

## Lime Rock

# NNJR "Trackside Classroom" *Car Control and "Feel"*

*August 1-2, 2022*



## ***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 Lime Rock, 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.*

# NNJR Car Control and Feel



- What is car control?
  - Car does what I ask it to do; expect it to do
  - Inspires confidence, not scary
  - Remember: driver is “guiding not dictating” \*
- What is car “feel”?
  - I know what the car is doing
  - I can predict, not just react



\* *Dennis Macchio*



# NNJR What is the car doing?



- Handling is
  - Balance,
  - Responsiveness, and
  - Overall grip
- There are tradeoffs
- Driver must have confidence in the car
  - Starts with “feel”



*Ross Bentley: Speed Secrets  
Weekly 378*



# NNJR How to “feel” the car?



- How close are you to the limit?
- Do you know if/when your car is understeering?
  - Oversteering?
  - Both (at different times)?
- Do you know when PSM intervenes??
- Sensing the car is a learned skill! \*

\* *Ross Bentley*



# NNJR Develop “Seat of the Pants”

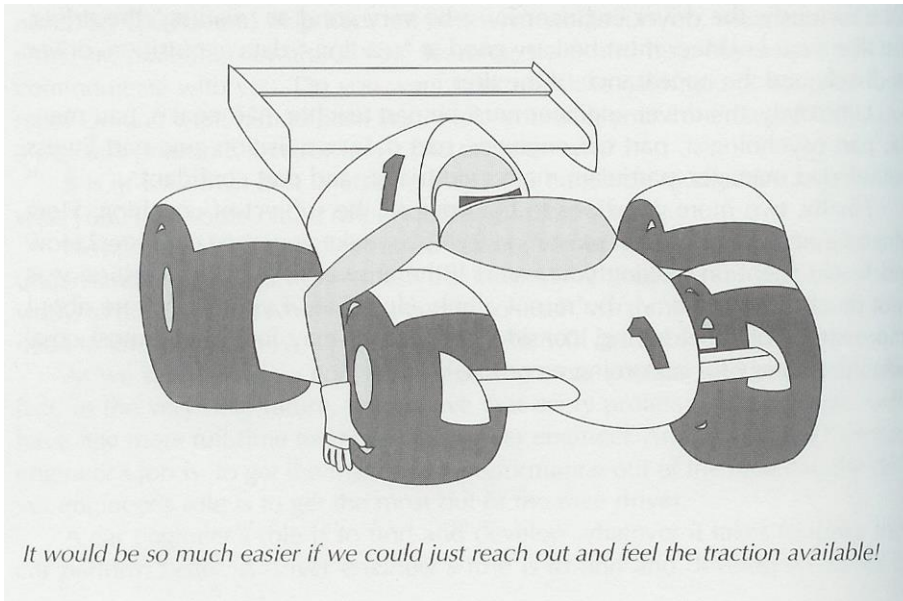


- Autocross
- Skid Pad
- Car Control Clinic
- Winter driving
- Etc.





- Sensory input sessions\*
  - Sound
  - “Seat of the pants” (Kinesthetics)
  - Feel in the steering wheel
  - Vision: car’s path vs. intended path



\*Ross Bentley

# NNJR What are we Sensing?\*



- Yaw (Body Slip Angle, Rotation)
- G-loads
- Weight (Load) transfer
- Steering effort/vibrations (steering is both output & input device)
- Visual picture
- Tire/wind/engine sound

*\*Ross Bentley*







- (Re)Learn the Track
  - Reference Points
  - Track Surface
  - Safety features
- (Re)Learn the Car
  - Brake Application
  - Brake Release
  - Throttle
  - Steering
- (Re)Learn the Traffic
  - Mirrors
  - What Would I Do If?
- Sensory Input
  - Vision
  - Kinesthetics
  - Hearing

\* **How you practice is more important than *amount***

Do it in a focused way,  
With clear goals,  
Plan for reaching goals, and  
A way to monitor your progress

*Sources: Ross Bentley, Speed Secrets Weekly 322 and 370; Talent is Overrated by Geoff Colvin, and Peak. Secrets from the New Science of Expertise by Anders Ericsson and Robert Pool*





- (Re)Learn the Track
  - Reference Points
  - Track Surface
  - Safety features

2. (Re)Learn the Car
  - Brake Application
  - Brake Release
  - Throttle
  - Steering

- (Re)Learn the Traffic
  - Mirrors
  - What Would I Do If?

1. Sensory Input
  - Vision
  - Kinesthetics
  - Hearing

\* **How you practice is more important than *amount***

Do it in a focused way,  
With clear goals,  
Plan for reaching goals, and  
A way to monitor your progress

*Sources: Ross Bentley, Speed Secrets Weekly 322 and 370; Talent is Overrated by Geoff Colvin, and Peak. Secrets from the New Science of Expertise by Anders Ericsson and Robert Pool*



# Deliberate Practice Worksheets



Topics for Sensory Input Worksheets  
Use these topics with your printed track map

## Reference Points

- Not cones!
- Cracks, posts, seams, curbs, etc.
- BOB, TI, EOB, A, TO, in between

## Track Surface

- Sealer, color change, etc.
- Elevation
- One new feature per lap

## Safety

- How soon/far ahead can I see flag stations?
- Bail out area(s) for each corner
- Which curbs could I drive on? Not?
- Etc.

## Brake Application

- Quick and hard enough? Too much?
- Does the car get upset?
- Totally consistent lap to lap?
- Get money in the bank early in the brake zone (Cass Whitehead)
- "On like a lion, off like a lamb" (Pobst)
- Etc.

## Brake Release

- Modulating pressure thru brake zone properly?
- Beginning release at the right point?
- Right rate? Slow, medium, fast
- Totally consistent lap to lap?
- Come off the brakes politely (Peter Argetsinger)
- Etc.

## Throttle

- Squeezing too soon? Too quickly? Not enough?
  - Pause between brake and gas?
- On floor until brake application?
- How are you using it (vs when)
- Use only the top half? (David Murry)
- Etc.

## Steering

- Especially how you unwind on corner exit
- Is turn-in from track edge?
- Is turn-in crisp/flowing or gentle/progressive
  - Both correct, depends on corner
- Etc.

## Mirrors

- Adjusted properly?
- How many cars behind?
  - End of back straight?
- Closing speed: is car in mirror closer or further away?
  - What color(s) is/are cars behind?
- Etc.

## What Would I Do If

- I smell anti-freeze?
- Car in front swerves under braking?
- Brake pedal soft in middle of traffic entering bus stop? off camber?
- Two fast cars, you give one signal, can't see second one?
- Etc.

## Vision

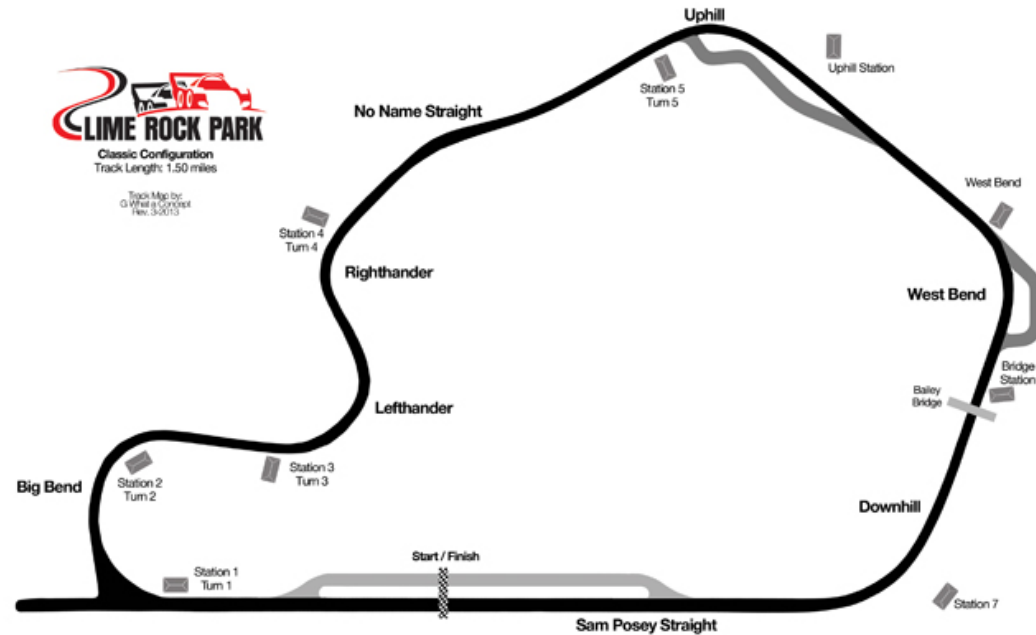
- Everything you can see on and off the track surface
  - Something new each lap
  - e.g. Horizon change during cornering
- How far ahead can you see?
- Etc.

## Kinesthetics

- Steering wheel feedback
- How g-loads build; weight transfer
- Feel the track surface
- Etc.

## Hearing

- Wind noise, tires, brakes
- Cornering vs. straight
- Different parts of track
- Etc.



Remember: Capture learning right away: in the first 10 minutes

- Write down what you saw, heard, felt
- Before lap times, data, video, socializing



NORTHERN NEW JERSEY REGION PORSCHE CLUB OF AMERICA  
Copyright 2020



Porsche Club of America

NNJR: Northern New Jersey Region Copyright 2022

Slide 11



PORSCHE

- As you start to turn in and relax the brakes
  - Did your car respond the way you expected?
  - Did it turn into the corner on the arc you expected?
  - Did it not respond as much as you expected, and on a radius not as sharp as you wanted?
  - Did it respond more than you expected, on a radius sharper than you wanted?
  - Did it turn the way you wanted, with more rotation than the amount of steering input would have indicated?

*Ross Bentley: Speed Secrets 473*

# NNJR Critical Point Because...



- What you sense your car is doing in this instant, dictates what happens – and what you do - through the rest of the corner. What do you sense?
  - Direction car turns vs. the steering angle you put in.
  - “Weight” of steering effort – more than expected, less than expected, what you expected.
  - Yaw angle of the car – your internal gyro sensing car rotation.
  - Visual picture –movement of horizon vs. what you expected.
  - Sound of the tires.

*Ross Bentley: Speed Secrets 473*



# NNJR Decisions, Decisions...



- The instant you turn in, you should be making decisions about what to do next. Should you:
  - Turn the wheel more, less, or hold it steady.
  - Continue easing off the brakes at the same rate, quicker, slower.
  - Look through apex to exit point, or take a global view, comparing the visual picture with what you planned.
  - Apply a tiny bit of throttle early to make up for over-slowng, or hesitate before applying throttle to adapt to too much entry speed.
  - Apply a tiny bit of throttle early to balance over-rotation, or hesitate before applying throttle to let car rotate more.

*Ross Bentley: Speed Secrets 473*



# NNJR How to Practice???



- Choose just one factor, or one decision, and consciously focus on it
  - Deliberately practice: paying attention to it for a period of time will improve your ability to sense and make decisions at a subconscious level.
  - And that will make you a consistently faster driver.

*Ross Bentley: Speed Secrets 473*





- Ross' 3 Suggestions. At least one session solely focused on
  - Steering effort, and how it changes (if it does) from turn-in, through the corner, and as you unwind the wheel exiting the corner.
  - Whether the car rotates as you release the brakes when entering a corner, and if not, what would it take to make it rotate.
  - The difference in sound from the tires as you turn into the corner, at maximum cornering, and as you unwind the wheel exiting the corner.

*Ross Bentley: Speed Secrets 473*







- Steering Effort
- Car Rotation/Brake Release
- Sound

Sensory Input Session(s)

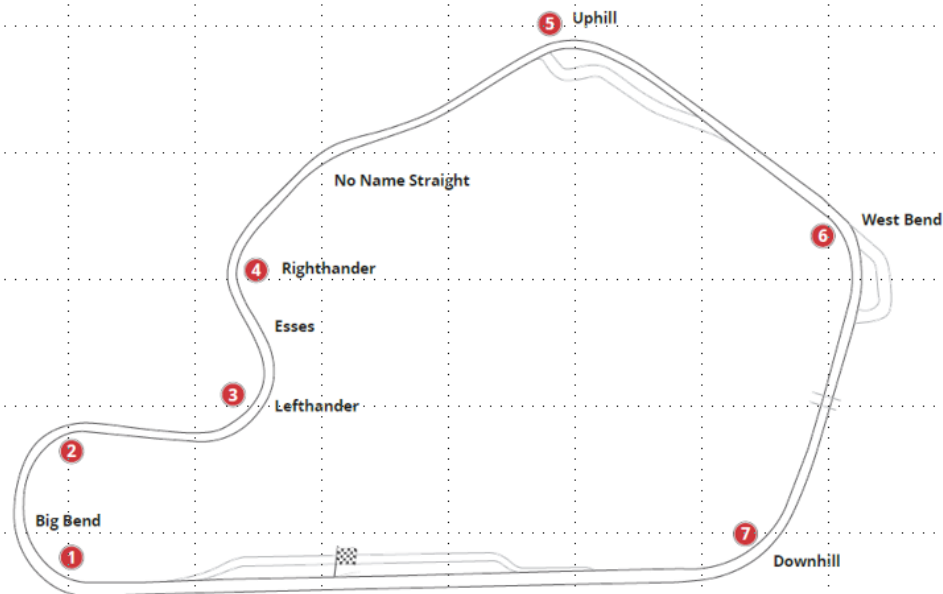
**Steering** (advanced):

- Spend an entire session solely focused on the steering effort, and how it changes (if it does) from turn-in, through the corner, and as you unwind the wheel exiting the corner.

*(from Ross Bentley Speed Secrets 473)*

- Download now!

– <https://bit.ly/3B0dpBd>



Write Steering notes on map immediately after session



# NNJR Car Control Summary



- Must “feel” what the car is doing!
  - Need confidence in what the car is doing
  - Key part of “advanced driving”
- No substitute for skid pad, AX, etc.
- To develop better “feel” on track
  - Use Deliberate Practice Worksheets
    - Pick 1 or 2 aspects per event
  - Really good? Use the Advanced Sensory Input Worksheets

