

## ***Disclaimer***

*The techniques shown here have been compiled from experienced sources believed to be reliable and to represent the best current opinions on driving on track. But they are advisory only. Driving at speed at NJMP ThunderBolt, or any other track, requires skill, judgment and experience. These techniques assume the reader has high performance driving knowledge and applies them as applicable to their level of driving experience.*

*High-performance driving can be very dangerous, carries inherent risks and may result in injury or death. NNJR and PCA make no warranty, guarantee or representations as to the absolute correctness or sufficiency of any representation contained herein. Nor can it be assumed that all acceptable safety measures are contained herein or that other or additional measures may not be required under particular or exceptional conditions or circumstances.*



# Trackside Classroom

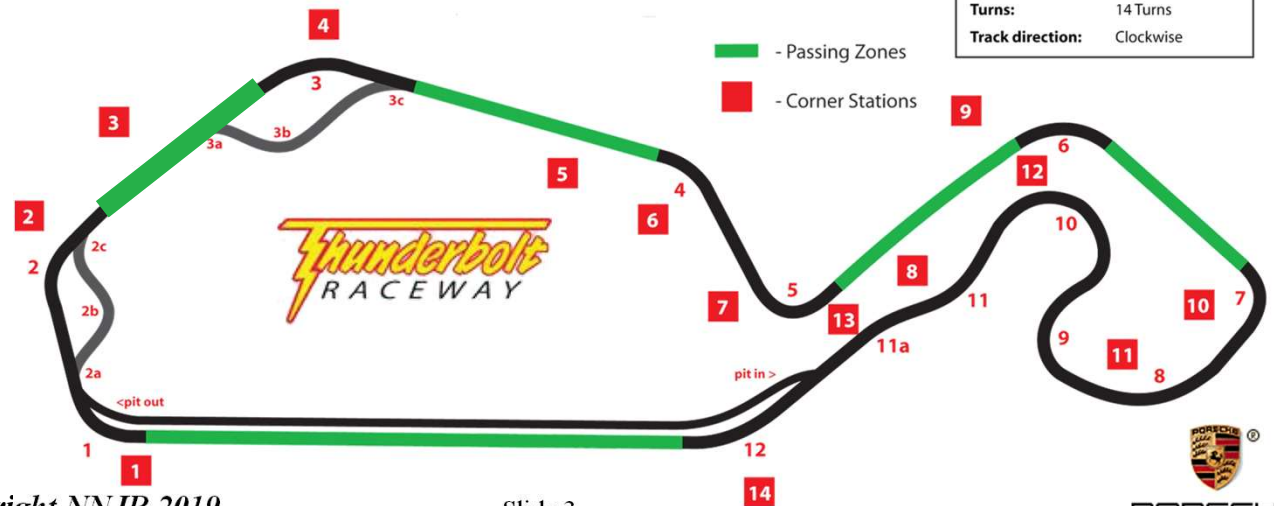
*How to Improve Smoothness*



- Smoothness
  - What is it?
  - Why do we care?
  
- How to improve?
  
- Thunderbolt Questions



Track Information:	
Length:	2.25 miles
Turns:	14 Turns
Track direction:	Clockwise





# Smoothness: What is it?



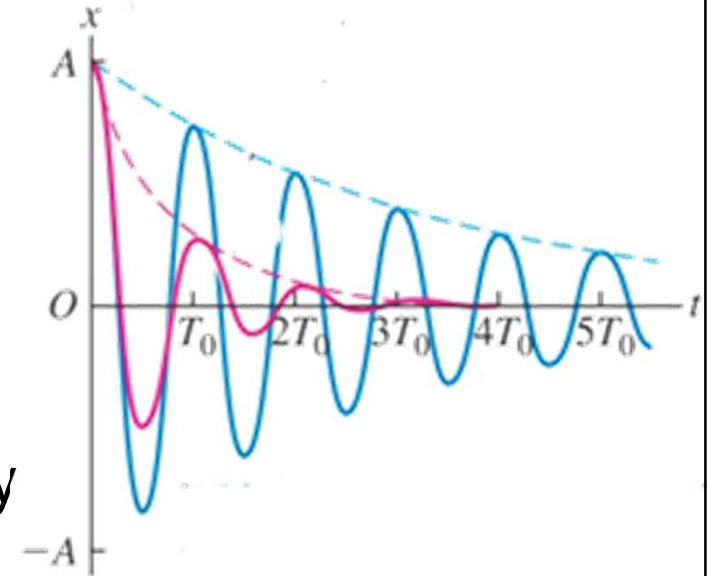
- Gentle use of the controls
  - Gas
  - Steering
  - Brake
  - Gear shift
- Not = “Slow”
- Is = “Not rushed” or forced

**Vic Elford:** *“You will notice that professional drivers often act extremely quickly, but they are rarely in a hurry. Turning from a straight must be a smooth flowing transition into and then out of the corner.”*

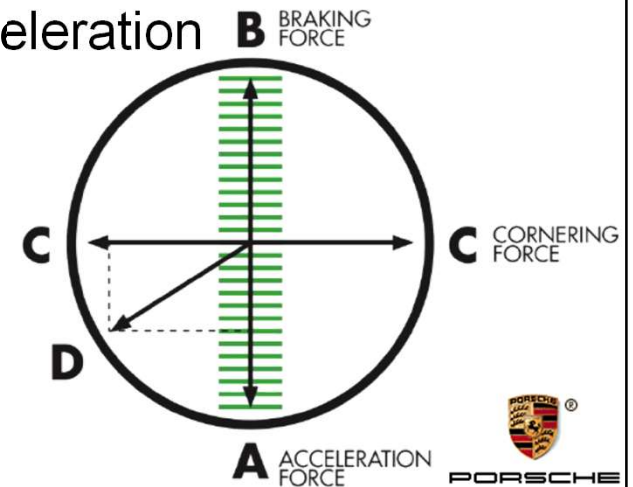
**Jackie Stewart (1985):** *“Senna is mellow on and off the throttle, calmly, smoothly, almost slowly.”*



- “Smooth is fast”
- Consider
  - Springs: load (compress) once
  - Tires: get to max grip, stay there
  - Weight transfer: move once and stay



- Using the full Friction Circle requires finesse:
  - Decreasing brake force and increasing cornering force
  - Decreasing cornering force and increasing acceleration
  - Balanced car has more grip



- Classic Advice
  - Controls are not “on/off”
  - No jerky or sudden movement
  - Wind, unwind steering
    - Turn progressively and once: “take a set”
  - An egg between foot and gas pedal
    - “Squeeze” the gas, “roll on”
  - Practice smooth gear shifts (3 motions)
  - Braking
    - Move foot smoothly (heel on floor)
    - Smooth but hard initial pressure (no egg!)
    - Gentle Brake Release
  - Practice every day in street driving
- Look at Data

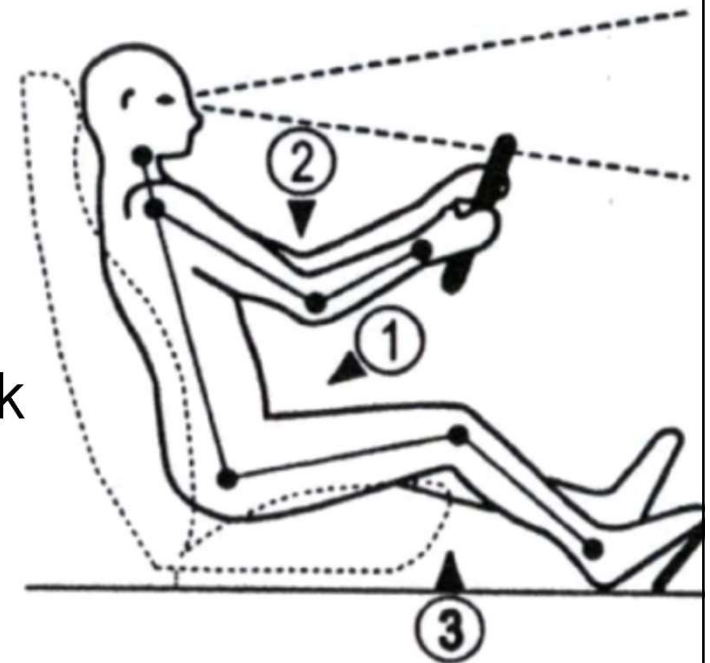




- Think in terms of Pressure, not position
  - Pressure on ball of foot during braking
    - Initial pressure
    - Gradual release
  - Amount of “pressure” applied to steering wheel
  - Pressure on gas pedal during acceleration
  - Pressure = “How Much?” steering, brake, etc.
- Make sure your body is relaxed
  - Be sensitive to feedback, esp. steering wheel



- Ideas to try
  - Lighten steering wheel grip
    - 4 on a 1-10 scale
  - Vary seating position slightly: does it help?
  - Look further ahead
  - Release the brakes slower
  - Focus on End of Braking (EOB)
  - How is your physical fitness?
  - Write down what worked, didn't work
- Always ask Why?





# NNJR Smoothness: Summary



- Smooth is fast
- Classic advice works
- Data may help
- Think about pressure
  - Especially in brake release
- Relax and be sensitive to feedback

*“It is not always possible to be the best, but it is always possible to improve your performance – gentle, smooth and progressive.”*

*--Sir Jackie Stewart*

