

drawings and tracing, therefore, are held in place on the board by using short pieces of Scotch adhesive tape. This tape is made of a heavy grade of paper, with adhesive material on one side, which does not have to be damped to make it stick on the board or to paper. Each piece can be pulled off and reused three or four times before the adhesive is worn away. The adhesive material which sticks to the board or the paper does not leave

a mess, but can be rubbed off readily. The tape comes in rolls, and can be secured in widths ranging from 1/4 in. to 1 in. or more. We use tape 1 in. wide, lapping about 1/2 in. of the width on the tracing and the other half on the board. By using pieces about 2 1/2 in. long and spacing them at intervals of 10 to 12 in. all the way around the drawing or tracing, the work is held in place and the surface is perfectly smooth.

## Make-Up-Time Chart

*"How can the time required for a train to make-up time at an increased speed be determined in chart form?"*

### Use a Nomogram

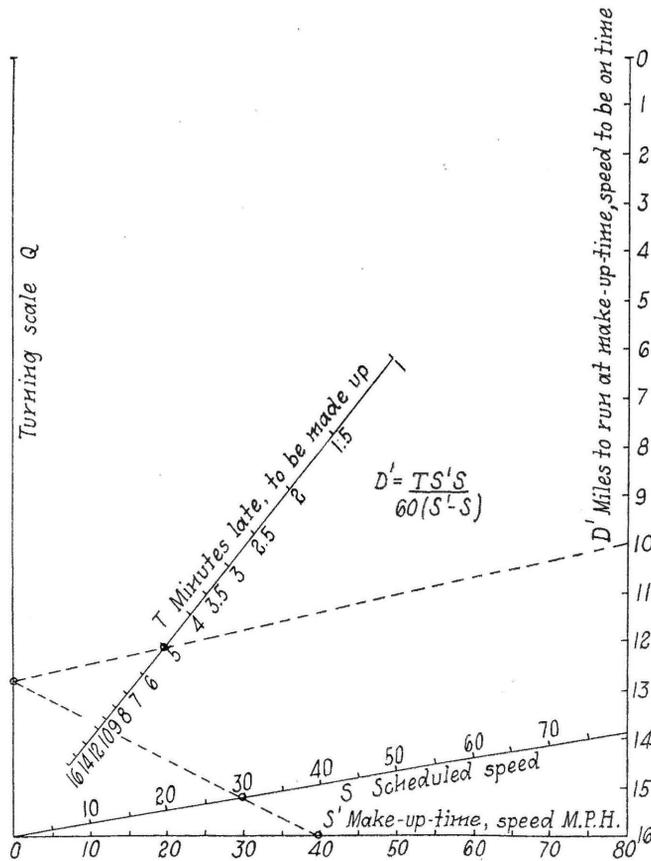
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The accompanying illustration is a chart for make-up-time speed:

If a train is T minutes (5) behind

Draw the secant line through 40 on scale S' and through 30 on scale S, prolonging it to turning scale Q, whence it is to be reflected back through 5 on T, and prolonged until it cuts scale D', which it does at 10 miles, the required distance. In short, the two dashed lines just drawn are an example of the use of this chart



Make-up time nomogram

time when running at scheduled speed, S m.p.h. (30), how far will it have to run on make-up-time speed of S' m.p.h. (40) to be on time again?

or nomogram, and they graphically solve the equation  $D' = \frac{TS'S}{60(S'-S)}$  This formula is excerpted from the

report of Committee 1, on the Economics of Railway Signaling, Vol. 37, No. 1, opp. p. 18.

Each secant cuts 3 scales at the intersections marked with little circles, and avoids by breaks, those intersections not significant. Any similar V line that might be drawn, each leg cutting the 3 proper scales, will cut out values from these scales that satisfy the equation. Moreover, the compactness of the nomogram is shown by the fact that the broken line gives the result of the multiplication of 4 quantities, the subtraction of two and the division of the former by the latter.

## Testing Insulated Joints

*"How do you test an insulated rail joint to determine whether current is leaking through the insulation?"*

### Using the Voltmeter and Ammeter

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There are several types of insulated rail joints in service. The continuous insulated rail joint has been quite popular for several years, but has now been improved upon and the armored continuous insulated rail joint is being placed in service. Although each type of joint requires practically the same method of testing, the following tests apply particularly to the continuous and armored continuous insulated joint.

The insulated rail joint is installed for the purpose of dividing the track into the required length track circuits, and to insulate each track circuit from its adjoining circuit. Each track circuit has its own track battery.

The first inspection of an insulated rail joint is made visually. The bolts must be in their proper place and must be tight. All the insulation must be in its proper place, especially the bottom pieces, which occasionally on some joints have a tendency to work out lengthwise. The fibre side straps must be in place between the steel washer plate and the angle bar. The fibre washer plate should be noted carefully for breaks and cracks which are sometimes present over the bolt holes near the end of the plates. The end post will be noted to be sure it is in its place and that the rail ends are properly separated. The top pieces should be inspected for cracks and