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# West Coast Rally Association Navigational Novice School

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**Instructor Name:** \_\_\_\_\_

**Student Name:** \_\_\_\_\_

## WHAT IS TSD?

Navigational Rallying has been practiced in Canada since the early 1950's and tests both driver and navigator. Instead of running flat-out as in a performance rally, navigational events use the Time-Speed-Distance (TSD) formula. In a TSD section, a particular average speed is listed and the teams must drive as close as possible to that speed. Checkpoints are placed at unknown locations in the TSD section and teams are penalized for passing them earlier or later than the target time.

Average speeds are always within posted speed limits and because the roads are not closed to the public, teams must obey all traffic laws. The route usually follows roads that are similar to those used in performance rallies: narrow winding forestry roads, ranch roads and other less-traveled roads. Route finding is generally not difficult, but the navigator has a lot of work to do to keep the driver on time.

## BEFORE YOU LEAVE:

### 1. Entry and Eligibility requirements:

- a) Entrants must be prepared to present:
  - 1) Driver must have valid Driver's License.
  - 2) Proof of Insurance.
  - 3) Registration certificate for vehicle.
  - 4) Permission of vehicle owner if other than rally participant, in writing.
- b) Completion of Entry Form.
- c) Additional passengers are allowed.
- d) Signature of all participants on Liability Waiver Form. (A separate form covers minors.)

## 2. Safety Inspection and Vehicle Eligibility – Tech Inspection

- a) Vehicles must be road legal and licensed.
- b) All vehicles must have seat belts, and be worn during the event.
- c) Each vehicle will be inspected for: working lights, usable spare tire, and other "road legal" items.

## 3. Classes

**Paper:** No calculators, rally tables or accessory odometers.

**Calculator:** Accessory odometers, non-programmable calculating devices that are not driven by a wheel.

**Unlimited:** Unlimited equipment.

**Novice:** Neither team member having entered more than 3 TSD rallies prior to the start of the competition year and navigation equipment to conform to calculator class.

**Historic:** Vehicles manufactured 25 years prior to December 31st of the year proceeding the current competition year as per the date stated on the vehicle registration. For this year, that means that any vehicle manufactured before December 31st, 1986 will qualify. Equipment in this class is unlimited.

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### **RULE # 1: STAY ON THE ROAD!**

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**You cannot finish the rally if you crash, or end up destroying your car.  
This is the driver's number one priority.**

**Every road is different!** Make sure you judge each road individually and drive to what you can see and how the car is handling.

If you crash or temporarily part with the road **do not panic!**

**Step 1:** Get out of the car and place your triangle 100-200m down the road on the side that you have gone off. (ie: You are in the left ditch, put it on the left side of the road.) Use your discretion, and put it approx 100 m before you knew you were in trouble.

**Step 2:** On the back of your route book there is a medical aid required sign, and an ok sign. If you are ok, and just need a pull out please hold the ok sign clearly. If you are both injured in the car, hold as clearly as possible the medical aid required sign. If you are the next car on scene and do not see an OK sign, you **must stop** and provide as much aid as possible.

**Step 3:** Once you are back on the road, collect your triangle and proceed onwards with care.

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## RULE # 2: STAY ON THE RIGHT ROAD!

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**You cannot remain on time if you get lost.  
As simple as this sounds, it can be tricky. It requires  
communication and trust between the driver and co-driver.**

### Route Instructions:

1. The route is broken down into two section types, regularities, and transits. Each type of section will look slightly different in your route book.
  1. Transit: Rallyists may be early or late within the section, but must be at the finish at the correct time. No checkpoints are located in transit sections. Allowed time will be based on legal speed limits and reasonable speeds.
  2. Regularity: Rallyists must average speeds as indicated in the Route Book and checkpoints may be located anywhere in the section.
2. Each note will contain an instruction number, mile and kilometer mileages and a tulip and/or average speed change instruction.
3. The route book will start with an odometer check and then alternate back and forth between regularities and transits. There will also be a refueling stop approximately half-way through each leg, where you can refuel and take a quick break. (The distance between refueling stops will be 250km or less.)
4. Once following the route book you need to remember the rules of precedence:
  1. Remain on the same named or numbered road if directed 'onto' (and only by the word onto) it by name or number.
  2. That is protected from entering traffic by STOP or YIELD signs.
  3. That is of similar road surface (paved vs. unpaved).
  4. That follows numbered or named highway.
  5. Continues straight ahead or as nearly straight as possible.
  6. Redundant instructions may be used to clarify the main road, or to provide references confirming-you are on the correct route. Such instructions may be appended with "MBCU" (**May Be Considered Unnecessary**).
  7. All rally roads are public roads unless otherwise noted in the Route Book. Dead End or Private roads are to be considered non-existent. Such roads may be indicated in the Tulip without noting such status as private or dead end.  
**Exception:** Usable roads will be specifically noted: "Ignore Dead End" or equivalent.
5. Distances relate to:
  1. The action point - ie. when you commence a turn or the middle of the hairpin.
  2. A reference where there is no action indicated - ie. Signs.

## Start / Finish of Sections

During the layout phase of this rally, convenient locations were chosen to Zero the odometer. These don't necessarily have room for 10 cars, so zero your odometer and pull forward - Please don't block the road! (There will be no checkpoints within the first 200 meters of the start of a regularity.) If another car starts on the same minute as you, double check your math, and follow the rules for a time declaration (see below)

### If you get lost do not panic!

- Retrace your steps until your last known good position, and try again. All checkpoint teams will remain in place for 10 minutes after the last car is scheduled to pass unless all cars have gone through successfully.
- Contact numbers for all rally officials are in the front of your route book, call and let us know what is going on.
- You may also have maps, try to locate where you are and work out to a major road. Under no circumstance just go home, we need to know where you are!

## TULIPS:

Tulip Meaning	Tulip Diagram	Tulip Meaning	Tulip Diagram
AL/ AR Acute Left/ Acute Right		RRX Rail Road Crossing	
BL/ BR Bare Left/ Bare Right (Turn off road)		KL/ KR Keep Left/ Keep Right	
SC Gravel Surface Change to Gravel		CG Cattle Guard	
Bridge		EXP Exposure	

## Other Short Hand:

HPR.....	Hairpin Right
HPL .....	Hairpin Left
HL.....	Hard Left
HR .....	Hard Right
EOS.....	End of Stage (End of Regularity)
TS.....	Traffic Signal
SSA .....	Sign Straight Ahead
SOR.....	Sign on Right
SOL .....	Sign on Left
CAS .....	Change Average Speed
MBCU.....	May Be Considered Unnecessary
CAUTION ! .....	Might Damage Your Car
CAUTION !! .....	Will Damage Your Car, and Possibly You
CAUTION !!! .....	Will Damage Both Your Car and You!

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### **RULE # 3: STAY ON TIME**

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**This is the main responsibility of the navigator.  
Be warned that it is very easy to get caught up on the calculations  
and miss calling a turn to your driver!**

#### **Checkpoints, Controls, and Timing:**

- Checkpoints may be visible or hidden and will take the time the competitors pass by down to the second. (Competitors do not stop at checkpoints.)
- All controls will open 10 minutes before the ideal arrival time of car 0, and close 10 minutes after the last car is due.
- Main Time Controls (MTC's) are only used at the end of the rally. You may declare a time in the future, but not in the past. Please make sure you check in with the rally master in order to ensure all cars have completed safely.

#### **Time:**

The event is run as a perfect time rally; Timing will be to the 0.1 second, but scoring is one point per whole second early or late. There is effectively a 0.9 second grace period either side of perfect time to allow for checkpoint position and timing accuracy. "Winter scoring" has been removed. Your time is Car 0 time plus your car number. (ie. If car 0 time is 16:02:00 and you are car 20, your time is 16:22:00.) Car 0 time is set at the start of each section: Please make sure that your stopwatch/timer is correct to the second!

**Scoring:**

Checkpoint locations are hidden and your time is taken as you pass without stopping. A point will be given for each second either early or late, and at the end of the rally the team with the lowest number of points wins. Rally time is on the registration desk.

**General Information:**

- a) Competitors must assume that notifications of the event have been sent to all law enforcement officials in the areas we traverse.
  - b) Failure to stop at an accident may result in disqualification. However, if you can't render aid, move on.
  - c) Checkpoint placement will be such that most competitors could zero each control: reasonable driving will allow competitors to be averaging the correct speed at all control locations (ie. Do not try to "average" 45 through 20 mph corner...) Don't overdrive the roads. There is no "balking" penalty, but unsafe control of vehicle "may be noted for later action".
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**Rally Formulas & Calculations:**

**These are the 2 main calculations you will use when starting to rally, other calculations just provide more information:**

1. Odometer Correction Factor  
 **$\text{Odometer Distance} / \text{Rally Distance} = \text{Correction Factor}$**
  2. Calculating Time  
 **$(\text{Distance (km)} \times 60) / \text{Speed (km/hr)} = \text{Time}$**
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**Time Declarations:**

- a) Competitors should be able to stop and render first aid at an accident without penalty.
- b) Competitors should be able to stop and deal with a public situation (concerned local, grader blocking road, law enforcement etc.) without penalty.
- c) Competitors' own errors should earn them penalties.
- d) Competitors should not be able to engineer a lower score post-facto through a time declaration.
- e) Competitors requiring outside assistance to extract them from a snowbank should be penalized.

Therefore, there will be 2 categories of time declaration:

- a) For situations involving public safety (stopped for a red cross incident, stopped to determine if there is injury, stopped by a member of the public, heavy traffic making it impossible to pass, etc.) the time declaration will not incur any penalty.
  - b) For competitor's fault situations (missed a turn, couldn't make the average, blew a tire, miscalculated the time, etc.) the time declaration will cost you 20 points.
- Teams will be given a Time Declaration sheet for each regularity. If you are delayed in a regularity, (e.g. if you have to stop for an accident, or if you are stopped by someone not connected with the rally) **do not race to catch up your time.**
  - The time declaration sheet includes:
    - a) field for the distance;
    - b) check box for fault/no- fault;
    - c) field for recording the reason if it is a no-fault;
    - d) the delay requested, which must be in whole minutes, or whole minutes plus 30 seconds (0:30, 1:30, 2:30 etc.), up to 9:30 late.
    - e) If this is the 2<sup>nd</sup> or 3<sup>rd</sup> time declaration in a regularity, enter the total cumulative delay from this point on – i.e. how much late are you running now, not how much later than at the previous time declaration.
  - In each case, you must fill in the time dec form at the time when the delay occurs. To ensure that competitors don't engineer their time decs post-facto, there may be a stop control at any location along the route, where the time dec forms will be collected. **Stop controls will be indicated by a yellow advance board ahead of the control and a red stop board at the control.** These will be on display at registration. At the end of the day, when you check in to the main time control in the restaurant, hand in any time declarations that weren't previously collected.
  - The maximum penalty at a single control is 300 points (5 minutes) and the maximum penalty for a regularity stage is 600 points (10 minutes). Control officials will remain in place at least until all remaining cars are beyond 10 minutes later than absolute rally time.
  - Ties will be broken by the most zero scores, then the most 1 second penalties, etc.

## West Coast Rally Association - Navigators Sheet

Kms /Hour	Sec/ Km	Kms /Hour	Min/ Km	Cents	Sec	
19	189.5	19	3.158	0.02	1	Time = $\frac{\text{Distance} \times 60}{\text{Average Speed}}$
20	180.0	20	3.000	0.03	2	
21	171.4	21	2.857	0.05	3	
22	163.6	22	2.727	0.07	4	
23	156.5	23	2.609	0.08	5	
24	150.0	24	2.500	0.10	6	
25	144.0	25	2.400	0.12	7	Odo Factor = $\frac{\text{Odo Distance}}{\text{Rally Distance}}$
26	138.5	26	2.308	0.13	8	
27	133.3	27	2.222	0.15	9	
28	128.6	28	2.143	0.17	10	
29	124.1	29	2.069	0.18	11	
30	120.0	30	2.000	0.20	12	
31	116.1	31	1.935	0.22	13	Odo Speed = Rally Speed x Factor Odo Distance = Rally Distance x Factor
32	112.5	32	1.875	0.23	14	
33	109.1	33	1.818	0.25	15	
34	105.9	34	1.765	0.27	16	
35	102.9	35	1.714	0.28	17	
36	100.0	36	1.667	0.30	18	
37	97.3	37	1.622	0.32	19	100th/minute = cents = seconds X 1.6667 or use conversion from table at left
38	94.7	38	1.579	0.33	20	
39	92.3	39	1.538	0.35	21	
40	90.0	40	1.500	0.37	22	
41	87.8	41	1.463	0.38	23	
42	85.7	42	1.429	0.40	24	
43	83.7	43	1.395	0.42	25	Cents = Secs    0.38 cents = 23 seconds Secs = Cents    17 seconds = 0.28 cents
44	81.8	44	1.364	0.43	26	
45	80.0	45	1.333	0.45	27	
46	78.3	46	1.304	0.47	28	
47	76.6	47	1.277	0.48	29	
48	75.0	48	1.250	0.50	30	
49	73.5	49	1.224	0.52	31	Speed = Rate  In Table to Left  Sec/kilometer = find units/hour (avg speed) and use sec/unit as # of seconds to do each Km at the posted average speed  Example    Average speed = 50 Kph 50 Kph = 72 sec/kilometer each 1/10 kilometer takes 7.2 seconds - makes it easy to pencil in incrementals between instructions to keep driver on time
50	72.0	50	1.200	0.53	32	
51	70.6	51	1.176	0.55	33	
52	69.2	52	1.154	0.57	34	
53	67.9	53	1.132	0.58	35	
54	66.7	54	1.111	0.60	36	
55	65.5	55	1.091	0.62	37	Perfect time to travel  0.00    avg speed = 45 Kmh 2.73    avg speed = 50 Kmh 4.14    avg speed = 60 Kmh 6.25    end of section  Calcs Time = (distance X 60) / avg speed 3.640 = (0.00 - 2.73) x 60 / 45 1.692 = (4.14 - 2.73) x 60 / 50 2.110 = (6.25 - 4.14) x 60 / 60  7.442 min = time to do 6.25 Kms 7.442 min = 00:07:27 (hh:mm:ss)
56	64.3	56	1.071	0.63	38	
57	63.2	57	1.053	0.65	39	
58	62.1	58	1.034	0.67	40	
59	61.0	59	1.017	0.68	41	
60	60.0	60	1.000	0.70	42	
61	59.0	61	0.984	0.72	43	
62	58.1	62	0.968	0.73	44	
63	57.1	63	0.952	0.75	45	
64	56.3	64	0.938	0.77	46	
65	55.4	65	0.923	0.78	47	
66	54.5	66	0.909	0.80	48	
67	53.7	67	0.896	0.82	49	
68	52.9	68	0.882	0.83	50	
69	52.2	69	0.870	0.85	51	
70	51.4	70	0.857	0.87	52	
71	50.7	71	0.845	0.88	53	
72	50.0	72	0.833	0.90	54	
73	49.3	73	0.822	0.92	55	
74	48.6	74	0.811	0.93	56	
75	48.0	75	0.800	0.95	57	
76	47.4	76	0.789	0.97	58	
77	46.8	77	0.779	0.98	59	
78	46.2	78	0.769	1.00	60	