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The Standard Code on the Chicago & North Western.

The Standard Code of train rules has been adopted by the Chicago & North Western, and the new rules went into effect April 6. We note the principal features in which the code varies from the Standard, as issued by the American Railway Association.

The "General Rules" have four paragraphs not found in the standard: one of these refers to employment of minors, and one to assignment of wages. In the definitions that for a fixed signal is omitted. Watches are examined quarterly, and are also inspected weekly, the inspector making an entry on the back of the employee's card each week. A new card is issued each quarter.

Rule 3b reads "Conductors, engineers, yardmasters and yard-foremen who have not access to a standard clock will obtain correct time from the train-despatcher daily, before commencing their work." Rule 5a reads "Full-faced type will be used at the ends of double-track, at junctions and at terminal stations, where the difference in time of trains is 30 minutes or less." Rule 6 has a number of signs, nearly all different from those of the standard. Rule 7 cautions trainmen to be careful to avoid taking a wrong signal when two or more trains are passing each other in a yard.

In rule 10 green means "proceed": green and red, proceed with caution. A green and red flag is used to place at the side of the track where trains must run under control. Rule 11 provides for red fuses, but not for any other color. Rule 14d reads "West or north"; c, "east or south." The whistle signal for highways applies to overhead as well as grade crossings.

Rule 16a reads "One continuous whistle when brakes stick or wheels slide." Rule 16 does not provide any signal for starting a train, nor for backing. Rule 20 provides for green signals in the usual manner, although in Rules 8 and 10 green means proceed.

Rule 31b requires extra trains to sound the station-approach whistle when approaching curves. Watchmen at public crossings use green signals. Rule 81a reads: "At meeting points, extra trains, as regards each other, are superior in the direction in which regular trains are superior." Rule 83 has added this sentence: "This information will be furnished the engineer by the conductor upon a regular blank provided for that purpose." Rule 86 reads "An inferior train must clear the time of a superior train in the same direction at least ten minutes"; and this clause is omitted from rule 89. Rule 88 provides a clearance of five minutes. In this, and the other meeting rules, an inferior train is forbidden to run past the switch and back in except when authorized by train order to do so.

Rule 88a gives the yard-limit rule; the limit board does not protect against regular trains. Rule 90a reads "When trains meet by special order or time-table regulations, conductors and engineers must inform each other what train they are. This must be done by word of mouth." In rule 91 the interval is ten minutes. Rule 95a forbids the running of freights or empty engines as a following section of a passenger train. Rule 97 has four supplementary paragraphs. Rule 98a limits the speed of passenger trains over interlocking switches to 25 miles an hour, and of freights to 15.

Rule 98b reads, in part, "No freight train must pass an open telegraph office not controlled by telegraph block system, except as provided by division time-tables, whether or not train order signal be displayed, until the conductor and engineer have received orders from the train despatcher or a release or clearance, as the case may require, from the operator. Conductors and engineers of passenger trains will observe the same rule at such telegraph offices as are regular stops for their train. Extra trains will observe the same rule as freight trains, but extra passenger trains are not required to make stops solely for this purpose. They will be governed in this respect the same as regular passenger trains. This does not relieve operators from promptly displaying red signals whenever they have orders, or making other necessary efforts to stop trains."

All freight and extra trains must approach and pass all stations, side tracks and water tanks, under control; getting the speed under control must be begun one mile from such points.

Rule 99 and three supplementary rules fill nearly two pages. This rule requires the use of fuses at night in all cases. The first line of this rule begins "In case of stoppage between stations."

Rule 102a requires a flagman at all crossings when switching is being done; and 102b forbids the movement of cars in front of passenger stations or over highway crossings, detached from the engine. Cars containing passengers must not be moved unless coupled to an engine, and air-brakes in use.

Rule 104a reads "Where a distant signal is installed for the protection of a switch, and the signal cannot be seen from the switch, the signal must first be set at danger, and then sufficient time, not less than one minute, allowed for train to pass from the signal within sight of the switch before a train or engine shall leave the side track. Extra precautions must be taken in stormy or foggy weather."

Rule 104b requires an engineman, having backed into a siding, to see that the switch is set straight.

Rule 105 regulates the approach of trains to passenger stations where two trains approach at the same time; rule 106 regulates the carrying of passengers on freight trains. The final rule of this chapter, requiring that, in case of doubt, no risk shall be taken, is 114; and this rule (without the number) is printed at the head of each of the chapters for different classes of employees, in the back part of the book.

Rule 206 requires conductors' names to be written in orders, and train numbers of regular trains are written in words and figures. Time, in the body of the order, must be written in words and figures; the figures must not be surrounded by brackets, circles or other characters. There is no provision for the use of "19" orders. Rule 208a requires meeting orders to be sent to the operator at the meeting point, if practicable. All train orders must have the suffix "12"; to be responded to by "13." If an operator is required to make additional copies of an order he must repeat those copies, the same as the original order.

Rule 210 provides that an operator must give the X response the first thing after receiving an order, and then repeat it. There is no provision for the use of the term "complete"; O. K. takes the place of this. The engineman must read his copy aloud to the conductor before proceeding. An operator at a meeting point, receiving an order, as required in rule 208a, must deliver two copies of it to the conductor first arriving, and the conductor must sign for them. Train order signals stand normally in the all-clear position, except when used to keep trains a required distance apart. A train must not leave a terminal without a clearance, release or train order.

In the blank for "31" orders, provision is made for inserting, as the first line in the order, the time when the last preceding train left.

Following the page on which form 31 is shown, are five other forms; a cross-over permit, a caution card, a clearance, a release from the train order signal, and a release from the train order and block signal. A note on the last mentioned says that when a block signal is in the diagonal position it only indicates that the block is clear to the first switch reached at the next block station.

The telegraph block signal rules begin with No. 300, as in the Standard Code, but the different subjects are not put in the order in which they appear in the standard, so that there is little or no correspondence in the numbers of the rules. The procedure for blocking trains is in principle about the same as in the Standard Code (rules 317 and 318), but the phraseology and the abbreviations are different. Among the definitions is one of the "positive block" and one of the "permissive block." The definition of the distant signal tells what the signal does. The rules for automatic block signals say that a train stopped by a block signal may proceed after waiting one minute, running cautiously to the next clear signal.

Under the head of interlocking there are definitions of the "high signal," meaning one 20 ft. or more above the track, and of a "mast." A dwarf signal is a low home signal. The indication for a diverging movement to a side track is given by a dwarf signal either at the foot of the high home signal or (if the high signal is at the left of the track) opposite to it. The light on the dwarf signal corresponding to the stop indication is covered with a shield.

Following the rules for interlocking signals are about 50 pages containing rules for the different classes of employees. The first chapter is for the telegraph department, the rules beginning with No. 700; then come those

for agents, for the passenger service, for the freight service, for enginemen and firemen; miscellaneous; air-brakes; the track department and the bridge department. Among the rules for passenger trainmen is one requiring them, after departure from a station, to see whether or not there are any passengers clinging to the handrail of the vestibule. In the miscellaneous rules it is forbidden to allow outsiders to ride cars or assist in switching. No person, either in discharge of duty or otherwise, shall ride on the pilot of a locomotive. In the air-brake rules there is one requiring brakes to be tested ("the two-mile test") on approaching a terminal, a meeting point, a railroad crossing or a heavy descending grade. The conductor's valve may be used to apply the brakes on passenger trains, but it must not be used except in cases of emergency.

Automatic Block Signals on the Philadelphia and New York Divisions of the Pennsylvania Railroad.

WITH AN INSET.

The Pennsylvania Railroad Company now has its road equipped with automatic track-circuit block signals practically all the way from Jersey City, N. J., to Paoli, Pa., about 104 miles, and the line is four-track for substantially the whole of this distance, thus making what is probably the most elaborate railroad plant, for so long a distance, in the world; for the block sections are all less than one mile long, and, in addition to the block signaling, the stations and yards are nearly all equipped with complete interlocking. Switches which are not connected with a cabin, and interlocked, are equipped with electrical connections, so as to short-circuit the current of the track battery whenever the switch is not set straight for the main line, thus setting at "stop" the signals controlling the entrance to the block section in which the switch is located. The signals (semaphores) stand normally in the clear position, that being the standard practice of the Pennsylvania Railroad. Each signal goes to the horizontal position immediately after the locomotive passes it. All of the block signals are the Westinghouse electro-pneumatic.

Eighty-seven miles of the line here referred to consists of the main line of the New York Division, some of which has been automatically signaled for about ten years. It is now thus signaled throughout. The line has four tracks except at the Schuylkill River and a short distance west thereof; at New Brunswick, about one mile, and at Newark for a short distance. Through New Brunswick and through Newark the line will soon be rebuilt at higher levels and with four tracks.

Philadelphia Division.—The remainder of the 104 miles is from Philadelphia westward to Paoli, 17 miles, on the Philadelphia Division. The block signaling on this portion of the line is one of the most recent installations of electro-pneumatic signaling that has been made, and it is this that we shall here describe. This plant has a number of features which were introduced here for the first time.

The line is four-track throughout, and the signals are on steel bracket posts at the side of the road. The power is compressed air, as on the New York Division, but the electric current is supplied by a storage battery at each post, the batteries being charged from a dynamo situated at Radnor, 13 miles from Philadelphia. At this point there is a power house which contains the air-compressors and the dynamos. The storage batteries supply current for the track circuits as well as for the signal instruments.

The drawing on the inset, Fig. 1, shows the general arrangement of the tracks and signals. Beginning at the lower right hand corner of Fig. 1 (see letter P at right of sheet) the terminal station is Broad street, Philadelphia. From this point westward to Powelton avenue numerous changes in the line will soon be made, in connection with the new junction station which is to be built near 32nd and Market streets. The dotted lines, near mile-post 2, represent the New York Division tracks, which run beneath the westbound main track at this point. In stating the distance from Jersey City to Paoli we have omitted that portion of the line from Broad street to this point. At 52nd street (Schuylkill Division Junction, mile-post 4) extensive changes are also being made. The westbound main passenger track, beginning near the arrow shown in the drawing, is to be elevated above the freight tracks and run around the north side of the freight yard, rejoining the present line at O R tower. After the change is made, the eastbound Schuylkill Valley track, which runs into the eastbound main track, will be carried beneath all of the east-and-west tracks.

Bracket posts are adopted for this line, in place of bridges, because the stations are so near together, and for the purpose of locating the signals, in every case, so that they will be in the most suitable position for starting signals at the stations. It will be observed that, at any station, a train headed in either direction has a signal not far in front of it; and, of course, with this arrangement, a train standing at a station is always a considerable distance in advance of the home signal which protects it at the rear. In thus providing for station stops it was impossible, without making the block sections shorter than was required, to have eastbound and westbound signals always at the same point, so that if bridges were to be used each bridge would, as a rule, carry only two signals, a needless expensive arrangement.

The block sections are all very short. Those on the

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