Car and Driver Calibration for Rookies

You have decided to try a GreatRace or VCRA rally. The schedule shows a rally school. You can learn everything you need to rally with at this school. **True!** You will be ready to rally on the first day. **WRONG!!!!** You **can** learn all that is needed at the rally school but you won't have time to "calibrate" the car and driver. If you want to be competitive in your first rally you need to be prepared. You get to be a rookie only once.

This type of rally has a basic assumption that makes it challenging. The assumption is that a car stops instantaneously and accelerates to speed instantaneously. The fastest of cars cannot do this. You will need to understand how your car and driver does this. You will loose time on both acceleration and braking.

What follows is how to build a chart that you can use during the rally to make adjustments for this.

First you need to find a place that you can mark a course and drive through without major traffic. We go out into the countryside or in a subdivision that is not fully developed. You will set up two courses or runs. One will need to be about a mile long. The exact distance in **NOT** important. You will be looking for differences in time. The second course should be about a half of a mile. We mark the start and end of the courses with a stick with a flag attached. You could accomplish the calibration with one-mile long course but it will take a lot longer when you do the lower speed runs.

First run the course at speeds of 10, 15, 20, 25, 30, 35, 40, 45 and 50 MPH. Time it 4 times at each speed. We run it in both directions. The reason for the 4 runs is to get a good average. Be steady on holding the speed on each run. If you get a lot of variation, make more runs.

Your numbers will look something like this. They will not be exactly these numbers because your coarse will be a different length.

Time In Seconds

Speed	Time-1	Time-2	Time-3	Time-4	Average	
10	179.6	179.9	180.5	180.0	180.0	**Short Course**
15	120.5	120.9	120.4	120.9	120.7	**Short Course**
20	90.8	91.0	90.5	90.4	90.7	**Short Course**
25	71.8	72.5	72.1	72.0	72.1	**Short Course**
30	119.6	120.2	120.6	120.1	120.1	**Long Course**
35	102.9	102.5	102.8	103.2	102.9	**Long Course**
40	90.0	90.2	89.9	90.0	90.0	**Long Course**
45	80.1	80.2	79.4	80.2	80.0	**Long Course**
50	71.9	72.0	72.2	71.8	72.0	**Long Course**

Now we have a basis for measuring the time lost in braking and acceleration. First measure the lost in acceleration. Drive to the starting flag on the course. Have the navigator give a start count-3, 2, 1, go. If the driver jumps the count, wack him or her with a club and do it again. It is important that the start is done with consistency. Start the stopwatch when you say, "go" and stop it when you cross the end flag. You will get numbers that look like this.

Time In Seconds

Speed	Time-1	Time-2	Time-3	Time-4	Average	
10	180.6	181.0	180.5	180.4	180.6	**Short Course**
15	121.7	121.8	121.7	121.6	121.7	**Short Course**
20	92.1	92.0	92.4	91.7	92.1	**Short Course**
25	74.0	74.4	73.6	74.5	74.1	**Short Course**
30	122.6	122.5	122.6	122.1	122.5	**Long Course**
35	106.0	106.4	105.8	106.1	106.1	**Long Course**
40	93.8	93.6	93.7	93.9	93.8	**Long Course**
45	84.5	84.3	84.6	84.6	84.5	**Long Course**
50	77.2	77.1	77.3	77.2	77.2	**Long Course**

Using the averages we can determine the lost time on acceleration. Take the difference between the average run time (time to run the course without start/stop) and the time taken when starting from a stop. This is the loss on acceleration.

Time In Seconds

Speed MPH	Average Run Time	Average From Stop	Loss On Acceleration
10	180.0	180.6	0.6
15	120.7	121.7	1.0
20	90.7	92.1	1.3
25	72.1	74.1	2.0
30	120.1	122.5	2.4
35	102.9	106.1	3.2
40	90.0	93.8	3.8
45	80.0	84.5	4.5
50	72.0	77.2	5.2

Now we have to determine the loss on braking. This is done by entering the coarse at the designated speed. Start the stopwatch when you pass the entry flag. Tell the driver to stop and the end flag. Stop the stopwatch when the car rocks back after the stop. Your numbers may look something like this.

Time In Seconds

Speed	Time-1	Time-2	Time-3	Time-4	Average	
10	181.6	181.0	182.0	181.9	181.6	**Short Course**
15	122.4	123.0	121.8	122.5	122.4	**Short Course**
20	92.6	92.4	92.8	92.5	92.6	**Short Course**
25	74.2	74.4	73.6	74.5	74.2	**Short Course**
30	122.6	122.5	122.6	122.5	122.6	**Long Course**
35	106.0	106.4	105.8	106.1	106.1	**Long Course**
40	93.7	93.6	93.7	93.9	93.7	**Long Course**
45	84.5	84.3	84.6	84.6	84.5	**Long Course**
50	77.5	77.7	77.4	77.2	77.5	**Long Course**

Using the averages we can determine the lost time on braking. Take the difference between the average run time (time to run the course without start/stop) and the time taken when stopping on the end flag.

Time In Seconds

Speed MPH	Average Run Time	Average From Stop	Loss On Braking
10	180.0	181.6	1.6
15	120.7	122.4	1.7
20	90.7	92.6	1.9
25	72.1	74.2	2.1
30	120.1	122.6	2.5
35	102.9	106.1	3.2
40	90.0	93.7	3.7
45	80.0	84.5	4.5
50	72.0	77.5	5.5

These are the basis for any numbers you might need to run the rally. I like to organize them in a fashion that I can read them quickly. I use a chart format. Put your numbers in a chart similar to the one below.

ACCELERATE

SC	0	5	10	15	20	25	30	35	40	45	50
B 0	NA	0.2	0.6	1.0	1.3	2.0	2.4	3.2	3.8	4.5	5.2
R 5	1.5										
A 10	1.6										
K 15	1.7										
I 20	1.9										
N 25	2.1										
G 30	2.5										
35	3.2										
40	3.7										
45	4.5										
50	5.5										

Now you can use simple math to fill in the blanks. For instance, if the loss on acceleration from 0-30 is 2.4 seconds and the loss from 0-50 is 5.2 seconds, the loss from 30 to 50 would be the difference or 2.8 seconds. Put 2.8 in the junction where 30 and 50 meet. For a chart like this to work, the driver must always accelerate and brake at the same pace. The navigator must always measure stops in the same manner (at rock back)

ACCELERATE

SC	0	5	10	15	20	25	30	35	40	45	50
B 0	NA	0.2	0.6	1.0	1.3	2.0	2.4	3.2	3.8	4.5	5.2
R 5	1.5	NA	0.4	0.8	1.1	1.8	2.2	3.0	3.5	4.2	5.0
A 10	1.6	0.1	NA	0.4	0.7	1.4	1.8	2.6	3.2	3.9	4.6
K 15	1.7	0.2	0.1	NA	0.3	1.0	1.4	2.2	2.8	3.5	4.2
I 20	1.9	0.4	0.3	0.4	NA	0.7	1.1	1.9	2.5	3.2	3.9
N 25	2.1	0.6	0.5	0.4	0.2	NA	0.4	1.2	1.8	2.5	3.2
G 30	2.5	1.0	0.8	0.7	0.6	0.4	NA	0.8	1.4	2.1	2.8
35	3.2	1.7	1.6	1.5	1.3	1.1	0.7	NA	0.6	1.3	2.0
40	3.7	2.2	2.1	2.0	1.8	1.6	1.3	0.5	NA	0.7	1.5
45	4.5	3.0	2.9	2.8	2.6	2.4	2.1	1.3	0.8	NA	0.8
50	5.5	4.0	3.8	3.7	3.6	3.4	3.0	2.3	1.7	1.0	NA

Now that you have this chart that probably took most of a day, how would you use it?

A common instruction during the rally would be to have you stop at a stop sign. They will allow 15 seconds at the stop. Again, they assume instantaneous stops and instantaneous starts. Lets say you were driving into the stop at 40 MPH and you were instructed to go 25 after the stop. Using the chart, the loss on stopping would be 3.7 seconds (the intersection between 0 and 40). The loss on acceleration is 2.0 seconds (the intersections between 0 and 25). The rally master gives you 15 seconds of which you have used 5.7 (3.7 plus 2.0) in stopping and starting. Therefore you stay at the stop sign for a countdown of 9.3 seconds.

Another type of instruction that this chart can be used for is turns. An instruction may call for you to make a turn to the right. Your entry speed may be 40 MPH and the speed at the completion of the turn is 25 MPH. The instructions assume instantaneous speed change at the apex of the turn. Assume that you will make the turn at 15 MPH. First the loss on braking is 2.0 seconds (intersection of 40 and 15). The loss on acceleration is 1.0 seconds (intersection of 15 and 25).

The hardest part of rallying is staying on course and time. This chart will not help you stay on course. If you miss a sign or a turn you may find yourself "Lost in the Bluebonnets" or "Abducted by Aliens". This chart is meant to give you a guide of what time to stay at stop signs and how much time you loose on turns. For it to work well, the driver has to be very consistent.

Course instructions are given to you 20 minutes of your start time with the GreatRace. It is given 45 minutes ahead of time with the VCRA. Use this time to mark them with stop sign pauses and turn losses.

If you choose not to make one before the rally, you can make some guesses on stop signs. Using 8 –10 seconds hold time will keep you in the ballpark. Using 3 – 4 seconds on turns will do the same.

There are lots of ways to calculate the data on this chart. You will hear other methods and most of them work well.

If you have and questions on this, feel free to contact me at Loubiere06@verizon.net.

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