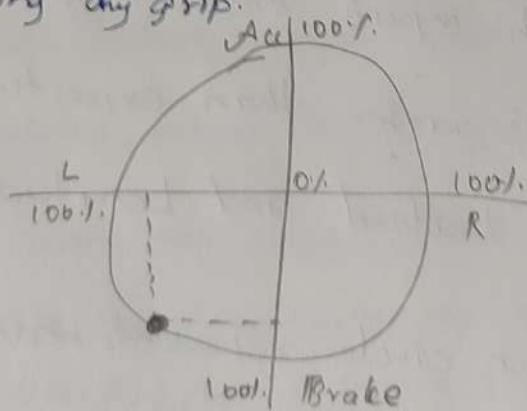
Not even 1% can be used to turn.

You must give up some ~~less~~ one directional braking
in order to change to other direction.

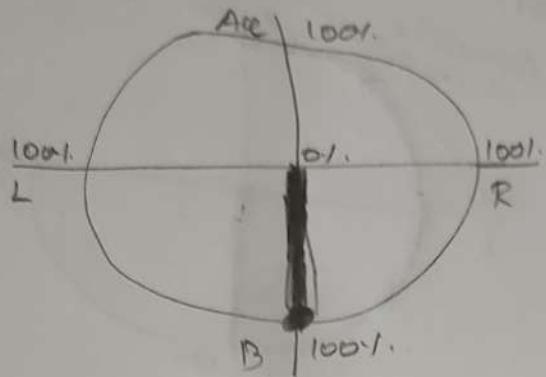
In this case, braking should be reduced to turn.

↳ Step wise implementation.

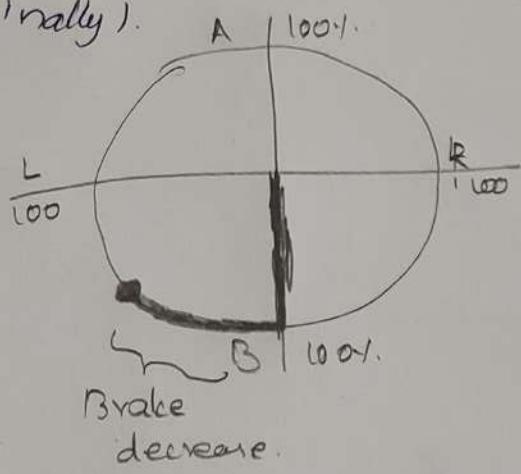
1. Car approaching a corner from a straight, tyres not using any grip.



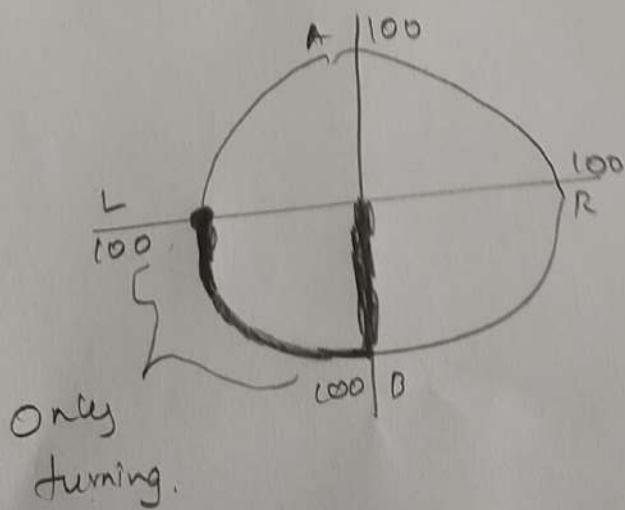
2. Car Driver starts braking, going through corner tyre using 100% of grip (longitudinal) to decrease decelerate No grip (laterally) to turn.



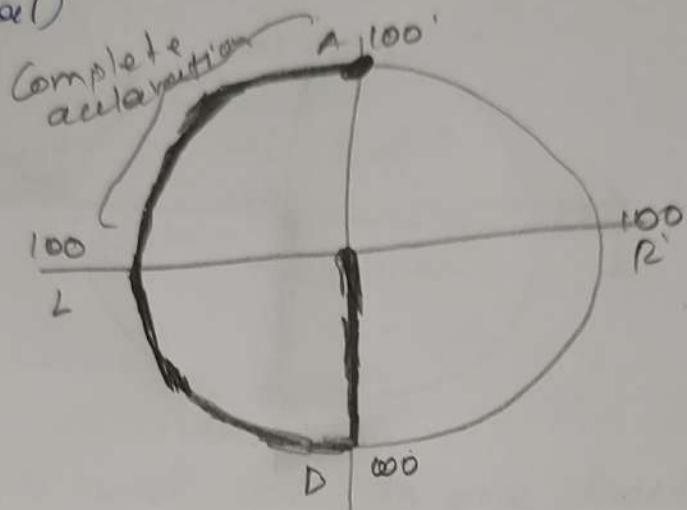
3. Beginning to turn towards the corner, grip used for turning (laterally) - less grip for braking (longitudinally).



4. Approaching apex, car at constant speed - grip solely used for turning (laterally) - Driver transition from brake to throttle.



5. Car beginning to open steering angle, to start accelerate.
Grip transfer from turning (laterally) to acceleration
(longitudinal)



And back to straights using no grip.