

# What is Autocross (AutoX)?

A fun way to develop some new skills and test your and your  
Car's limits in a Controlled and Safer environment than  
the public highway

With thanks to  
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# Ground rules

- Please silence your cell phone
- Please keep side conversations to a minimum
- Feel free to ask questions as we go but, please be polite about it
- If you disagree with us on any points in the presentation that is fine
- Everyone is entitled to their own opinion and is free to express it
- There will be time at the end of the presentation for more discussion



# What is this class about?

## 1. Autocross

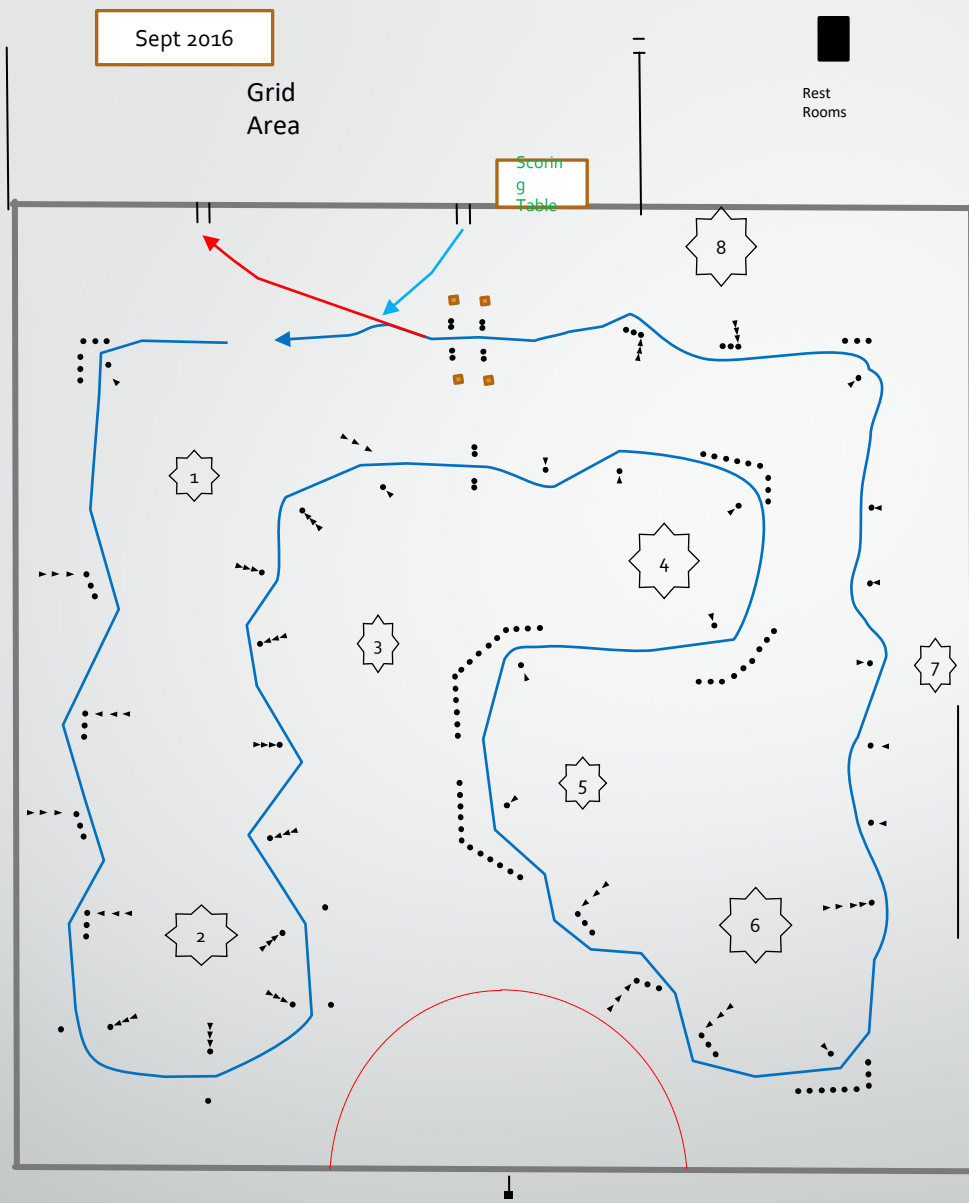
- Learning to drive your car through a course defined by cones
- Looking ahead
- Driving at the limit
- Reading the course
- Traveling a high rate of speed relative to the turn radii in close proximity to obstacles (traffic cones)
- Things happen very fast

## 2. Track day truism:

- Spend Money on your car to make it fast, you will go faster in that car
- Spend money on learning to be a better driver you will be faster in every car

# PCA Autocross "101"





**Example of an Autox course**

## First Timer- what is going to happen?

- Remove “loose stuff” from car the day before and load it with up drinks (non adult type), folding chair, sunscreen and helmet if you have one (2010 or newer “Snell-rated” helmet)
- Do a mechanical check of brakes, coolant, oil, tire pressure (start a few pounds over normal driving), bring an air tank or air compressor and gauge
- Wear comfortable clothes (long sleeve, cotton) and rubber sole shoes.

# First Time Autocross (con't)

- Arrive on site and sign PCA waivers
- Sign up for work assignment
- Quick safety inspection of car
- Walk the course (several times)
- Driver's meeting
- Drive on course or work course (after first run group switch)
- Multiple laps (one car on course for 3-4 laps)
- Do this several times and .....
- HAVE FUN






# What AutoX days are not

- A wheel-to-wheel race but exciting solo competition
- Bragging rights or setting lap records
- Speed test for your car
- A good hobby for show cars and older hot rods
  
- But at the end of the day you are responsible for making decisions that keep everyone safe at the track





# What will you Experience and Learn?

- A day of fun and thrills with some very nice folks
- Turning your car with high cornering force
- Max Acceleration for a few seconds at a time, 2 to 4 times each lap (depending on the layout)
  - If you did this on the street you would end up in jail
- Maximum Braking Force
  - If you did this on the street you would get rear ended
- You will learn that your car is far more competent than you are at this sport to begin with
- This will be A Great Day of Learning and developing new skills, finding the courage to push your boundaries back
- And meeting some new like minded and very nice folks



# How do you prepare your car?

- You do not need a race car or to modify your street car to try this hobby
- You do need to check your car's fluids
  - Change the oil if it has not been changed in the last 3000 miles or 1 year
  - Make sure the coolant is topped off
  - Coolant and water wetter is good (not glycol) since it does not freeze here
  - If your brake fluid is older than 24 months, new brake fluid is in order
  - A half tank of gas
  - Factory Tire pressures in your tires
  - Tires that should be less than three years old
  - Tires age quickly here in the dry and hot climate
- Wheel fasteners torqued to factory specification
- Clean it up, especially the windows and mirrors
- Remove all loose items from the car
  - If it is not tied down it comes out, including coffee cups, stuff in the door pockets, glove box, water bottles, makeup bags, check under the seats and loose items in the trunk

# Your typical street car ready for AutoX





# What are the risks?

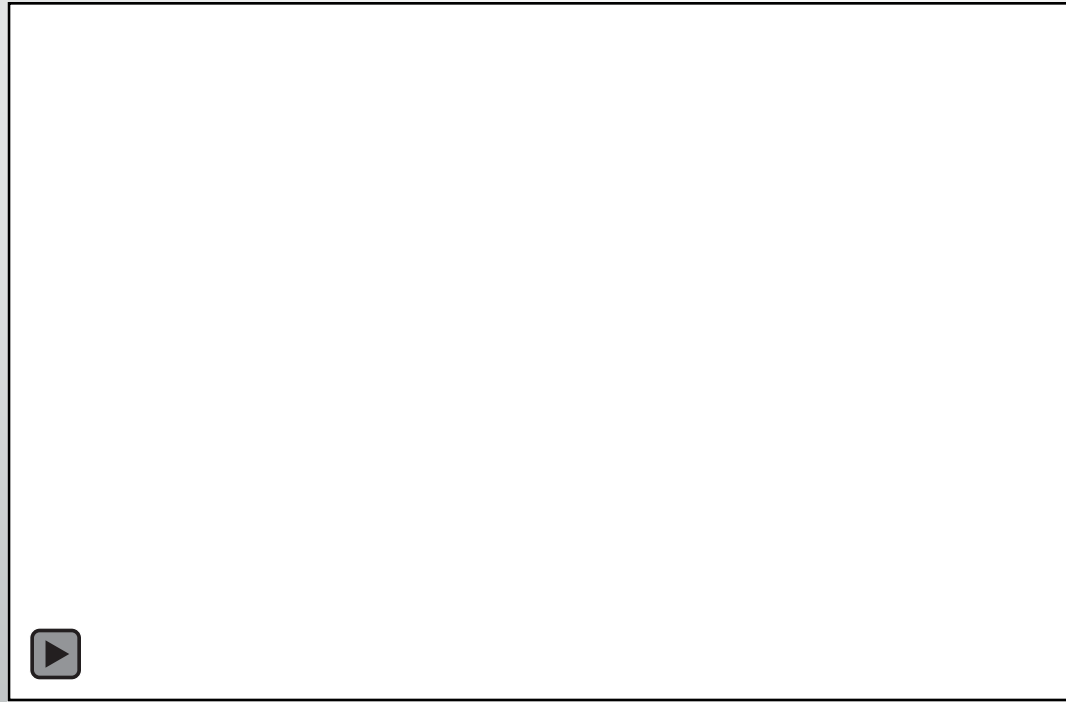
- With today's (most 2004 and later) cars the risk of losing control is very small
  - All the nannies (Traction Control, Stability Management, etc.) help assure this
- The Beginner run groups rarely (or never) have an incident
  - As you move up the run group levels the drivers take more risks
- You must be in good health
  - Lots of adrenaline and elevated heart rates are common
- Your car could suffer a mechanical failure
  - You will be driving it harder than you usually do




# What will you learn?

- Some new driving fundamentals
  - Proper turn lines, how to use the whole track
  - Different braking techniques
  - Smooth application of the controls
  - Control near the limits of adhesion
  - Looking ahead, not right in front of you
- How to
  - Drive in a variable width lane
  - Control your car at speeds higher than is safe on a public street
  - Look ahead and plan then execute the line through a turn
  - Use the brakes at maximum deceleration rate
  - Have tons of fun with your car and new friends

After a session you can relax a bit





# Just a little bit of the new knowledge and skills you will gain on the track

- How to approach and execute a corner
- Braking on the road
- Seeing the important stuff
- The Importance of Smooth Control Input
- The key to going faster is to make more straights out of the corners and maximize corner exit speed



# Racing Line

- The racing line is the quickest route to drive any corner – it has four stages:
  - Braking point
  - Turn in point
  - Apex
  - The position and direction of the next corner



# The Control Sequence for a corner

- Beginning of Braking (BOB)
- Downshifting
- End of Braking (EOB)
- Turn-in
- Maintenance throttle
- Apex
- Unwinding the wheel
- Acceleration
- Track-out
- Full throttle
  
- Corner Axiom: Slow in = Fast out
- Corollary: Fast in = Slow out

# Turn Terminology

## At Brake Zone

Use "3-2-1" Markers

## See Reference Cones:

"TURN-IN"

"APEX"

"TRACK-OUT"

## "Use the Whole Track"

Outside →

Inside →

Outside

OK to feel "berms" or "curbs"

TRACK-OUT



APEX

TURN-IN



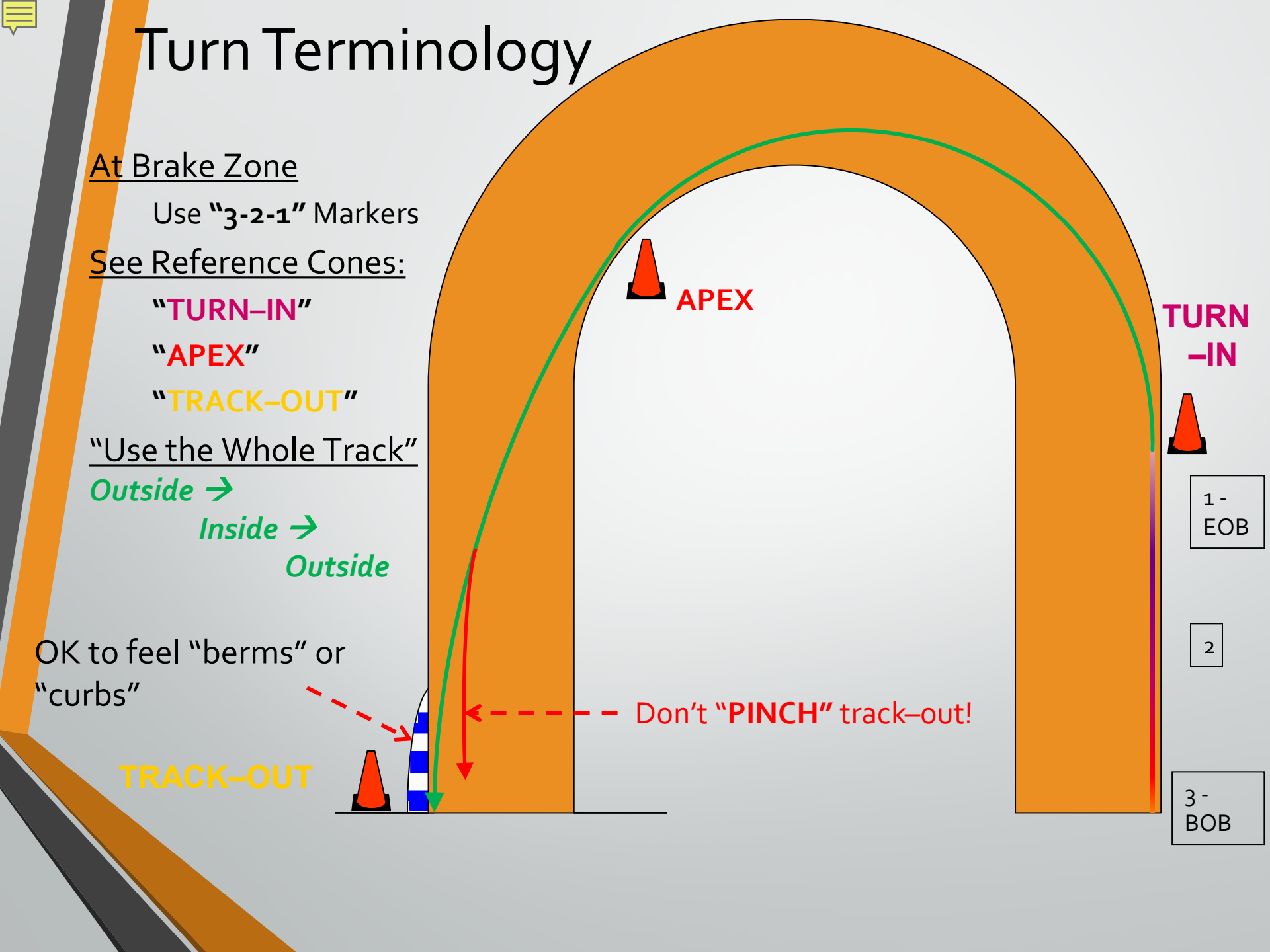
1 - EOB

2

3 - BOB



Don't "PINCH" track-out!



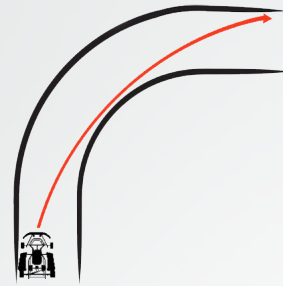
# What's an APEX?

- The apex is the point at which you are closest to the inside of the corner, also referred to as the clipping point (berm). Once you have hit the apex you should be able to reduce the steering lock, start increasing the throttle and focus on the exit. Determining the apex can be tricky at first and is impacted by the type of corner and the upcoming corners.

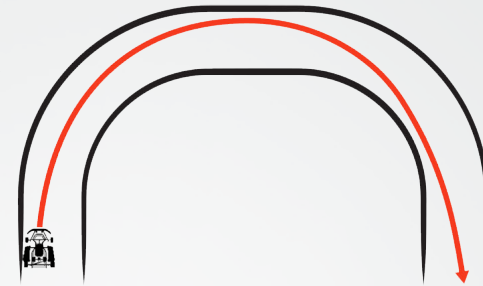
# Advantages of the modern racing line:

- Increases the chances of a fast lap in a powerful car
- Allows the power to be applied earlier
- Maximizes the use of any straights following the corner
- Allows late braking

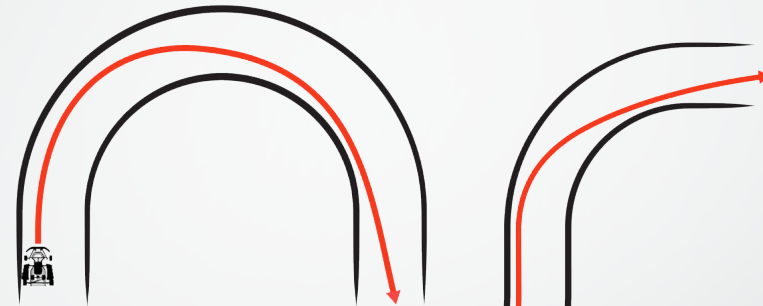
# Many types of corners



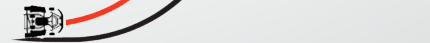
Classic Racing Line



Double Apex



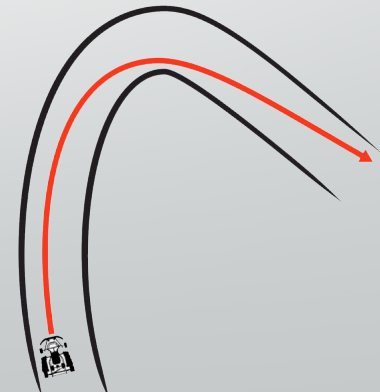
Hairpin Bend



Connecting /  
Linked Curve

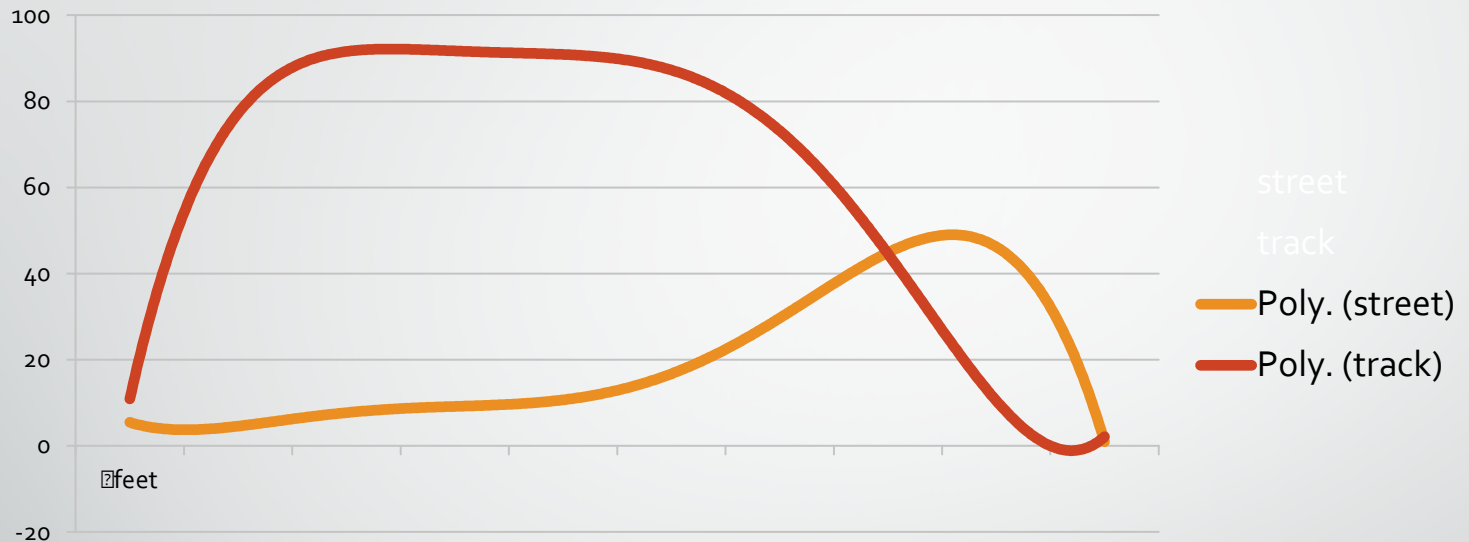


Increasing Radius Curve



Decreasing Radius Curve

# How do we use the brakes?



- You cannot do this on the street safely except in an emergency
- Braking on the track is about getting the car slowed early then releasing the pedal smoothly until you get to the EOB matching the required corner entry speed



Kiss the berm!





# Looking at the right Stuff

- See what is important and ignore the rest
- Look ahead, eyes up
- Keep your eyes moving do not stare at one object or marker
- Use your peripheral vision for the close objects
- If you are looking just ahead of your car you will not be able to correct in time
- Look at least 2 to 3 seconds ahead
  - So you have time to react to developing situations
- You will develop reference points as you learn
- This will allow you to take consistent actions based on your references

**IMPORTANT: If you get confused or lost on the course, STOP, and someone will guide you**



# Be Smooth

- Every action you take with the controls will change the balance of the car
- If you press the gas peddle or apply the brakes
  - The action changes the cars balance fore to aft
- If you turn the steering wheel
  - The action changes the balance of the car left to right
- Smooth actions result in the car maintaining its balance
- Why is this Important?
  - A balanced car reacts predictably and has better margin for error
- However if you have to react it must be quick and decisive

# Weight Transfer

The diagram below shows how the weight distribution of a car under braking or accelerating affects its control. The more traction the car has, the better its control. Under acceleration the rear end squats down, shifting a percentage of the car's weight to the rear end, thus increasing its control and increasing the tire patch area. Conversely under braking the weight or pressure is shifted forward to the front end. "Nose dive" occurs, and front tire traction increases.

Under braking, weight transfers to the **front**, increasing tire Traction.

Under acceleration, weight transfers to the **rear**, increasing tire traction. This allows the rear end to squat & bite.



More Traction

Less Traction

Exaggerated view



Less Traction

More Traction

What is important to understand is that when weight is transferred to one set of tires, weight is being removed from the other set, **reducing its traction**. This condition either creates reduced steering control on the front or the potential for spinning on the rear. The same action occurs side to side as well during cornering. This is why braking properly is such a big part of the **weight transfer effect**.

# Get a Grip – tire traction

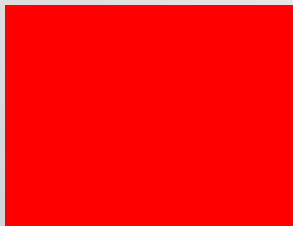
- For any given set of circumstances, a set of tires can only make so much traction. The goal of the astute racer should be to not screw up the total available traction
- The laws of physics are not open to debate – no physics deniers can win
- The factors we have control over include: tire pressure, tire camber, tire toe (in or out) and camber change.
- Vertical load is the load actually seen at the tire contact patch. This includes the weight resting on the tire contact patch *plus* any aerodynamic downforce (or *minus* aerodynamic uplift) – downforce is “free”, adds no weight to the car
- The contact patch is the only thing keeping you on the track.



Contact Patch

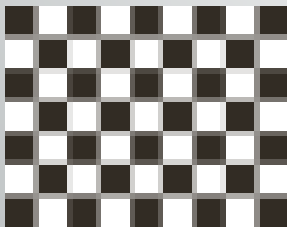


# Flags



## Course Caution (Waving)

- Red flags are held by the course worker and deployed when circumstances dictate or timing tells them
- Deployment is done by waving the flag



Session finished



# A typical track day schedule

- 7 am: Arrive bright and early at the track well rested and prepared to learn
- 8 am: Drivers meeting
- 9 am: First car out
- Run groups rotate on the track in 2 or 3 3-4 lap sessions; run groups not driving will be track workers
- 12 pm: Lunch break
- 1 pm: Back out on the track
- 3 to 4 pm: The day is complete and it might be beer:30



# Autocross Video

- This video provides a drivers-view of what driving an autocross looks and sounds like.

[https://mediaassets.pca.org/pages/microsites/parade2023/files/uploads/13796\\_palm\\_springs\\_pca\\_rsr\\_z8\\_2.mp4](https://mediaassets.pca.org/pages/microsites/parade2023/files/uploads/13796_palm_springs_pca_rsr_z8_2.mp4)

Notice the “directional” cones, or pylons, (laying down pointing the direction to turn or which side of a standing cone to drive past), the “barrier cones” marking the side or end of a section and “gates” to drive between. Pylons may also be used for other course marking purposes. Sometimes other color cones are used to mark the corner apex.

## Discussion/Questions?

- The only Dumb Question is the one you didn't ask!

# Planned June 4 Course

