NASCC.AB.CA
ALBERTA RACING

2026

# Ice Racing and Winter Driving SCHOOL

Conducted By The Northern Alberta Sports Car Club

WCMA.CA
GO RACING!

# INTRODUCTIONS

- Chief Instructor – Jed Harrison
- Classroom Instructors –
  - Jed Harrison, Jim Graham
  - *experts from the internet*
- Instructors - Drivers from the NASCC & ARCA
- Chief Registrar – Jed Harrison, Linda Sakaluk
- Licensing – Sue Wilson of WCMA
- Other Officials and Workers - Members of NASCC/ARCA
- YOU

# Course Outline

- Presentations by Jed Harrison, & Jim Graham
- Classroom Session
  - Friday, Jan 16
- On track sessions
  - Saturday, Jan 17, arrive by 8:20 am, Big Beaver Lake, near Ferintosh, Hwy 611 & 21
- Morning exercises – 2 or 3 assigned run groups
- Morning & Afternoon full track sessions
- Sun, Rain, Snow, Wind, Cold, Sun?.?.?.?

# OBJECTIVES

- Enhance the enjoyment of participation in MOTORSPORT by:
- Safety - paramount - if it isn't safe - don't do it.
- Skills - like any other, these need to be learned.
- Knowledge - how and why things happen.
- Enjoyment - its gotta be FUN.

# Outline

- Focus
- Body Position
- Car Balance
- Traction Management
  - Balance
  - Load (weight) Transfer
  - Control/Smoothness

All of the above contribute to maintaining the balance which is critical in all advanced driving situations.

# Outline

- Focus
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- Car Attitude (Position)
- Traction Management
  - Balance
  - Load Transfer
  - Control/Smoothness

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# Focus

- What is it – definition
  - – awareness and ability to concentrate on the moment
- Awareness
  - Of the immediate situation you are in
  - of cars around you at all times
  - of cars in front and behind you
  - of corner marshal stations & flags on display
  - of emergency response vehicles on track
- Concentrate on the moment - Very Important
- Surprising, but you can loose focus while driving a race car

# Vision Challenge

- Car goes where you look but can you see?
- Focus and situational awareness critical here
  - Upper rear tail lamp of car in front
    - Hope they know where they are going and follow them
  - Peripheral vision
    - View markers out side windows,
    - memorize marker colour sequence at corner entrance and exit.

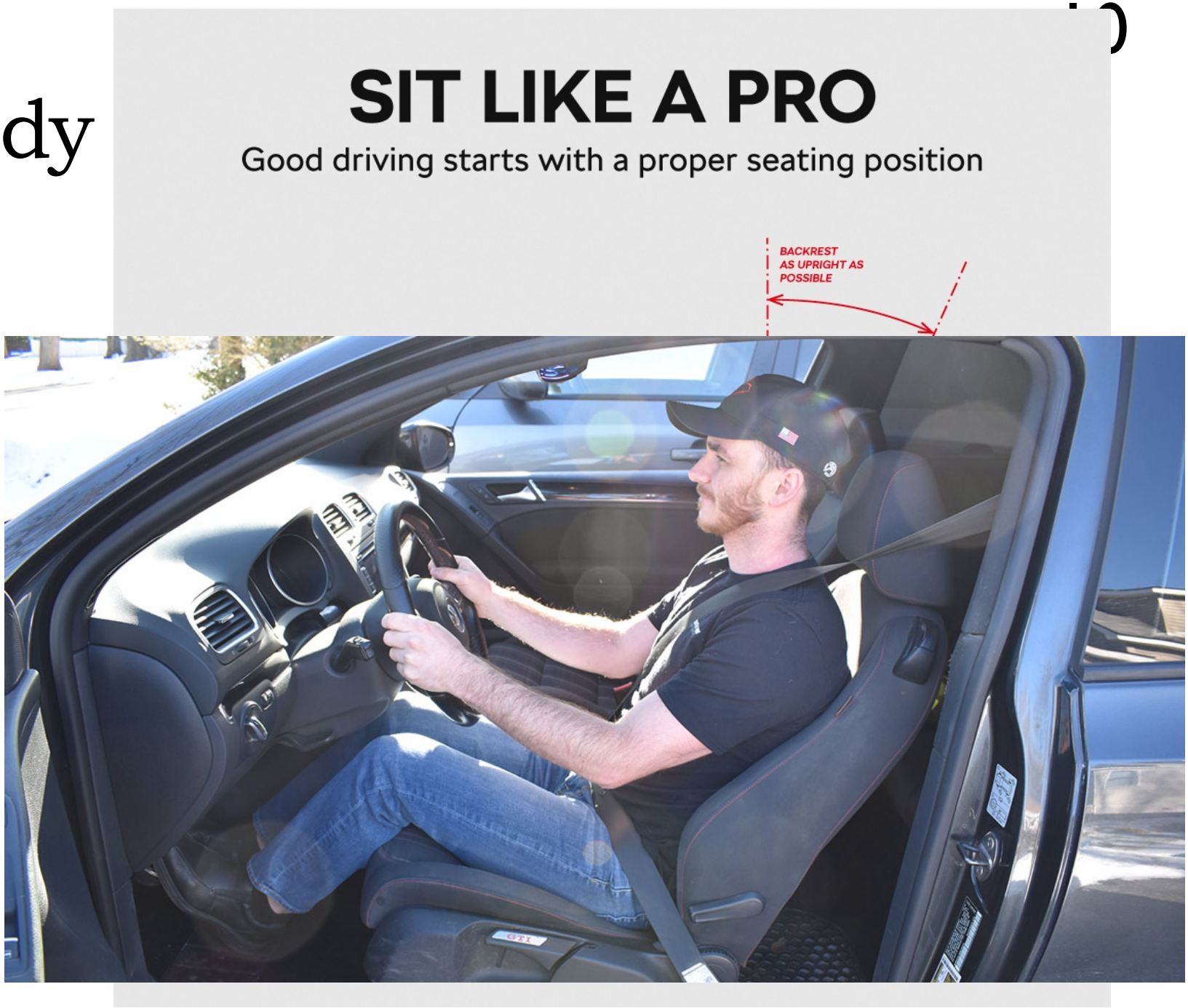
# Ice Racing views

https://www.youtube.com/watch?v=kWRjmFeA-5o

Video Mike Thorn

# Body

- Torso
- Arms
- Hands
- Feet




Images from Skoda Motor5port & Jonathon Goring Motorsport

# Body Position

- Torso
- Arms
- Hands
- Feet
- Eyes – car goes where you look
  - eyes UP & FORWARD
- notes: ease of access to controls
- make the car fit you, not you fit the car

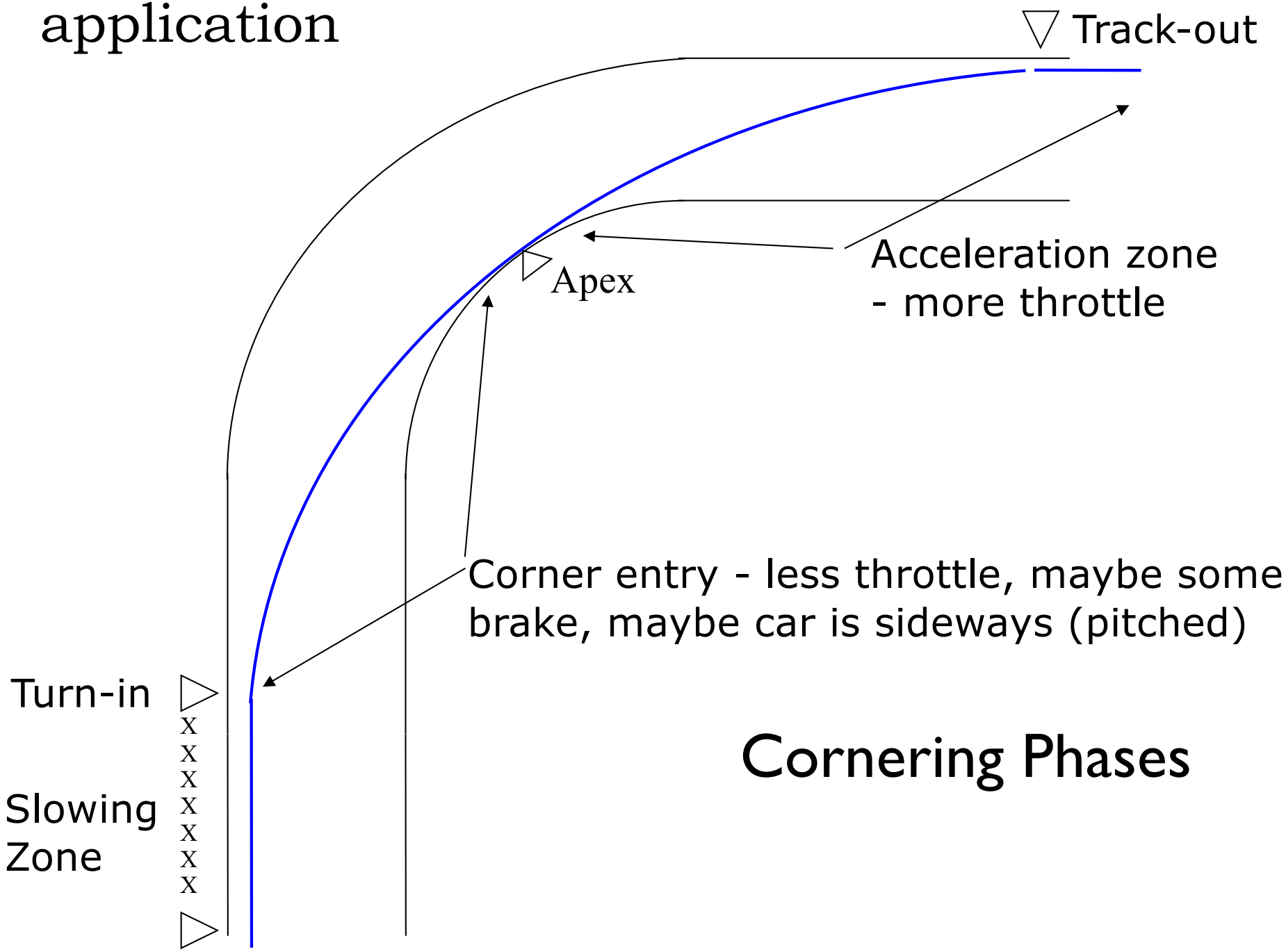
# Cornering - General Principles



- Goal – Maximize grip
- Optimum path around corner
  - Where is the best traction?
  - What gives maximum corner radius given best traction zones?
    - to minimize the traction needed to turn
  - Use weight transfer to maximize grip

# Braking & Throttle application

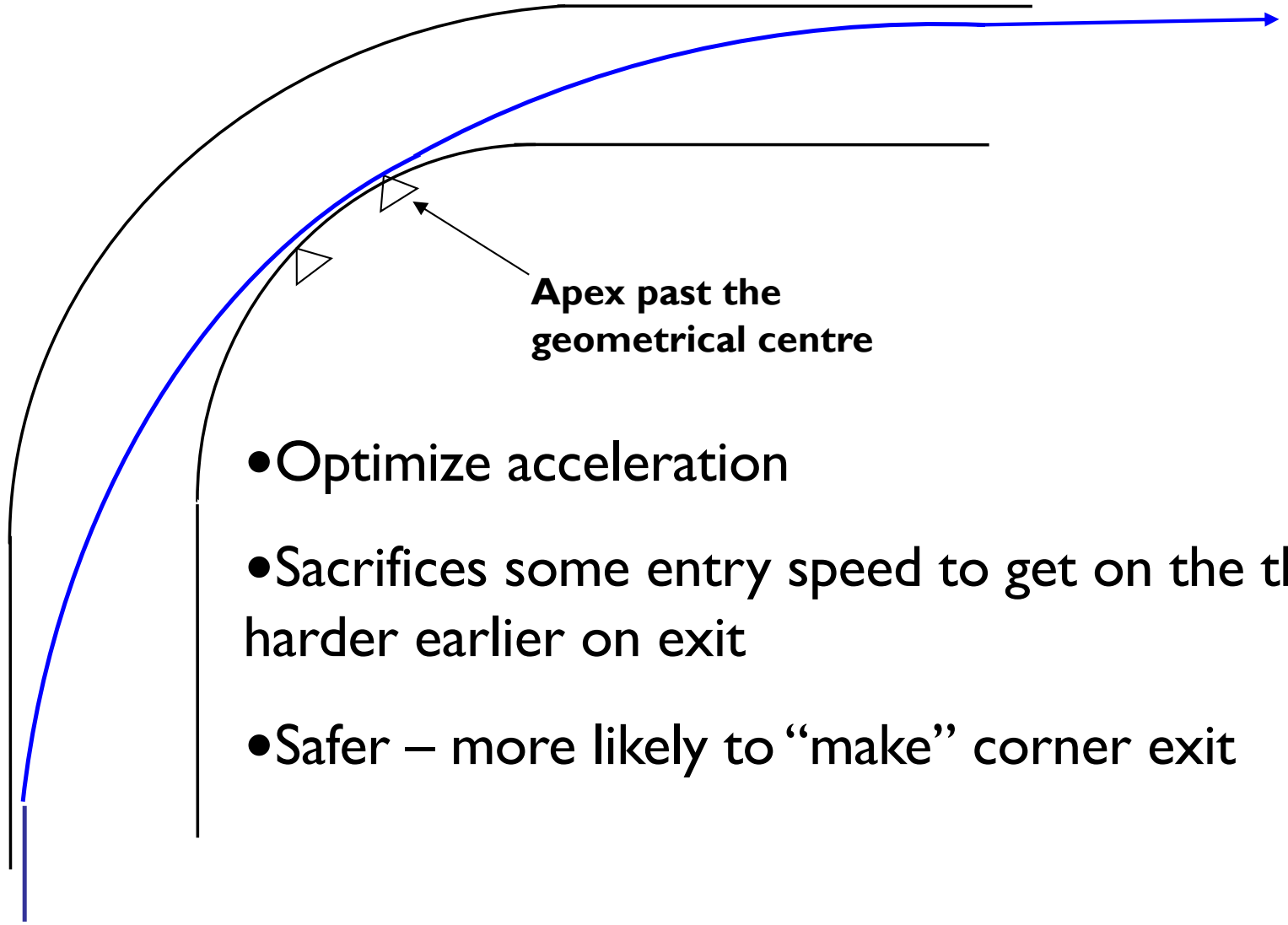





## Cornering Phases

# Cornering Basics

## "The Line" with Late Apex




- Optimize acceleration
- Sacrifices some entry speed to get on the throttle harder earlier on exit
- Safer – more likely to "make" corner exit

# Reality of Ice Racing

- Where is the Grip?
  - Thin layer of snow can help cars on rubber
  - Snow is a problem for studded cars
  - Thick snow bogs all cars down
  - Glare ice has no grip
  - Stud-roughened ice can have good grip
  - Ruts can help turn the car, or direct it the wrong way
- Finding the grippy-ice defines where the best line is
- The track changes throughout the race
  - so the best line changes every few laps.

# The Front vs Rear Wheel Driving line

- You will hear front and rear lines differ
  - Actually they do and they don't
  - The ideal line around the corner is about the same
  - But the response of the cars differ past the limit of adhesion when you are in sliding friction
  - Understeer instead of oversteer on throttle application
    - So entering the corner you set the car up a little bit differently
      - FWD needs some tricks to get it to rotate
      - RWD needs excess throttle application
    - Exiting the corner FWD allows earlier throttle application
      - The angle of the car compared to direction of travel differs as the centre of gravity follows the line

# Car Balance

- Neutral
- Oversteer
- Understeer
- Braking
- Accelerating

- Braking, cornering and slalom exercises demonstrate each of these characteristics

# Neutral

- Front wheels followed by the back ones
- all wheels have the same level of adhesion

- IMPORTANT –
  - neutral is the condition you must be in entering a yellow flagged region
  - Neutral is the condition you must be in when approaching and passing the tow or rescue vehicles

- Now, off to watch the video on oversteer and understeer
- https://www.youtube.com/watch?v=EwmDdMzzDjY


THE

# Summary

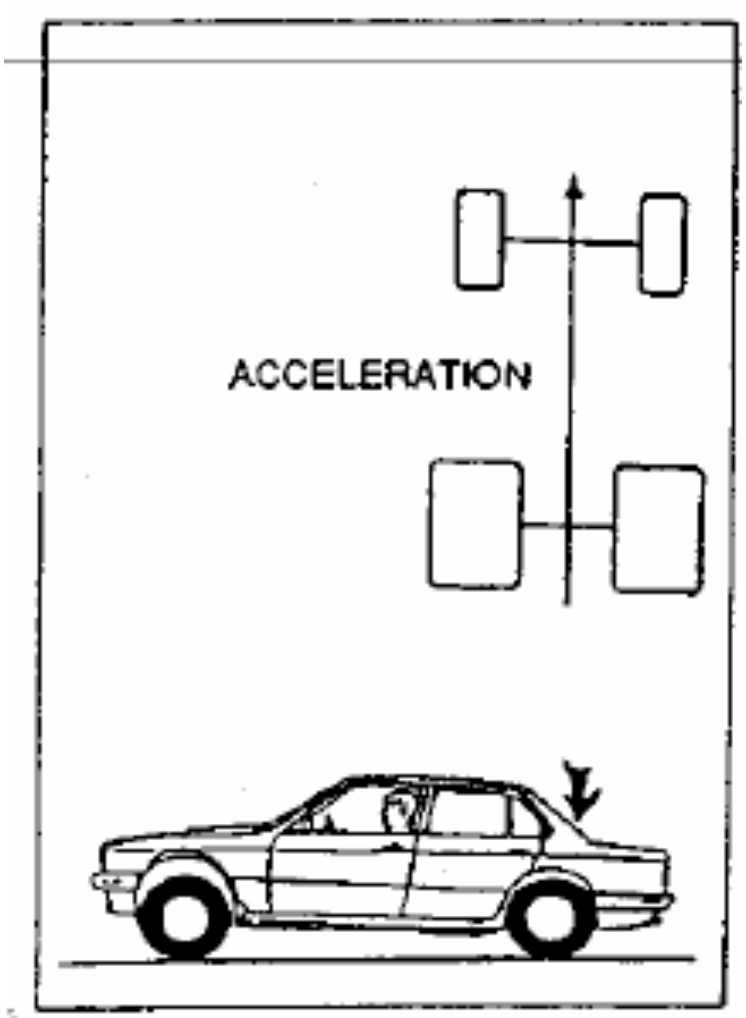
- Oversteer
  - Rear wheels lose traction before the front
- Understeer
  - Characterized by - turning the wheels and *nothing happens !*

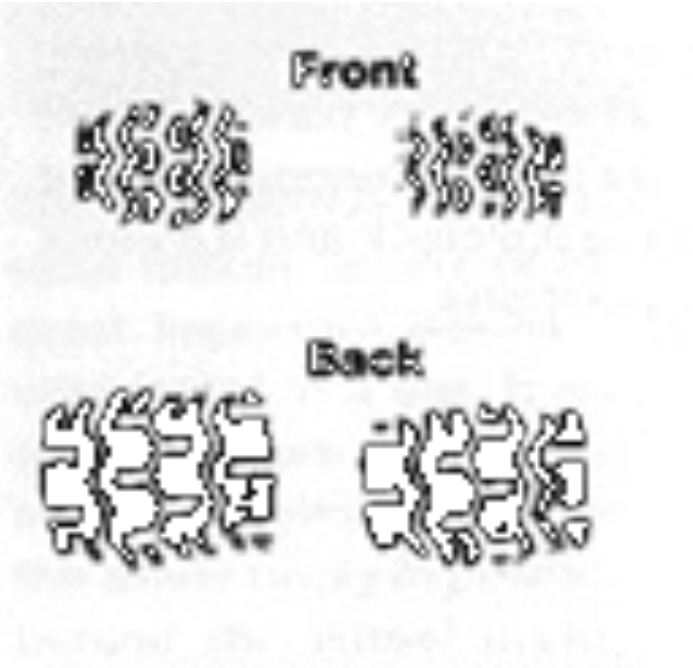
- Always remember - in reduced traction conditions - wet, snow, gravel, ice - you must **react earlier** than in the dry!
- slalom and cornering exercises

# Car Control & Weight Transfer

- Weight Transfer as your tool ice racing
  - Presenter - Jed Harrison
- Rear Wheel Drive
  - Presenter – Jim Graham

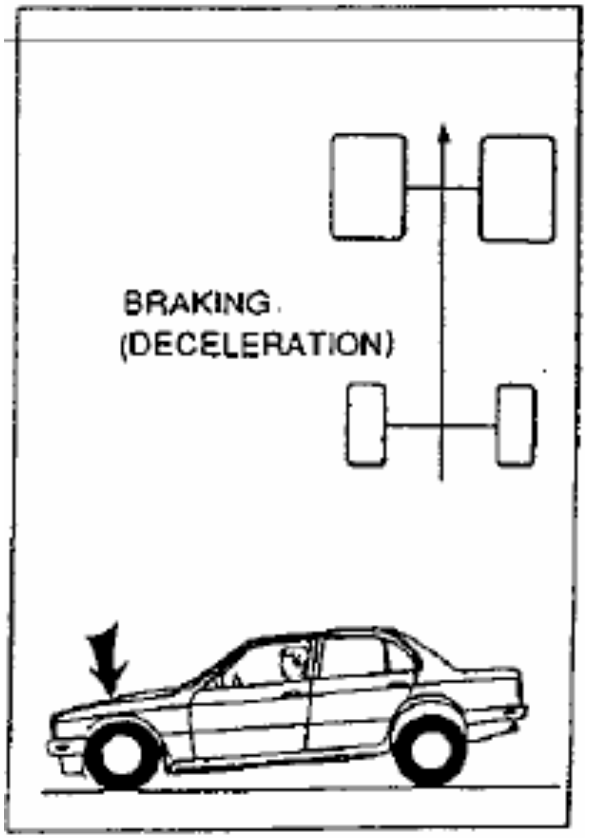
# Weight transfer - acceleration



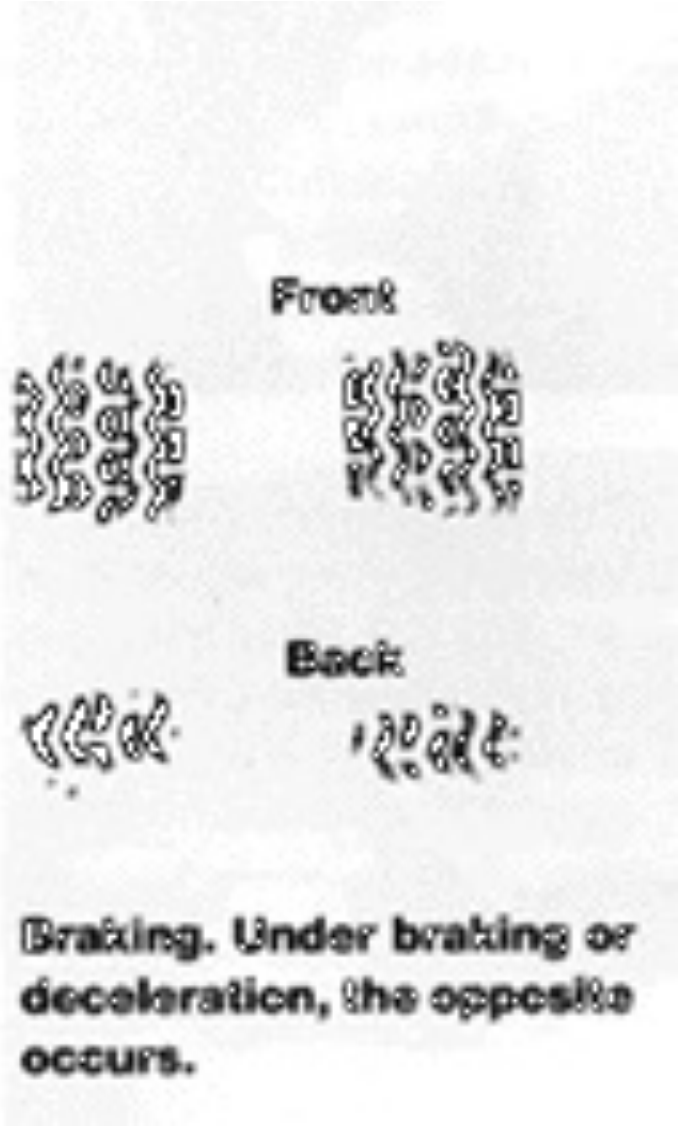




Rear gains, front looses traction

# Weight transfer - braking




Front gains, rear looses traction



# WEIGHT TRANSFER – model for car control

- Is the result of inertia and momentum. It moves:
  - to the rear under acceleration,
  - to the front under braking and
  - to the side under cornering.
- Causes corner weight changes
  - which cause tire contact patch changes
  - Changes the pressure/force tire exerts on surface
  - Result is a change in traction at that corner
- Transition from rolling to sliding friction
  - Causes loss of traction
- Pitching a sliding car sideways increases sliding friction
  - Getting sideways improves sliding traction somewhat

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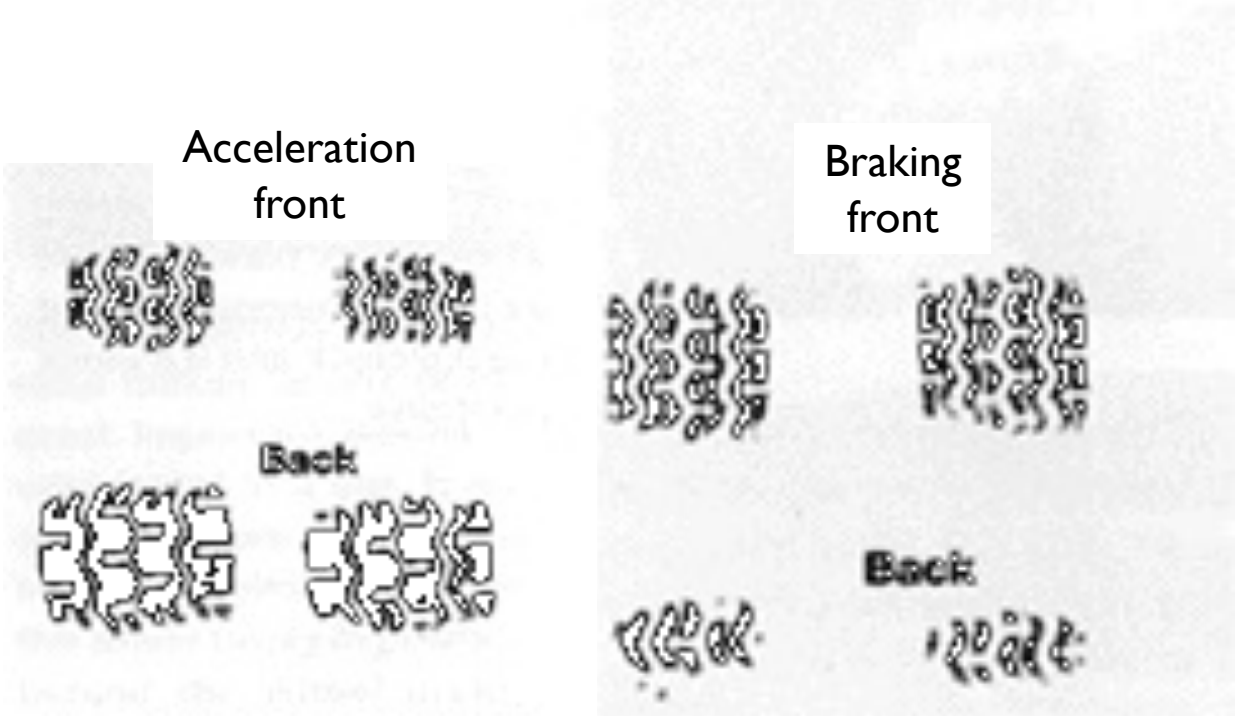
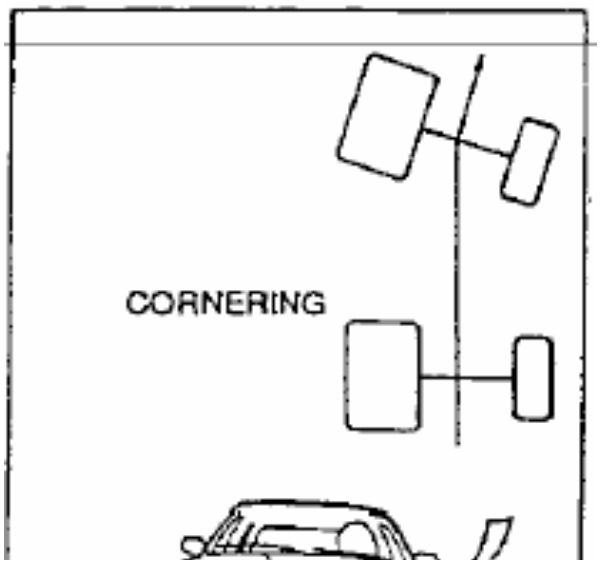
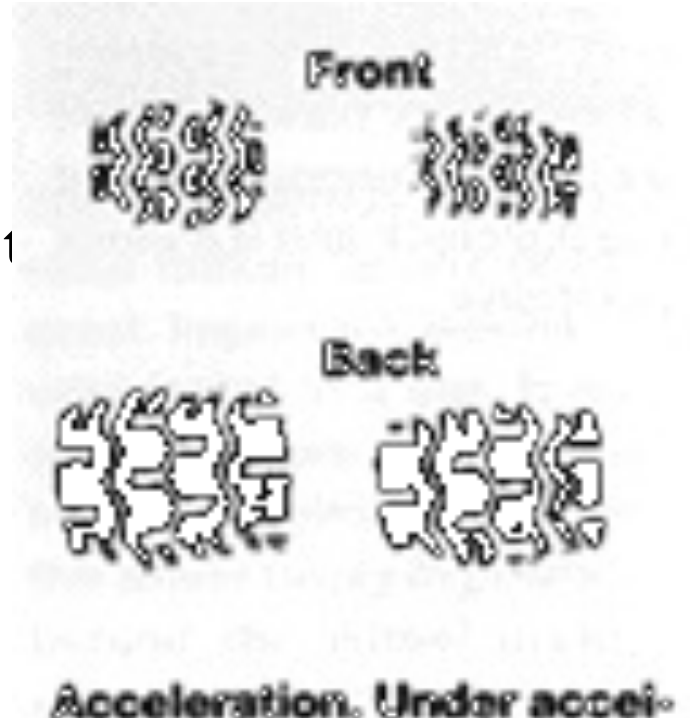


# Car Control - oversteer



- Oversteer - do not suddenly lift the throttle
  - Steer into the skid (counter-steer)
    - Look in direction you want to go
    - Steer the car there
  - Gently add throttle - transfer weight to rear
  - Avoid the tank-slapper
    - Be ready to catch the rebound
    - Release the counter steer as you feel t stabilization
    - Ease off the throttle a touch as well



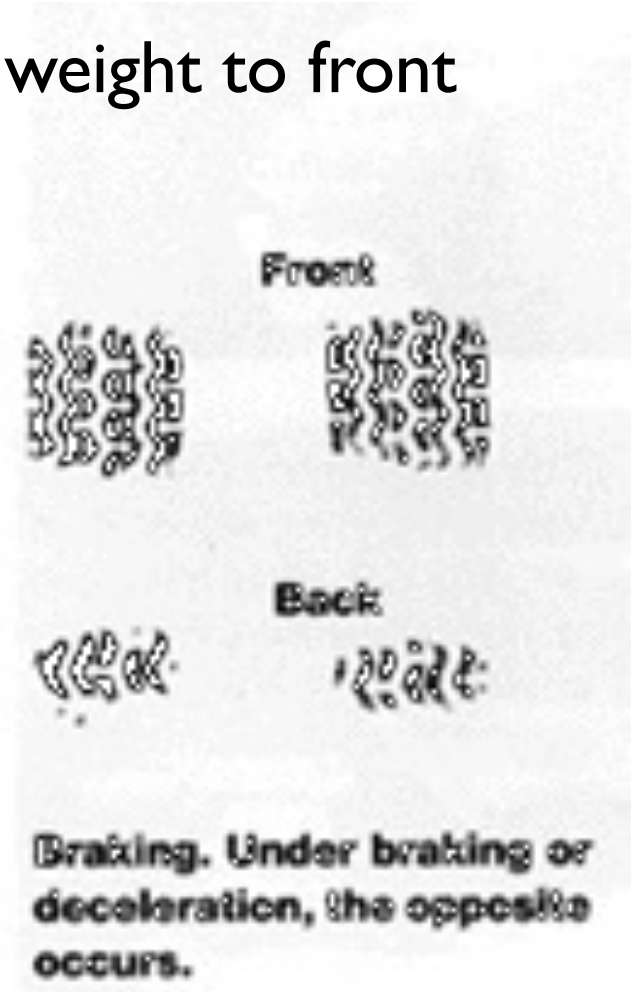
# Car control - understeer



- RWD
- Understeer - do not suddenly lift the throttle
  - Reduce steering input slightly
  - Gently reduce throttle - transfer weight to front
- FWD & AWD
  - Same as for RWD
  - Or add left foot braking to rotate the rear

All: deliberately unsettle the rear

Use a heavy lift to transfer a lot of weight to the front wheels, and wait to start to rotate.
Then get hard on the throttle, and correct the direction with the front wheels



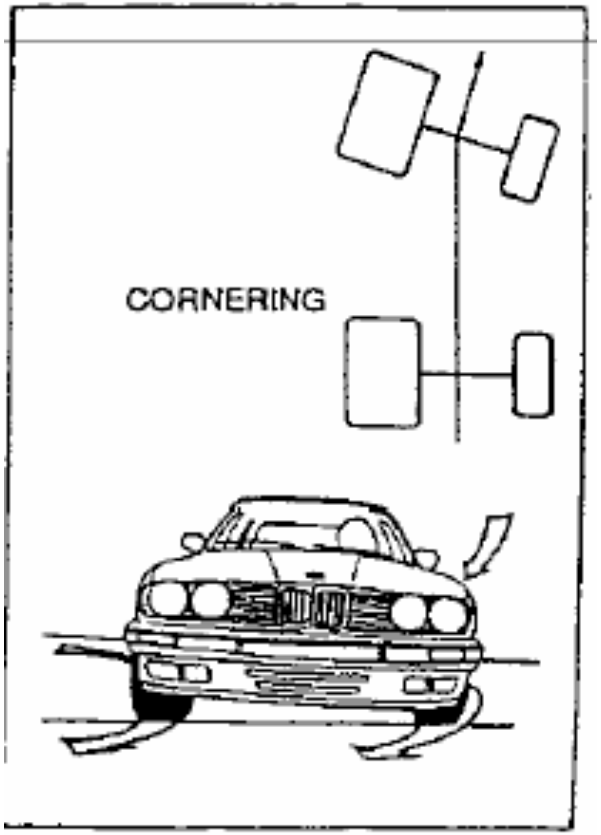
# Weight transfer - cornering

Outside - weighted - wheels have more traction

You can barely feel this lateral weight transfer ice racing, but if you focus on it, you will notice it is there.

Weight transfer has consequences, helping the outside wheels to bite better

Combine with weight transfer to rear
by heavier throttle
so pin the outside rear end in place as you corner!



# Sliding Friction – Ice driving

- Transition from rolling to sliding friction
  - Causes loss of traction
- Pitching a sliding car sideways increases sliding friction
  - Getting sideways improves sliding traction somewhat

# Sliding friction

- You will usually be sliding in a corner
  - Enter corner more slowly to have steering control
    - Dry track approach
- Think about how to rotate the car
  - Throttle in RWD causes oversteer - good here
  - Throttle in FWD causes understeer - bad
  - Hard turn-in causes over steer
  - Braking as you turn causes oversteer
  - Lifting as you turn causes oversteer
- You want oversteer to rotate the car if you are sliding
  - Use one of the above to get it

# Now you are rotating !

- Use the throttle:
  - Once the car is rotating in the direction you want to go
  - Throttle steer
    - More throttle pushes out - understeer and widens the turning radius
    - Lifting slightly lightens rear end - causes oversteer - radius  tightens up
    - Test this in the skidpad exercise

# The FWD Claw

- Once you are rotated into the direction you want to go:
  - Straighten the wheel
  - Apply throttle to claw your way out
  - Like a dog paddle
    - you can feel the FWD struggling desperately to pull you out of the corner
    - Throttle now in RWD just gives more oversteer

# FWD & AWD - Left Foot Braking

- Brake with your foot on the throttle
  - Lift a bit on throttle & brake as you turn
  - Eliminates FWD understeer and causes oversteer
  - Like handbrake but much more control
  - It is a Rally favourite on gravel and dirt
- It does not always work on ice!!
  - If you have some traction it is great
  - If you have none it causes understeer too

- Check out Andrew Comrie-Picards driving guidelines for Rally Racing at

- http://www.oldrallysport.on.ca/articles/Driving.html
- And Grassroots Motorsports website for their articles.
- Look at one titled racecraft: Autocrossing a front wheel drive

# ICE RACE BRAKING TECHNIQUES

- Braking to slow down
  - Maximum braking without locking up
  - Usually done in a straight line
    - Threshold braking
    - Smooth transition from brake back to throttle
  - For “Rubber to Ice” Brake where there is grip
    - Glare ice is bad
    - Roughened ice decent
    - Very light snow is good
    - Heavy snow bogs you down
  - With ABS equipped vehicles
    - will feel brake pedal pulsing when over threshold
- on-track cornering exercise – sweeper & the esses

# ICE RACE BRAKING TECHNIQUES

- Braking to transfer weight for cornering
  - Trail braking (RWD, FWD, AWD)
    - Light  braking while turning – weight to front
  - Left Foot braking (FWD, AWD)
    - combine brake, throttle, turning – weight to front
- Pay attention to weight transfer
  - Use brakes to balance car through corner and maximize adhesion at the most important wheel

- Sweeper & on-track esses cornering exercise

# Do you need to brake?

- Pitch the car sideways just before entering the corner
  - Using 4 wheel sliding friction to slow the car
  - Works really well with studded tires

# Studded Race Braking/Slowing

https://www.youtube.com/watch?v=c1E4noZAW4s

Video Chris Saunders

# When it all fails

- You Spin
  - Go two feet in
    - one on brakes
    - one on clutch
  - Choose when you do this to match a direction you prefer to go
  - Do this so you do not careen out of control under power and into another driver

# Careening out of control & putting others at risk

# Rev Matching skills - Heel and Toe

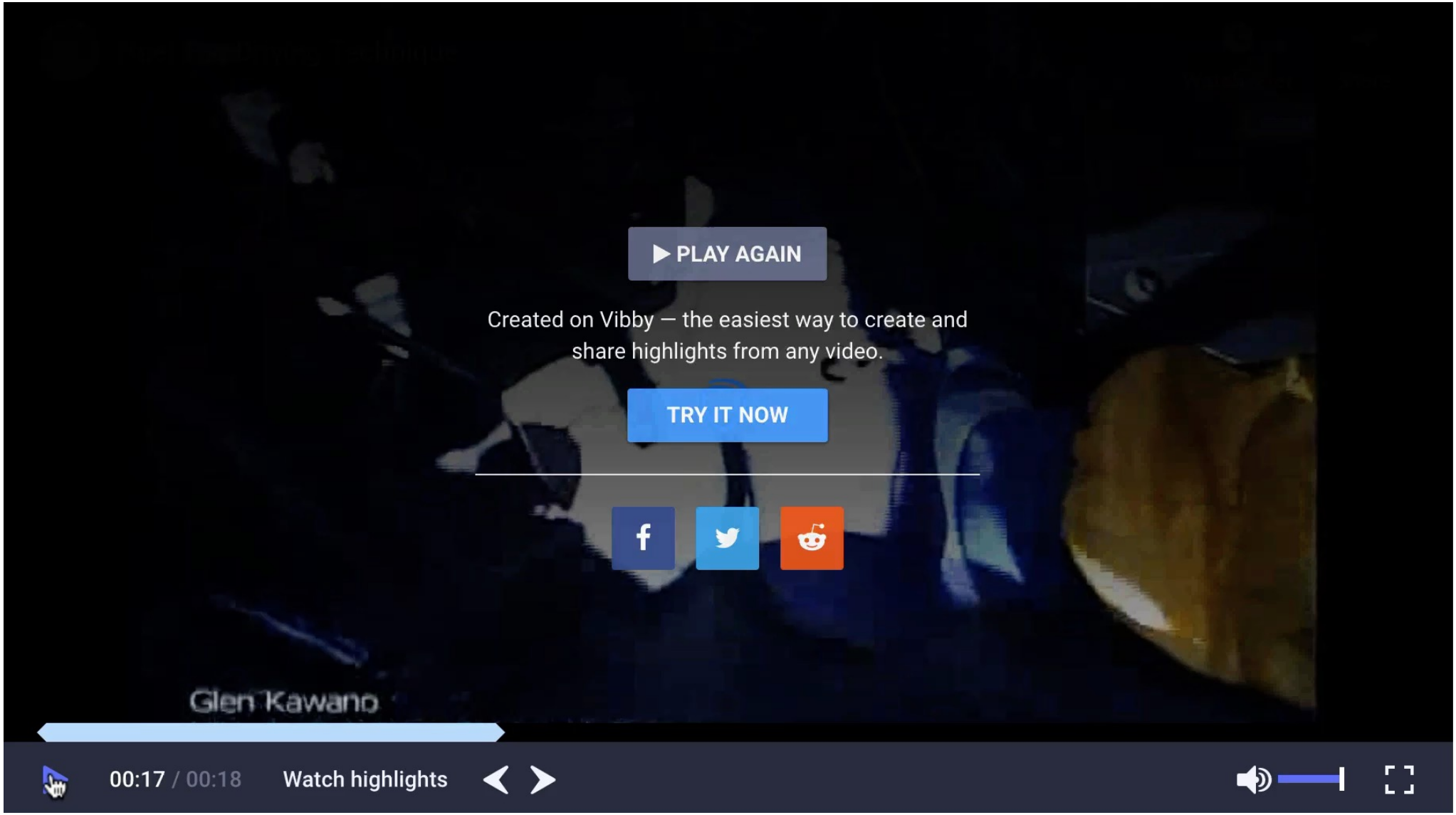
- Smoothness in Shifting - as in gear selection
  - heel and toe
- matching the engine revs to wheel speed
  - Prevents wheel hop, lockup, sliding or spinning
- Makes for smooth downshifts at speed
- Not a method to learn for the first time at the track - practice on a country road first

# Heel and Toe Process

- Foot and pedal placement is important
- 1) Apply brake, with half of right foot
- 2) disengage clutch with left foot
- 3) roll right foot over, or twist heel over to apply throttle "blip" with foot still on brake
- 4) Re-engage clutch before rev's drop back too much

Watch the Heel Toe video
https://www.youtube.com/watch?v=IuoZeuSgEj4

# Heel & Toe classic method



# WEIGHT TRANSFER SUMMARY



Smoothness - Dimmer vs. Light Switch

- Smooth building to max brake or throttle over a short time period
- you can't control weight transfer if you're shouting with the controls

Throttle steer

- Use of throttle to control the understeer/oversteer
- Changes rear tire slip angle to induce oversteer
- Most effective when cornering near the limit

Trail Braking

- Shift weight to front wheels for cornering (RWD, FWD, AWD)

Left Foot Braking

- Shift weight to front wheels
- Impedes rotation of undriven wheels
- Works best for FWD & AWD to combat understeer

# Safety

- Track Layout - obstacles
- Track Entry and Exit
- Passing – rules for the school
  - Only on long straights in designated passing lanes
- Marshal Stations
- Flags

# Flags and Their Meanings

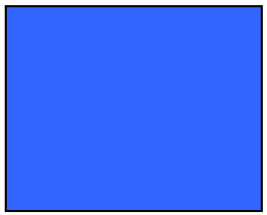
- Basics
- Yellow caution flag
  - Slow down until you pass the incident
- Red Flag
  - Come to a safe controlled stop off the racing line
- Black Flag
  - Race Stewards (or Chief Instructor) need to talk to you about your driving on track – come in to pits


G Brooke Carter

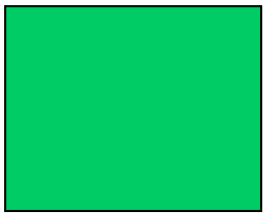
# Safety

https://ualberta-ca.zoom.us/rec/play/97x-yqlpZ43xheP6kWS_9Sj7SjiGpbTTW1RNmMqgXFxm0e0Bjnk4ex3CbO_3BUgAJyhgsselVZBelnJM.Hu0vTCz3pb1tZpbC?continueMode=true

- Flags and signals:

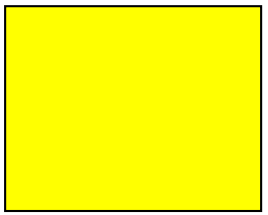


Blue - overtaking

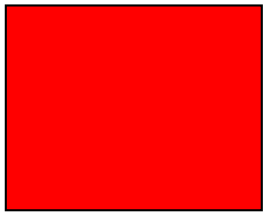


Green - Road clear

White - Slow moving vehicle

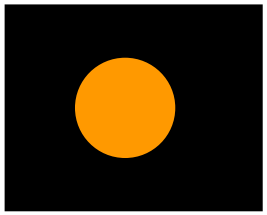


Yellow - Danger

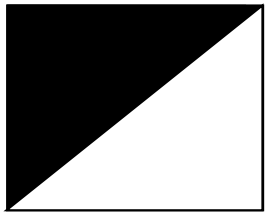


Red - cease racing stop

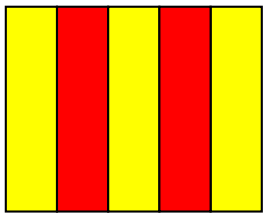
Black - report to clerk



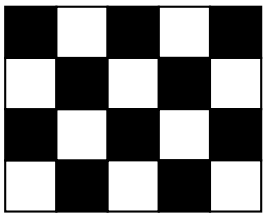
Meatball - Mechanical failure



Black/White - Warning



Yellow/Red - Change of adhesion



Chequered - End of race

# Review School track protocols –

- Helmets for all sessions
- Always wait at track entrance to be waived on
- Enter the track under acceleration and keep to outside
- When being passed – point the other driver by to pass you
  - on the inside line of the straight
  - You stay on the normal line along the straight
- Passing zones – must point by to be passed, ease up to allow a faster pass –
- If stuck in bank
  - talk with Chief Instructor in the pit lane after session

# Safety – on track (school & race)

- On track safety:
  - Obey flags & signals
  - Overtaking vehicle - responsible to pass safely
  - Yield right-of-way in lose-lose situations.
  - No vehicle may ever move counter to the normal direction of travel.
  - Rejoin - when other traffic has cleared the racing line.
    - If you are off track you have already compromised your race, do not compromise others when re-entering

# Safety – in Paddock & Hot Pit lane

- Pit and Paddock safety:
  - Paddock speed is dead slow; 15 km/hr.
  - Pit lane & Paddock crew fully clothed,
  - nomex recommended for refueling in Paddock
  - Smoking is not permitted in the pit lane or when fueling
  - Cars must enter the track through the pit exit lane
  - Cars must exit the track through the dedicated track exit
  - Cars may not be driven backwards in the pit lane.
    - Directions usually defined at driver meeting

# Safety Racing – on you and in car

- Safety Equipment - *outlined in the Race Regulations*:
  - Snell SA 2025 & 2020 helmet and HANS device.
    - new 2025 spec out now, 2010 &2015 helmets expired
  - Approved fire retardant single piece driving suit, or one piece Nomex Safety overalls
    - Fire retardant gloves, socks and balaclava, shoes/boots of natural materials (excluding soles)
  - 5 or 6 point racing seat belts
    - SFI belts expire every 2 years, FIA every 5 years
  - Car preparation according to class:
    - Fuel cells, window netting, fuel line specs, seat requirements, roll-cage specs, etc.

# Safety (School & Racing)– Your Health

- Medical Safety:
  - Fitness
  - Hydration
    - Actively focus on drinking water and staying hydrated
  - Don't race fatigued
  - No drugs, alcohol, etc.
  - Medical conditions – inform appropriate parties if necessary (ie: ambulance personnel)

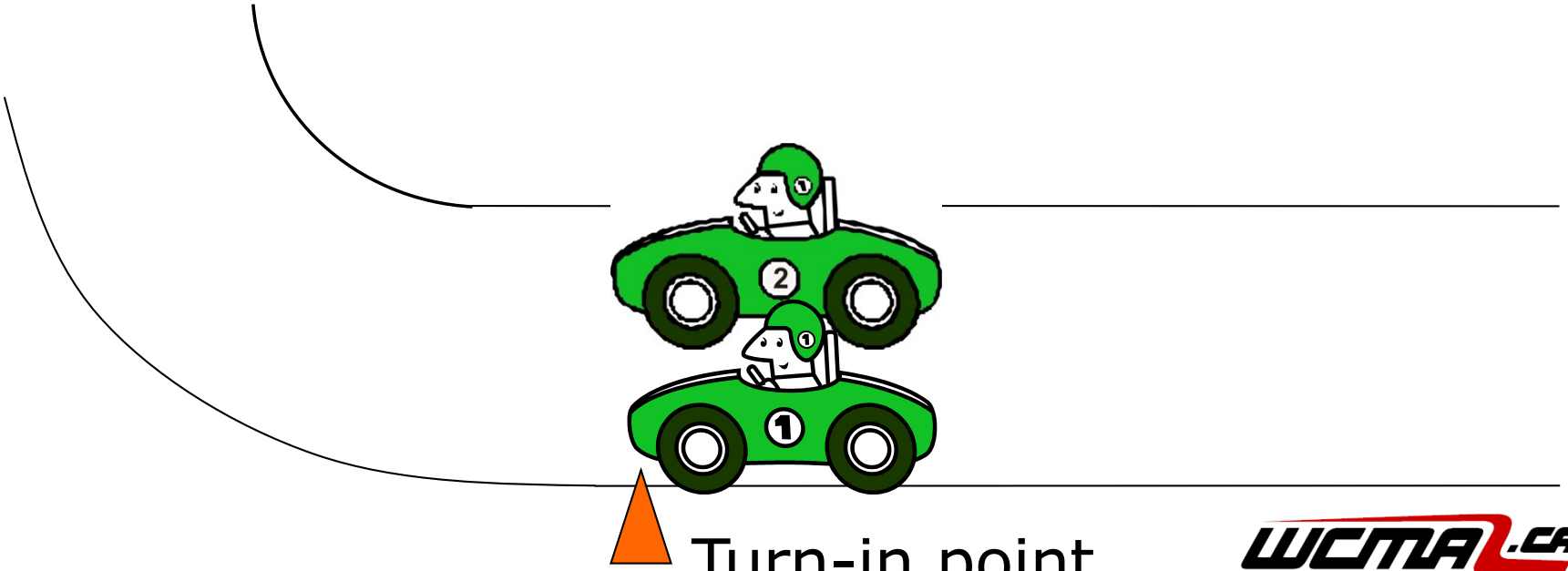
# Racing – Starts

- Starting Procedure
  - 
  - This signals start next time by start/finish
  - Pace car exits into pits – pole car sets the pace
  - Field formed up? - Green! Green! Green!
  - Field ragged? – go around again under control of pole car
- Note Chevettes also do a standing start

WCMA.CA GO RACING!

# Ice Racing - Passing

- Most contentious part of racing – most risky too
  - Who has 'right-of-way'?



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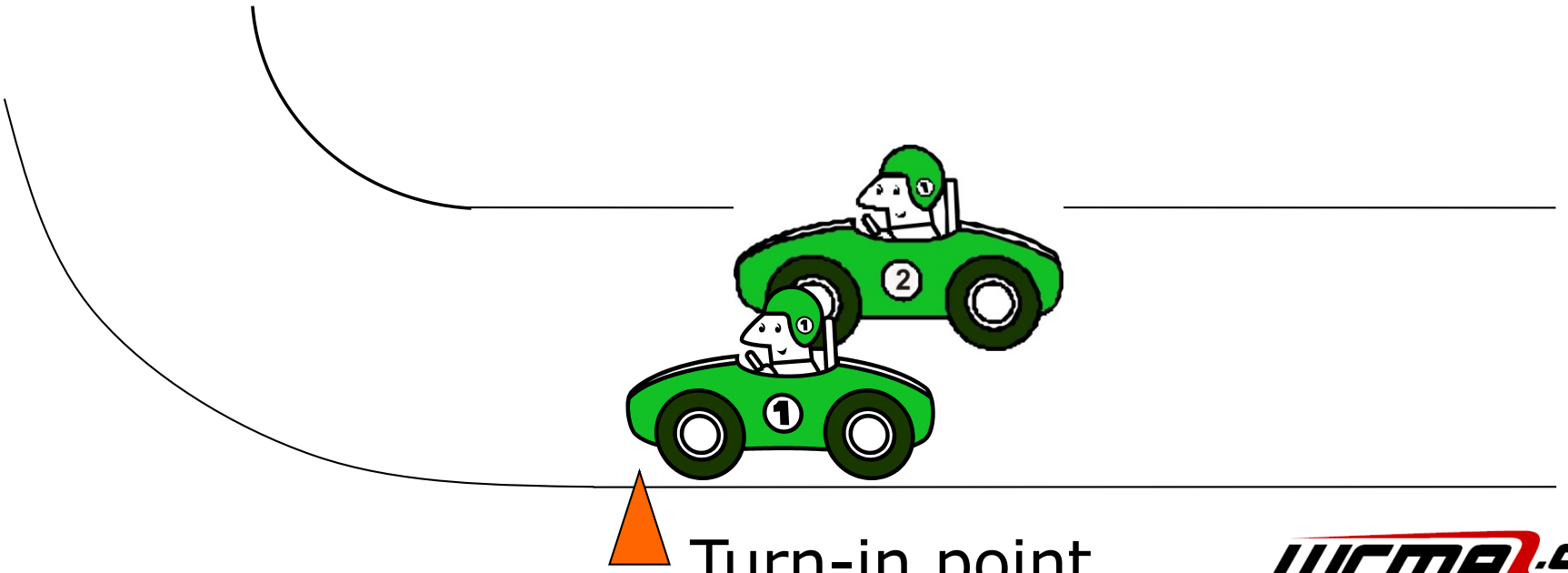

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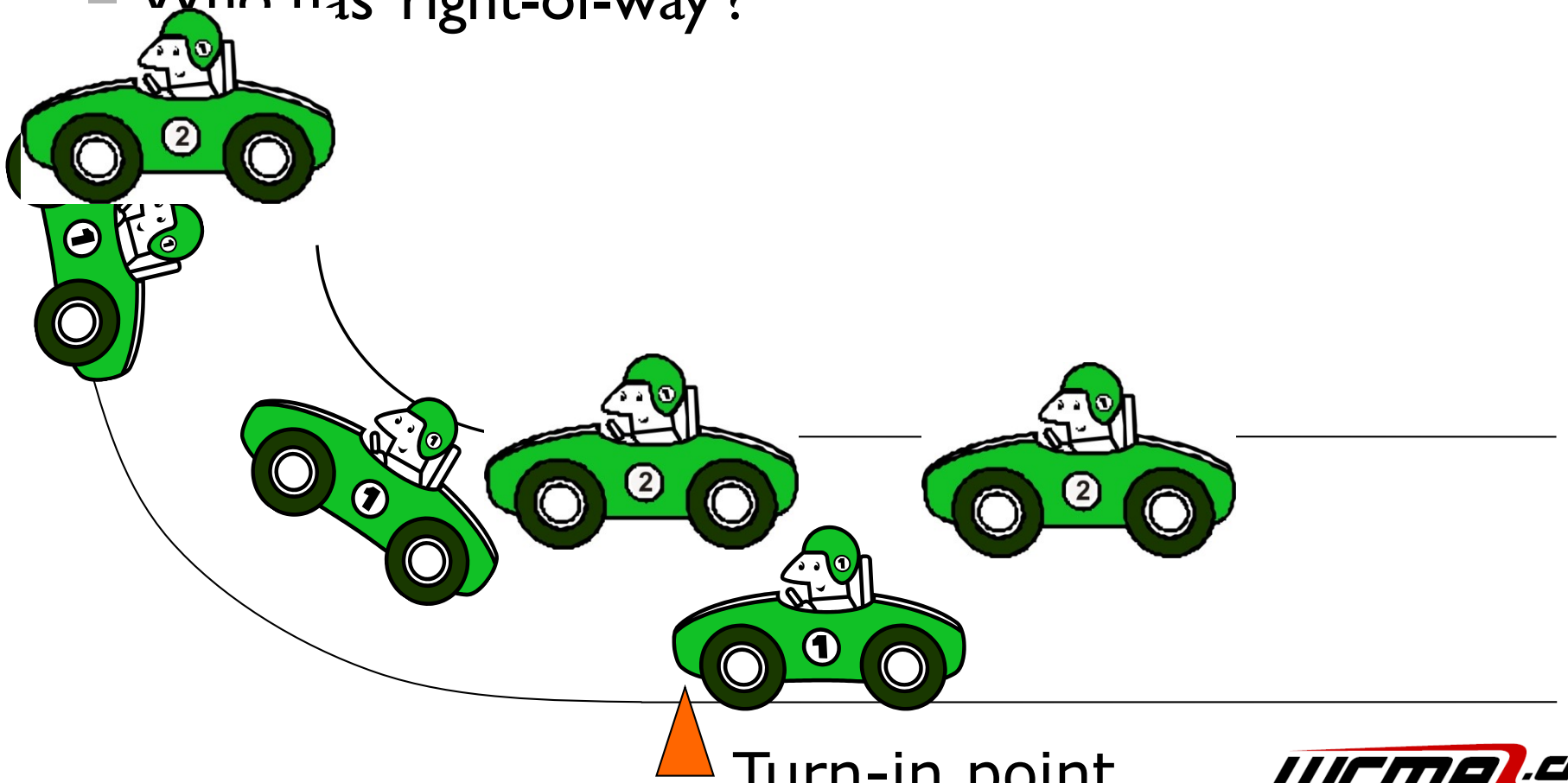


# Short'n'sweet summary

All competitors have a right to "racing room" on the marked racing surface. All have a responsibility to avoid contact.

"Racing room" is generally defined as sufficient space on the marked racing surface so as to allow a competitor to maintain control of his car in close quarters, under racing conditions.

# Passing – respecting each other

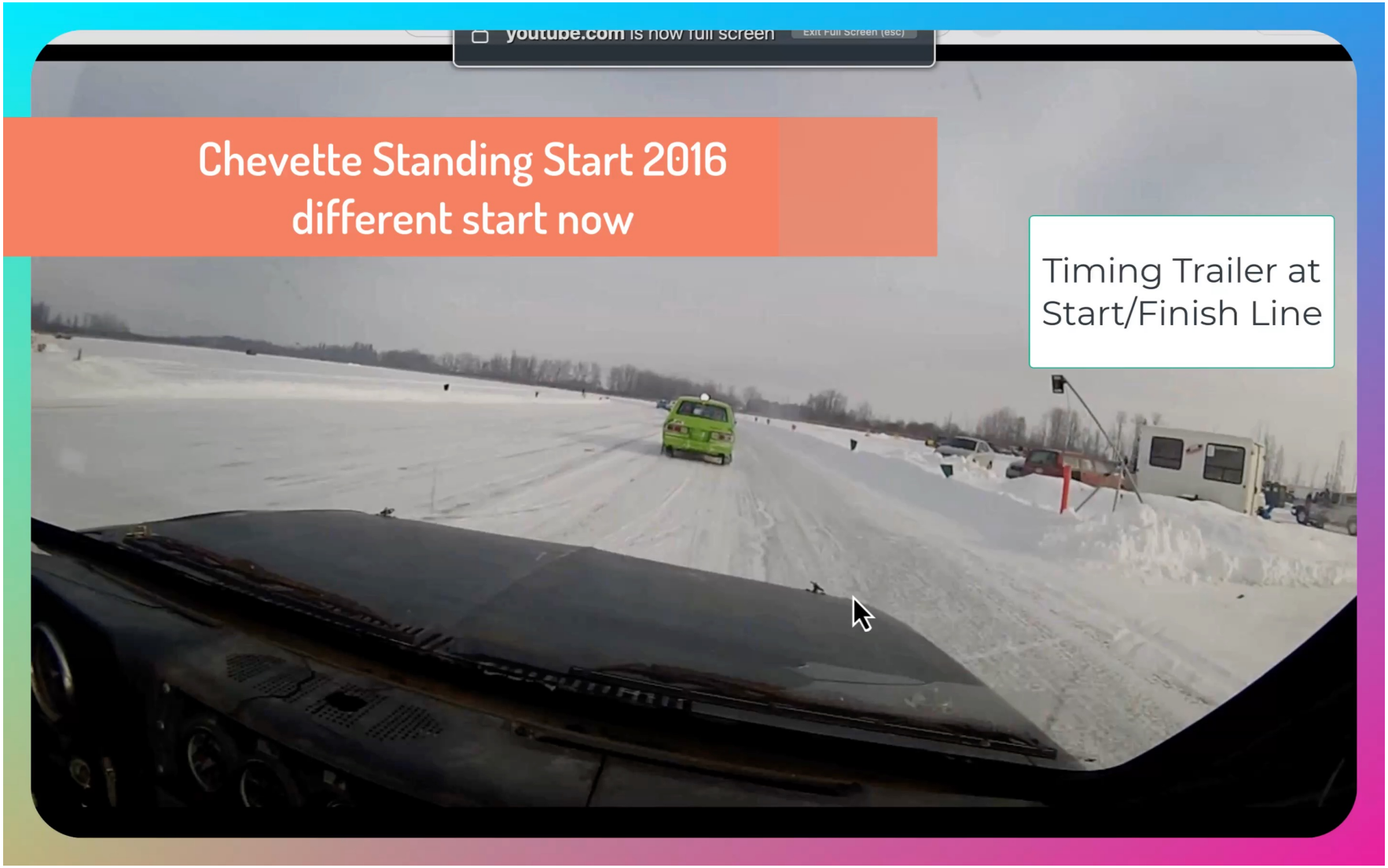
https://www.youtube.com/watch?v=c1E4noZAW4s

Video Chris Saunders

# Passing – strategies

Note CH Standing start is nose to tail from pit lane now

Video Chevette driver



# WCMA Passing Rules – notes for you

- **9.4 Passing on the race track**
- a. Corners or curves, as well as the entry and exit zones thereof may be negotiated by drivers as they wish, within the limits of the marked race track.

- b. **The responsibility for the decision to pass another car rests with the overtaking driver**. However this will not relieve the overtaken driver from the responsibility for the safe passing of another car.

# WCMA Passing Rules

c. The overtaken driver shall not block. Both drivers in a passing maneuver shall give each other adequate room to pass if the passing car is significantly alongside. **Failure to yield racing room by either driver may result in a penalty at the discretion of the Steward.**

- d. Any driver being overtaken should point to the side on which an overtaking driver should pass.

# WCMA Passing Rules

- e. Drivers are obligated to heed the flag signals displayed around the track. Failure to respond to a flag signal is serious violation of these regulations and is subject to penalty which is not subject to protest or appeal.

- f. Any driver appearing not to be making adequate use of the car's rear view mirrors, or driving in a manner which, even if unintentionally, appears to hinder or discourage another driver seeking to pass, or appearing to ignore the blue flag, may be given the black flag.

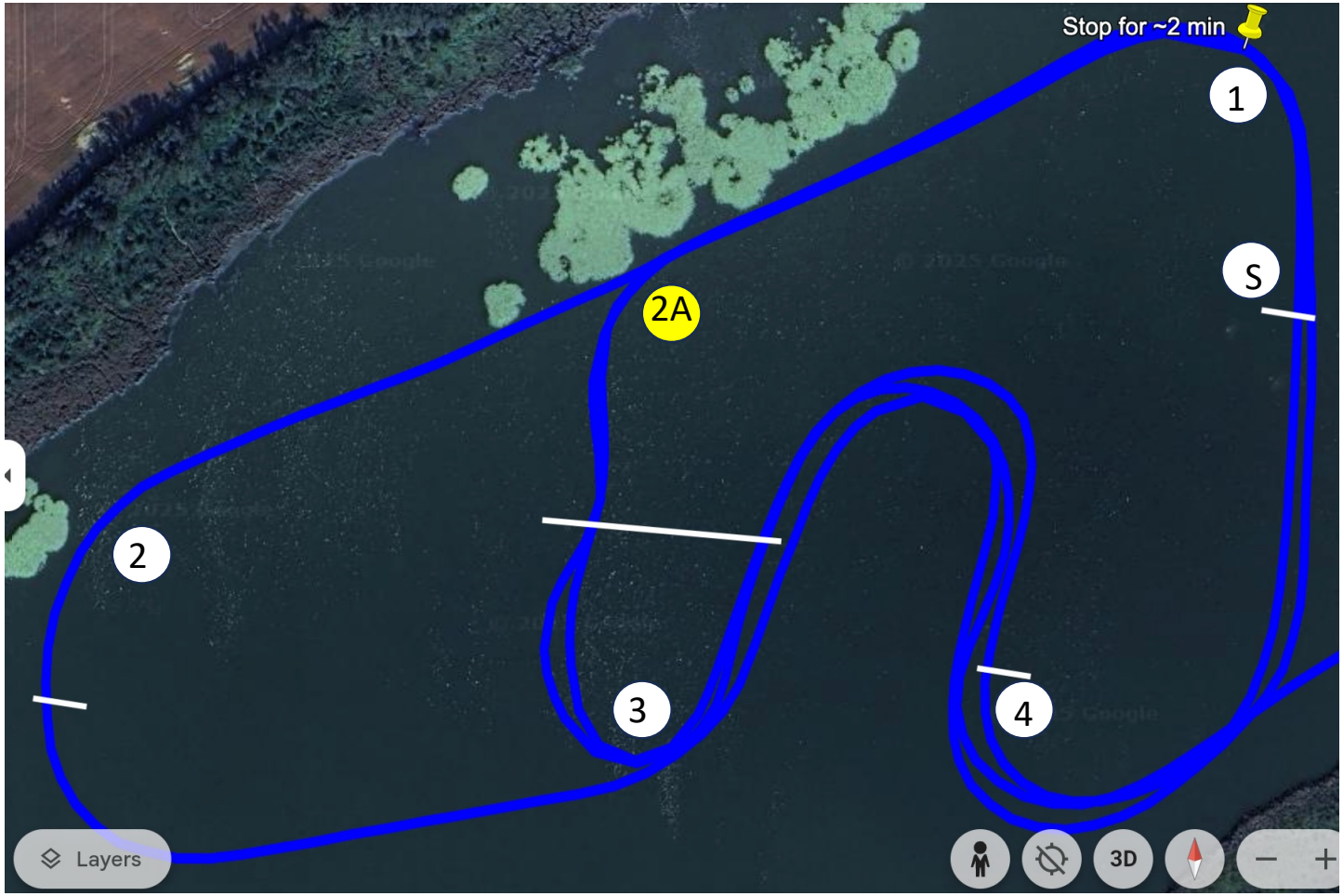
# WCMA Passing Rules

- g. Systematic or repeat offences may result in exclusion of the offending driver.

- h. The penalty inflicted for ignoring the blue flag shall be applied to the drivers who obstruct part of the track and may range from monetary fine to exclusion. The same penalty shall be applied to drivers who swerve from one side of the track to the other side of the track in order to prevent other competitors from overtaking.

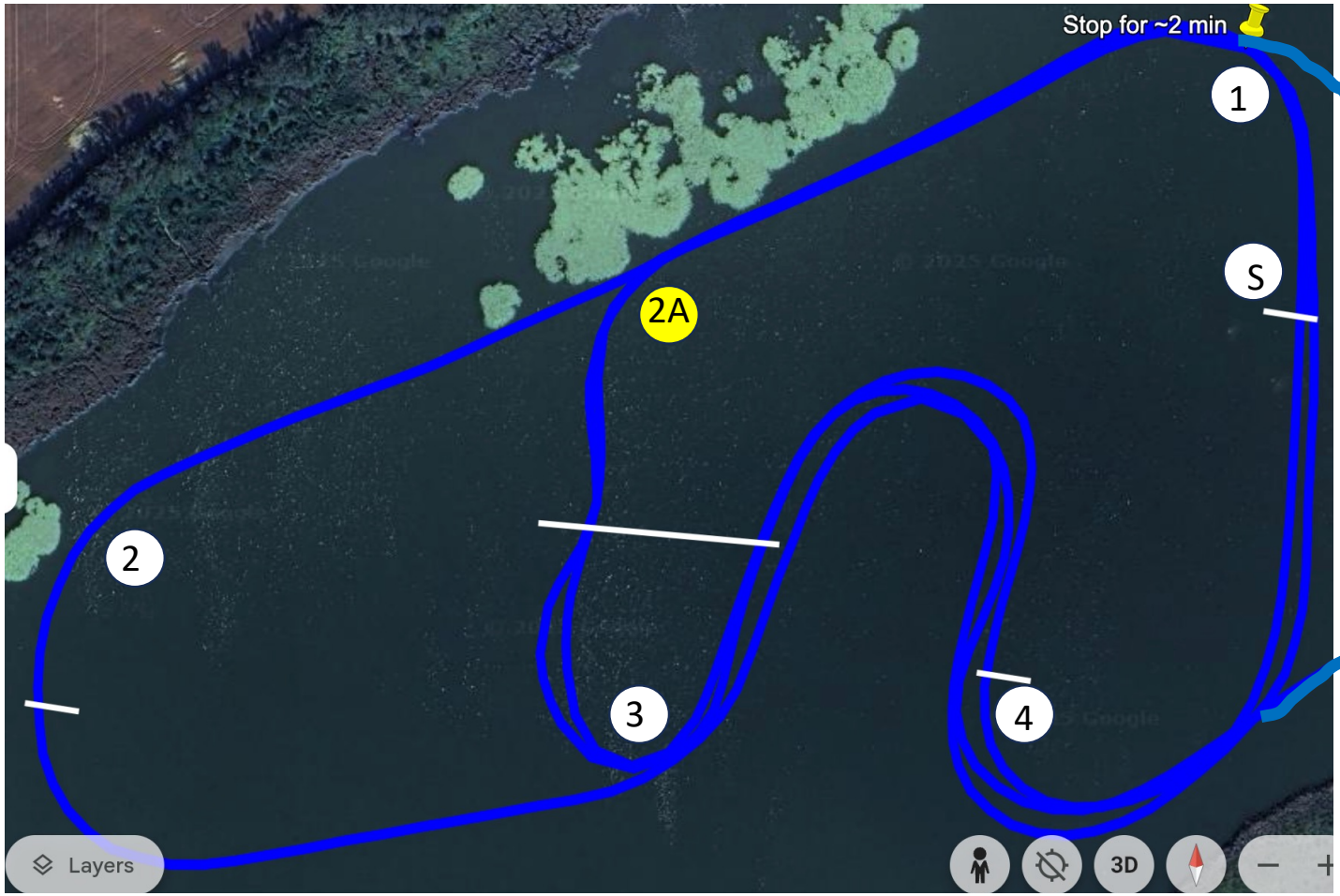
# Roy's Lake Track

White lines are cut throughs for rescue, white circles are built marshals, yellow needs building




Marshal at 2 needs to shuttle to 2a & back, and set a few guide cones for short track

# Roy's Lake Track



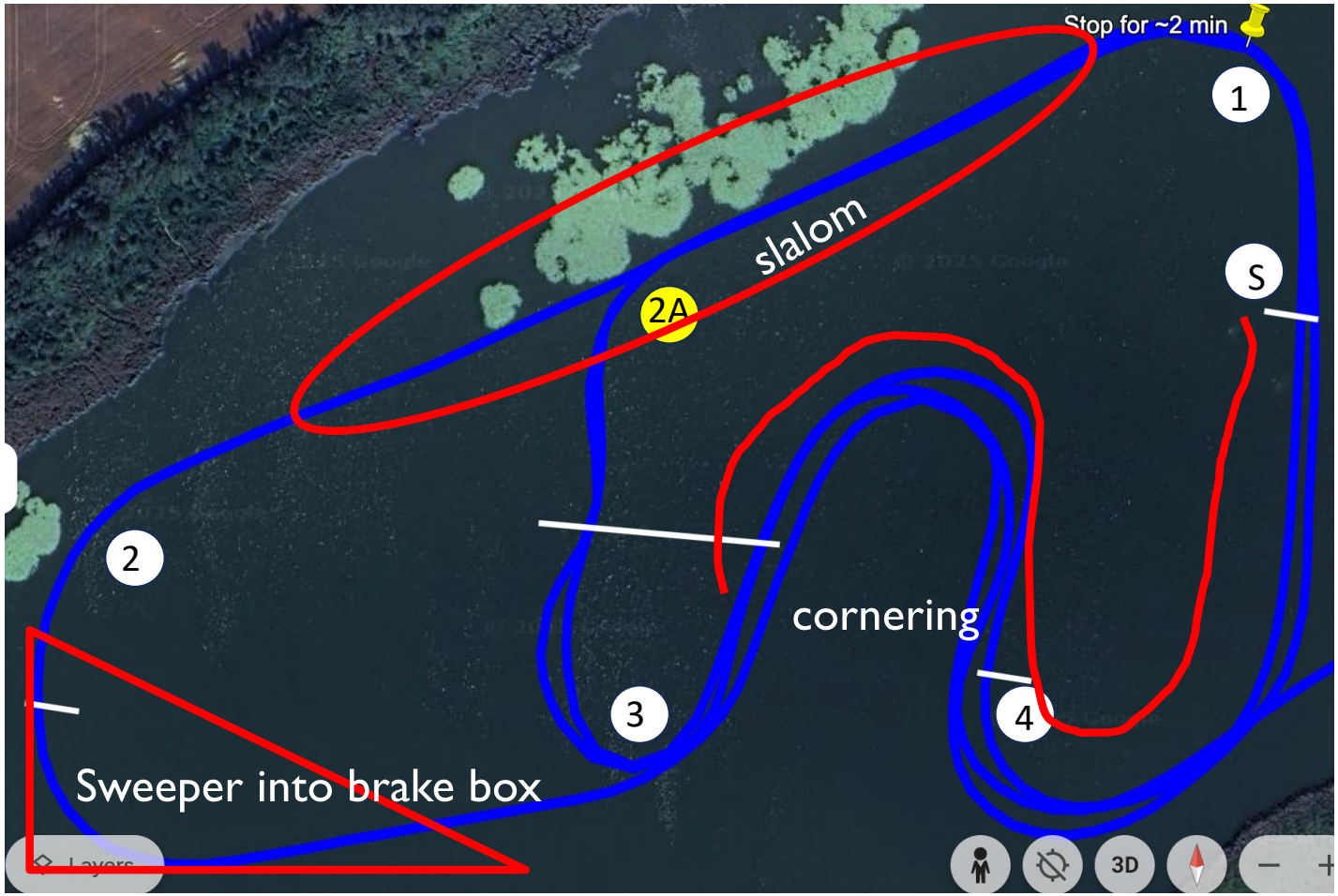

Track Entrance

Paddock

Track Exit

# Exercises

Students will go through an exercise then move on to the next one.
Wait at the entrance gate to each exercise to be waived in to start
Keep cycling all around the track



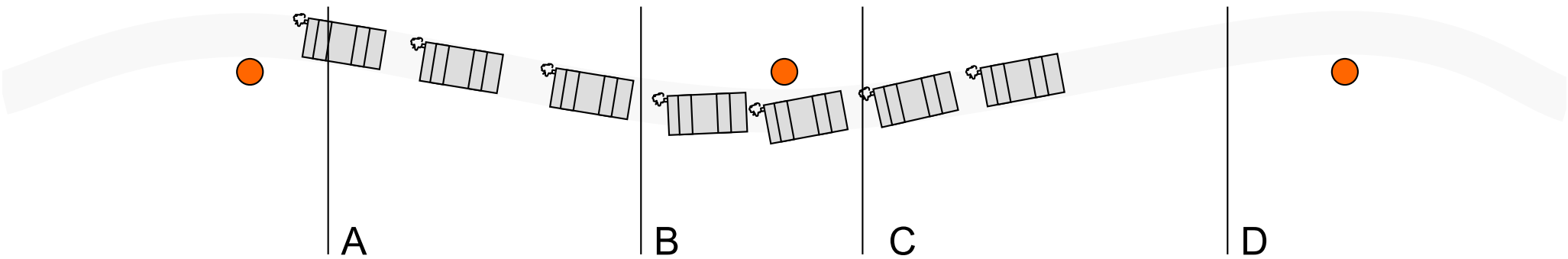

If sharing a car – both in the car– trade who drives after each cycle around the track

# Exercises - The Ice Slalom

## These are a place holder for the lectures

## Setup

Cones are spaced no more than 20 yards apart. Mark cone locations with ground marking paint for easy cone replacement. Use about 6-8 cones to make for a good run. The area should be wide enough to allow for cars to spin out without hitting the snow banks.




## Execution

Execution is somewhat different to that of a dry slalom. The gas pedal is used to control the car almost more than the steering wheel.

From A to B – **On** the gas, steering straight, heading for right side of approaching cone.

From B to C – **Off** the gas (weight transfer to the front), steering slightly left causing slight oversteer situation to point the car around the upcoming cone.

From C to D – Back **on** the gas (weight transfer to the rear) to stabilize the rear of the car, and aim for left side of approaching cone.

And so on….

- Exercise 2 Sweeper & brake box
  - Use the sweeper to experiment with throttle steering, trail braking, and left foot braking to change to attitude of the car, and over vs understeer
  - Followed by brake box
    - Each time through brake later
- Exercise 3 Double hairpin
  - Practice in cornering on ice
    - Find the right line
    - Experiment with throttle & brake steering

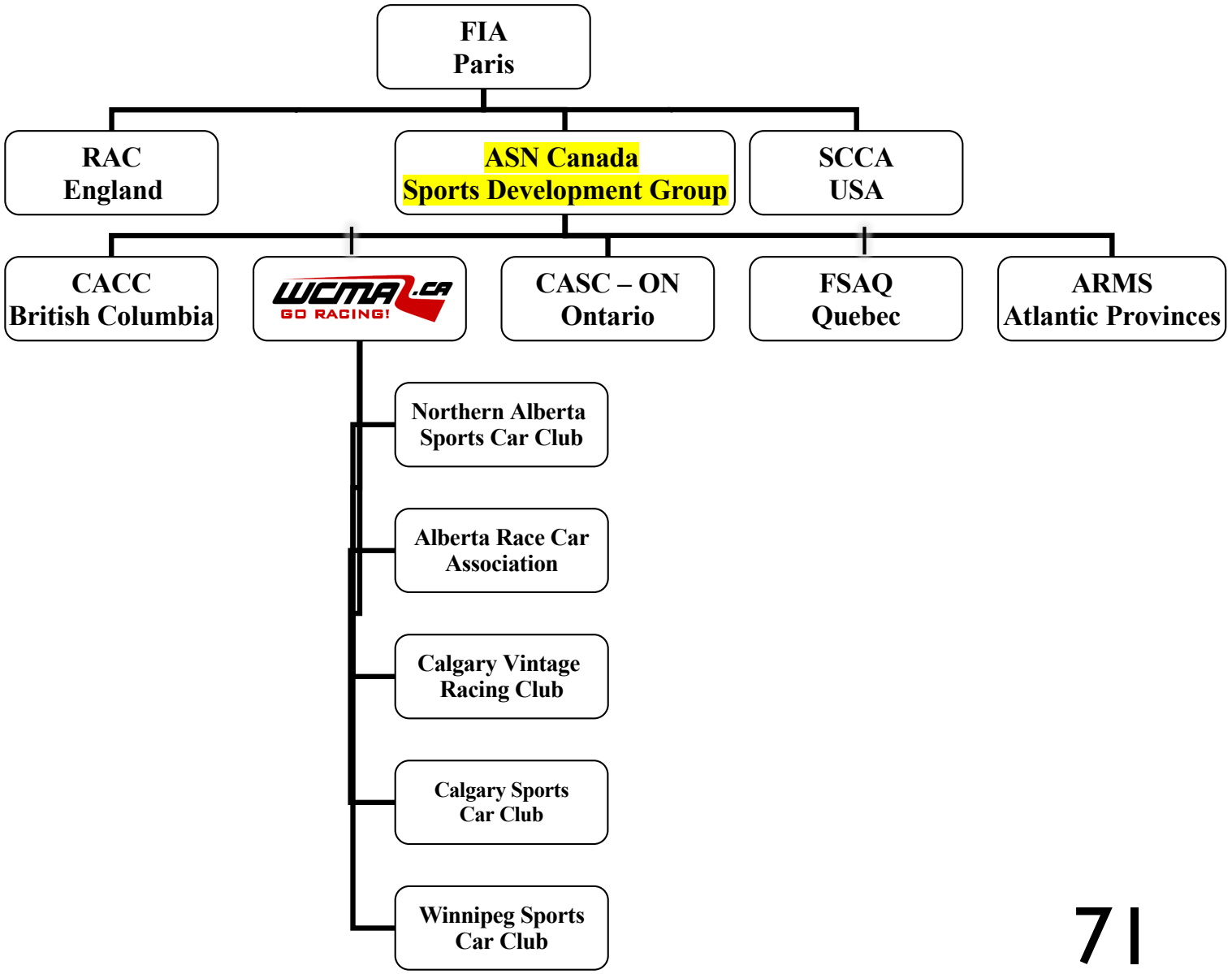
# WCMA Hierarchy & Basic Racing Stuff

Western Canada Motorsport Association

- Sanctioning body - Alberta, Saskatchewan, Manitoba
- Responsible - safe and fair administration
- Racing, Solo, School events
- www.wcma.ca

WCMA.CA
GO RACING!

# Motorsport Organization



# WCMA Regulations

- Sporting Regulations
- Technical Regulations
- Solo (Solosprint) regulations
  - All available on-line: www.wcma.ca

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GO RACING!

# WCMA Officials

- Senior Steward, Steward & Recording Steward
- Clerk of the Course
- Chief Scrutineer
- Chief Starter
- Corner marshals
- Chief Timing and Scoring
- Chief of Licensing

# How to go racing

- Join a WCMA affiliated racing club
  - Northern Alberta Sports Car Club
  - Alberta Race Car Association
  - Calgary Sports Car Club
- Enter a rent-a-ride series
- Jump into the online forums
  - www.wcma.ca
  - NASCC group Facebook page

NORTHERN ALBERTA SPORTS CAR CLUB
NASCC.AB.CA
ALBERTA RACING

ARCA
ALBERTA RACE CAR ASSOCIATION

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