North Raleigh Model Railroad Club

Standards and Recommended Practices

Measuring Train Speed

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Introduction

This publication was authorized by the Standards Committee on December 7, 1994, and proposed to the general membership. It was ratified by the Club on December 7, 1994.

Many model railroaders like to run their trains at prototypical speeds, while others just want to know how fast the trains are going. There are several methods for determining train speed, from a simple stop-watch all the way to a computer with electronic telemetry. This publication describes three of these methods, all of which should be within the financial means of most model railroaders.

Speed Chronometer

The speed of model (or real) trains can be determined by measuring the time it takes for a train to travel a known distance. The speed can then be calculated by applying a "scale factor" to the normal formula:

Speed (Miles per Hour) =
Distance (Miles)/Time(Hours) x Scale Factor

This is not an easy calculation, even with the help of a calculator, especially when it is repeated often within short intervals. It is much more convenient to be able to simply time a train moving over a known distance using a stop-watch that then automatically calculates the speed of the train. Such a stop-watch is available at reasonable cost, as follows:

Robic Sports Speed Chronometer Model SC-544

available from

Marshall-Browning International Corporation
115 Hurley Road
Oxford, CT 06478

Phone: 1-800-336-6756

List Price: $34.95

Visa/MasterCard accepted

This model provides several features: normal time of day, calendar, alarm, hourly chime, speed chronometer and interval lap chronograph. It comes with a neck strap.

Note: If you call Marshall Browning they will first try to locate a dealer close to you based on your zip code. Only if there is none close-by dealer will they sell you the Chronometer direct, at list price. You should be able to find a better price locally.

The "known distance" must be programmed into the watch (in either miles or kilometers). The chart on the left of the next page shows the "miles" to be programmed following the instructions provided with the chronometer, for different module lengths and scales.

Speed Tables

Another method of calculating train speed, using a wrist-watch or normal stop-watch, is to measure the time it takes a train to travel over a standard NTRAK module, then look in the N Scale Speed Table at right on the next page for the speed.

Known Distance Chart

Module Length	Distance in Miles				
	Z	N	HO	O	LGB
2 ft	0.083	0.061	0.032	0.018	n/a
4 ft	0.167	0.121	0.066	0.036	0.017
6 ft	0.250	0.182	0.099	0.055	0.026
8 ft	0.333	0.242	0.132	0.072	0.034

N Scale Speedometers

Perhaps the most accurate method of measuring train speed is to use a N Scale Speedometer which actually measures the speed of a train on the track as it passes the speed detection device. Two such devices have been manufactured.

Toth Electronics Speedometer
This unit was manufactured by Toth Electronics. It is no longer being produced, but may still be available from Hobby Shops, EBay or from mail-order suppliers.

The N Scale Speedometer consists of a box (containing optical sensors, a display and microprocessor) and a reflecting panel parallel to the optical sensors, joined by a plastic separator.

Place the speedometer over the tracks so the train passes between the optical sensors on the box and the reflector. If the train is small, place the box should be close to the track to insure the sensor beam is interrupted by the passage of the train.

The speedometer will display the speed of the train instantly after the second sensor detects the train. The direction of travel through the speedometer is unimportant; it will work either way. The speed will be displayed for approximately 7 seconds and then go blank to conserve battery life. If the train takes longer than 7 seconds to pass through the speedometer the unit will not reset until after the last car.

Accuracy of the reading is achieved through the use of quartz crystal timing and a microprocessor for the calculations.

TDP & Associates TrainSpeed
TrainSpeed is a scale speedometer that will work with any scale and on all control systems. Two versions are available — a single channel version that monitors speed at one point on the layout and a four channel version which monitors speed at four separate locations on your layout. The units, shown at right, are designed for control panel or facade mounting.

The units use ambient light to detect the train, and will not work in the dark. There is a bright LED display and power can be from any 12V source. The track sensors can be mounted up to 30' from the display unit. Speed can be displayed in either MPH or KPH. These units are great for speed matching locomotives.

TrainSpeed is available from hobby shops or online dealers.

N Scale Speed Tables

Time (seconds)	2 ft Module (SMPH)	4 ft Module (SMPH)	6 ft Module (SMPH)	8 ft Module (SMPH)
1	218	436	n/a	n/a
2	109	218	327	n/a
3	73	145	218	291
4	55	109	164	218
5	44	87	131	175
6	36	73	109	145
7	31	62	94	125
8	27	55	82	109
9	24	48	73	97
10	22	44	65	87
11	20	40	60	79
12	18	36	55	73
13	17	34	50	67
14	16	31	47	62
15	15	29	44	58
16	14	27	41	55
17	13	26	39	51
18	12	24	36	48
19	11	23	34	46
20	11	22	33	44
21	10	21	31	42
22	9.9	20	30	40
23	9.5	19	28	38
24	9.1	18	27	36
25	8.7	17	26	35
30	7.3	15	22	29
35	6.2	12	19	25
40	5.5	11	16	22
45	4.8	9.7	15	19
50	4.4	8.7	13	17
55	4.0	7.9	12	16
60	3.6	7.3	11	15

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