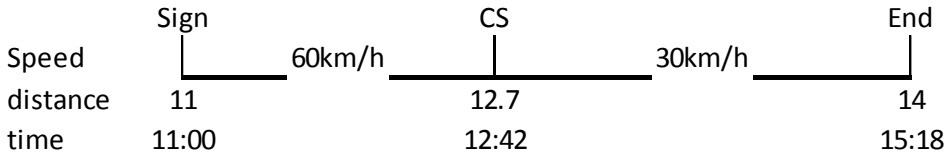
Regularity Rallying
Finding the unknown time

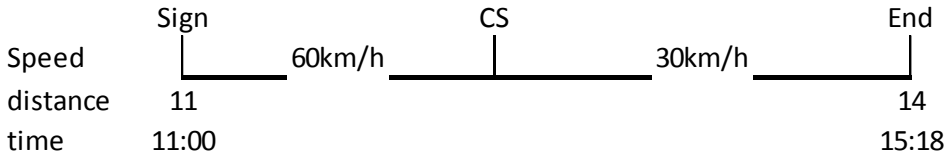
In the previous articles the basics where introduced, then counting White lines as a means of determining your speed. In this installment I am going to share how you can work out the time you should be at a point when it would seem impossible to do so.

Below is an example to get the ball rolling, from distance 11 proceed at 60km/h to distance 12.7, then change speed (CS) to 30km/h till the end at distance 14, simple enough.



Dist	A Speed	**Rally Schedule**	Time h,m,s
10.00	60	Sign 100	00:10:00
10.80	60	Windmill	00:10:48
11.00	60	**Sign**	00:11:00
12.70	30	Change speed (**CS**)	00:12:42
14.00	30	Sign **END**	00:15:18

But what if the schedule only instructed a change speed, with no distance or time given, see below, now the picture is a little different.
The unknown could be a speed change at an STC, a Marshal or one of those overhead wires we all love.



Dist	A Speed	**Rally Schedule**	Time h,m,s
10.00	60	Sign 100	00:10:00
10.80	60	Windmill	00:10:48
11.00	60	**Sign**	00:11:00
	30	Change speed (**CS**)	Unknown
14.00	30	Sign **END**	00:15:18

The time can be determined:

*Time unknown = distance covered (km) * 3600 +/- time difference (second) multiplied by the last speed (km/h) all divided by the difference in speeds (km/h).*

The (+/-) bit is key, whatever the answers are from the workings subtract the smaller result from the larger.
The result is in decimal minutes, which is converted to minutes and seconds.

Step 1 Subtract the start distance from the end distance, then multiply by 3600
Step 2 Subtract the start time from the end time (times in seconds) then multiply by the last speed (km/h)
Step 3 Subtract the higher speed from the slower one, both (km/h)
Step 4 Subtract the lesser of the answers from 1 or 2 from the other, then divide this by the answer from Step 3.
Step 5 Convert the answer from step 4 to minutes.
Step 6 Convert the decimal portion from step 5 to seconds

1. (14.00 - 11.00 *3600) = 10 800
2. 15:18 - 11:00 (258 seconds * second speed 30) = 7 740
3. 60 - 30 = 30
4. (10 800 – 7 740) / 30 = 102
5. Convert to minutes (102/60) = 1.7 minutes.
6. Multiply the decimal portion by 60, (0.7*60) = 42 seconds.

Time unknown = 11:00 + 01:42 = **12:42**

Further example

Dist	A Speed	**Rally Schedule**	Time h,m,s
10.00	65	Sign 100	00:10:00
10.80	65	Windmill	00:10:44
11.20	65	**Sign**	00:11:06
13.60	30	Change speed (**CS**)	00:13:19
15.80	30	Sign **END**	00:17:43

1. (15.80 - 11.20) *3600 = 16 560
2. 17:43 – 11:06 (397 seconds * second speed 30) = 11 910
3. 65 - 30 = 35
4. (16 560 – 11 910) / 35 = 132.857
5. Decimal convert 132,857/60 = 2.214 minutes
6. Multiply the decimal portion by 60 (0.214*60) = 12.85 (13 seconds)

Time unknown = 11:06 + 02:13 = **13:19**

Rounding errors that may be reflected in the printed times on the rally schedule can result in the time derived being a second or so out.

Roger Lewis

Further examples to play with

In these examples the speed increases.

Dist	A Speed	**Rally Schedule**	Time h,m,s
10.00	50	Sign 100	00:10:00
10.80	50	Windmill	00:10:58
11.20	50	**Sign**	00:11:26
13.60	66	Change speed (**CS**)	00:14:19
15.80	66	Sign **END**	00:16:19

1. (15.80 - 11.20) *3600 = 16 560
2. 16:19 – 11:26 (293 seconds * second speed 66) = 19 338
3. 66 - 50 = 16
4. (19 338 – 16 560) / 16 = 173.625
5. Decimal convert 173.625/60 = 2.893 minutes
6. Multiply the decimal portion by 60 (0.893*60) = 53.6

Time unknown = 11:26 + 02:53 = **14:19**

Dist	A Speed	**Rally Schedule**	Time h,m,s
10.00	45	Sign 100	00:10:00
10.80	45	Windmill	00:11:04
11.20	45	**Sign**	00:11:36
14.00	67	Change speed (**CS**)	00:15:20
15.80	67	Sign **END**	00:16:57

1. (15.80 - 11.20) *3600 = 16 560
2. 16:57 – 11:36 (321 seconds * second speed 67) = 21 507
3. 67 - 45 = 22
4. (19 338 – 16 560) / 22 = 224.863
5. Decimal convert 224.863/60 = 3.7477 minutes
6. Multiply the decimal portion by 60 (0.7477*60) = 44.86 (45)

Time unknown = 11:36 + 03:45 = **15:21**

Dist	A Speed	**Rally Schedule**	Time h,m,s
49.90	85	Windmill	00:47:31
	55	Change speed (**CS**)	00:48:01
52.00	55	Sign **END**	00:49:32

1. (52.00 - 49.90) *3600 = 7 560
2. 49:32 – 47:31 (121 seconds * second speed 55) = 6 655
3. 85 - 55 = 30
4. (7 560 – 6 655) / 30 = 30.1666
5. Decimal convert 30.1666/60 = 0.502 minutes
6. Multiply the decimal portion by 60 (0.502*60) = 30

Time unknown = 47:31 + 00:30 = **48:01**

Calculate the Unknown time when all you are given is a Speed Change

Dist	A Speed	Rally Schedule	Time hrs, min, sec
10.00	65	Start	
10.20	65	Sign CS	
Dist A	**Speed 1**	Windmill	**Time A**
	65		
	Speed 2	Change speed	**Unknown time**
Dist B		Sign END	**Time B**

Time unknown = distance covered (km) * 3600 +/- time difference (second) multiplied by the last speed (km/h) all divided by the difference in speeds (km/h).

	Dist B	Dist A		Dist B - A		Result 1
Dist					**X 3600 =**	

Time	Minutes	Seconds		Seconds	B - A Speed 2	
B			**Min* 60 +sec**		**X**	
					Seconds km/h	**Result 2**
A			**Min* 60 +sec**			

	Speed 1	Speed 2		Speed diff.		Result 3
Speed			**higher - lower**		**x 60 =**	

Subtract the larger of Result 1 or 2 from the smaller

Decimal Minutes

Formula = $\frac{\textbf{Result 1/2} \quad - \quad \textbf{Result 2/1}}{\textbf{divide by Result 3}}$ **=**

Seconds

Multiply the fractionof the decimal minutes by 60 =

	Minutes	Seconds
Time A		
Formula time		
Time A + Formula time = Unknown Time =		