tacts of which connections to special taps on the 2,300-550 volt transformer are changed to reduce the line voltage at night from 550 to 380 volts.

This arrangement has been used successfully for several years on both a-c. primary and a-c. floating territories. This automatic adjustment of the lamp voltage has two advantages. It permits us to have a strong color-light signal aspect that can be readily seen at long distances under even the most adverse conditions of sunlight and, on the other hand, the reduction of the voltage at night prevents too strong a glare in the eyes of enginemen at night. Without the automatic control of the lamp voltage, a compromise, not exactly satisfactory for either condition, is necessary.

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Braking Distance with Signals

"What data is available on the braking distance of modern high-speed passenger and freight trains, on which to base the spacing of automatic block signals?"

Tonnage Freight Train Usually Establishes Distances

J. P. Muller
Signal Engineer, Boston & Maine
Boston, Mass.

Spacing of automatic block signals on the Boston & Maine for the modern high-speed passenger and freight trains is based primarily on braking curves and retardation curves furnished by the mechanical department. Curves for tonnage freight trains are available at 5-m.p.h. intervals for all speeds from 25 m.p.h. to 50 m.p.h., while curves designed for 16-car passenger trains are in use up to 75 m.p.h. Acceleration and deceleration curves have been furnished for the new high-speed streamlined train, "The Flying Yankee."

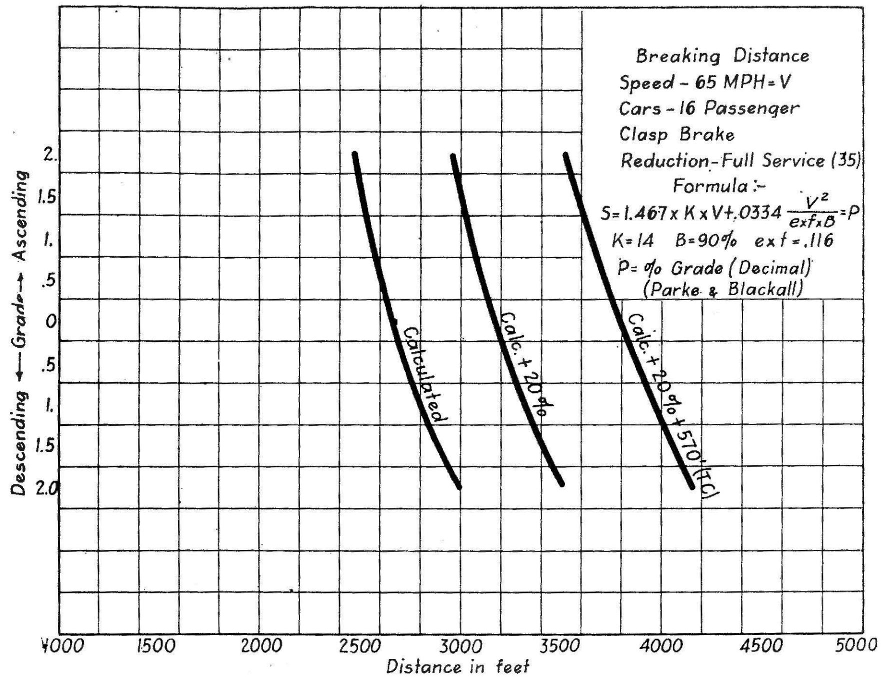
Typical curves are shown herewith. The curve ordinarily used is the one marked "calculated plus 20 per cent." Up to the time that our automatic train-stop system was changed to a cab-indicator system, an additional distance was allowed in this territory for the air-brake apparatus to take effect.

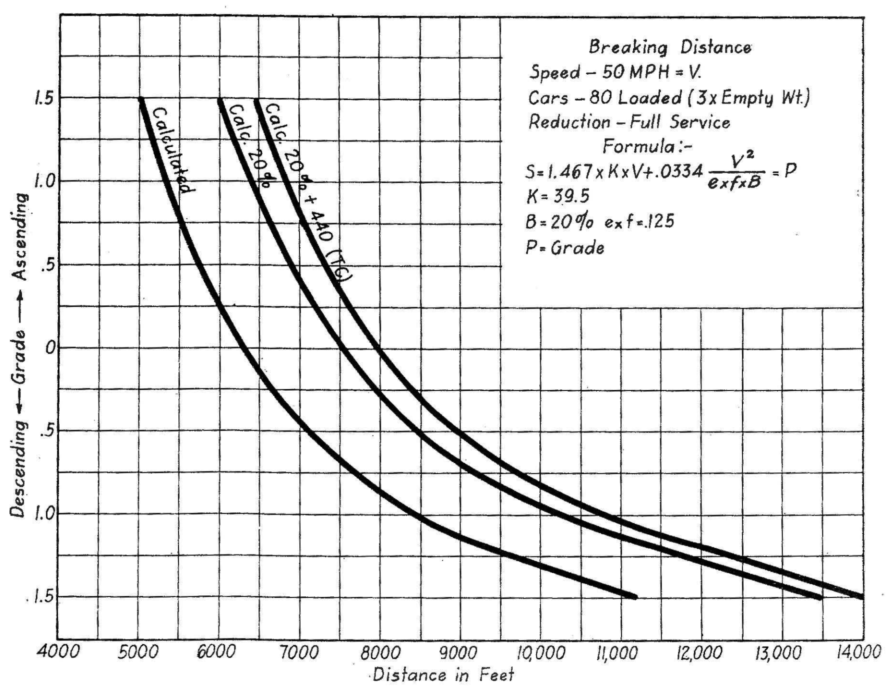
Braking distances are based on maximum authorized time-table speeds plus 5 m.p.h., giving due regard to locations where speed restrictions are in effect as to whether they appear to be permanent restrictions or are likely to be lifted at some later date. The additional 5 m.p.h. is used on the higher speed ranges to provide a margin, owing to the fact that most locomotives have no speed indicators and the engineman has no way to determine his speed accurately. Its use on low speed ranges is dependent somewhat on local conditions.

On primary main lines, the tonnage freight train is usually the train which establishes the maximum braking distance, although in terminal territory or on secondary main lines, the passenger train may be the determining feature. Care must be taken not only to provide braking distance from high speed, medium speed, and slow speed to stop, but also where medium-speed or slow-speed interlocking signals are used to route trains over medium- or slow-speed turnouts to diverging routes, to provide sufficient distance and proper indications to bring the train down to proper speed before reaching the turnout.

Whether two-block three-indication, three-block four-indication or four-block five-indication signaling should be used in any particular territory, is determined by a combined study of braking distances and traffic density. In some instances, it is advisable to

(Continued on page 328)

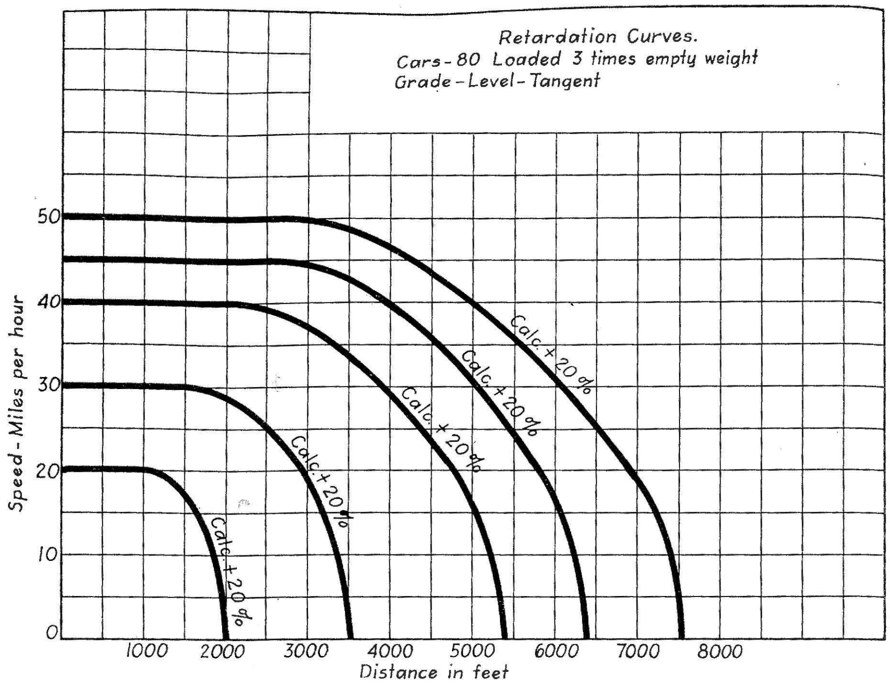




Calculated braking distance curves for passenger and freight trains make a graphic chart of the train movements to determine whether, with certain block spacing, scheduled trains following one another would receive too many restrictive signals in succession.

The current time-table schedule cannot be entirely depended upon, for, in the northern part of the country, a signal spacing which might be satisfactory for a winter schedule might not work so well with the summer time-table. In suburban territory using daylight-saving time, the suburban trains are usually advanced one hour, while the long-distance trains may or may not be shifted, thereby possibly setting up a very different grouping of trains between the two time-tables.

In general, the proper location and spacing of signals is dependent not only on consideration of the above mentioned items, but also on the good judgment and knowledge of local operating conditions on the part of the men designing the layout.



Calculated retardation curves for freight trains

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Maintainers' Tool Houses

"Do you use a standard plan for maintainers' tool houses? If so please furnish construction plan and details."

On the Southern Pacific

R. D. Moore

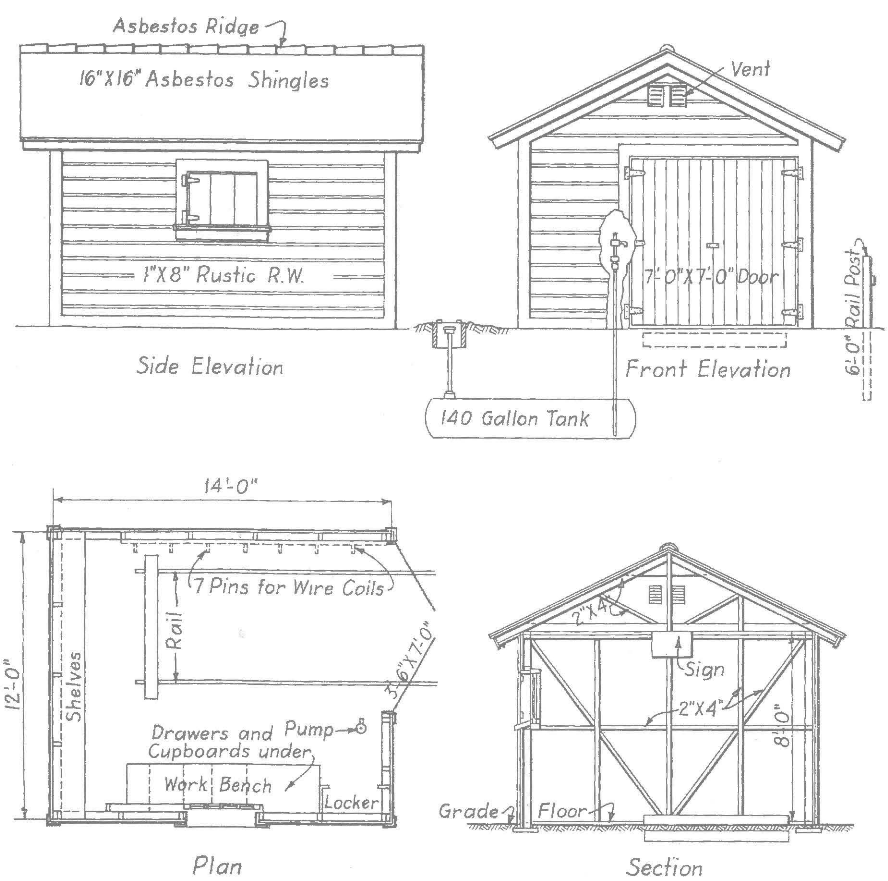
Signal Engineer, Southern Pacific
San Francisco, Calif.

Some provision should be made for protecting a maintainer's motor car, tools and supplies, and it is our standard practice to furnish a 12-ft. by 14-ft. tool house, as shown in the drawing. This provides space for his motor car and supplies, also a small work bench and clothes locker. These houses are neat in appearance but are located by preference away from station buildings, at points in the yard, where there is little likelihood of tracks being blocked by trains or cars.

The plan also shows the method of storing gasoline underground with a pump inside the tool house. The gasoline is delivered in drums and emptied into the underground storage tank. In some cases, where a section foreman and maintainer are located at the same station, only one storage tank is provided, being located either at one tool house or the other, and used jointly by both men.

In most cases, these tool houses were provided when the signals were installed, being included in the signal estimate as a part of the installation program.

Practically all of our automatic signal sections have tool houses of this type. Interlocking maintainers, however, as a rule, have other facilities for keeping their tools and supplies and do not use motor cars, so this type of tool house is not needed for them.



Other answers to this question will appear in subsequent issues.