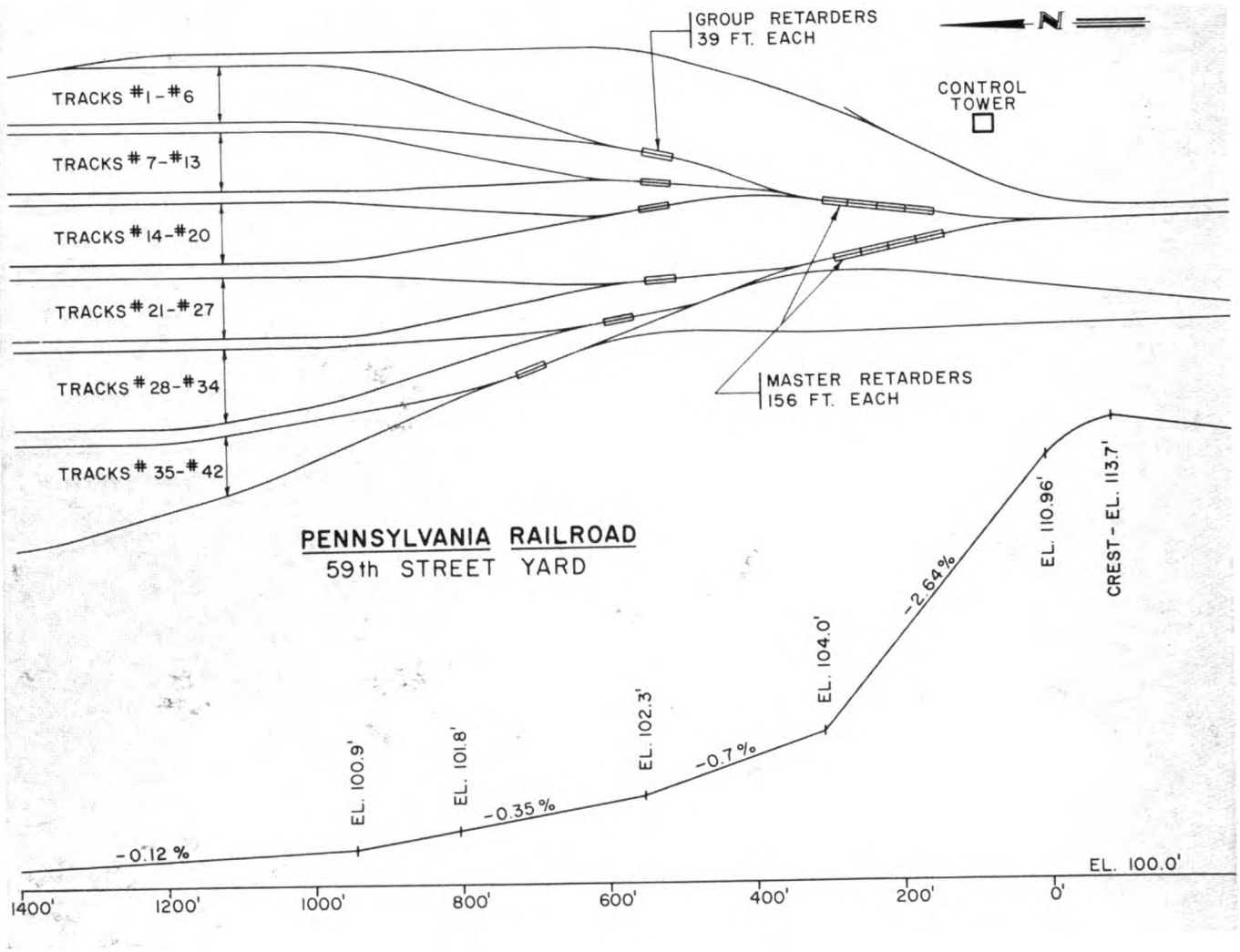
New semi-automatic controls will speed up classifying by 12-24 hours.

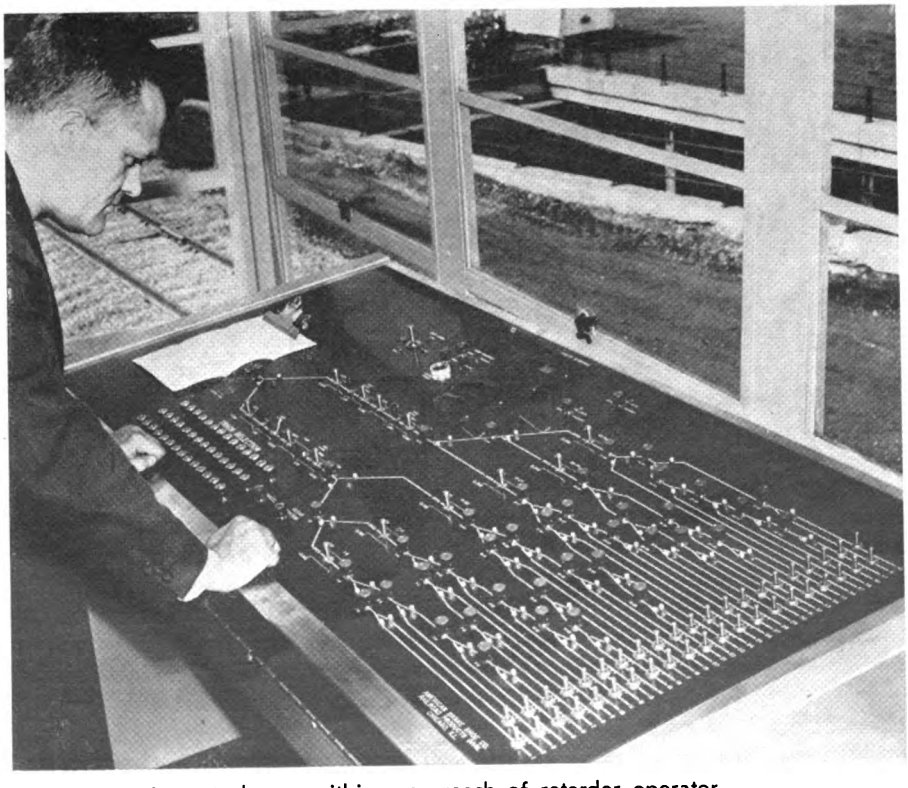
PRR converts two hump yards

In a project of building "under traffic" Pennsylvania converted two rider hump yards into one retarder classification yard with semi-automatic controls. The new 42-track classification yard has two master and six group retarders equipped with speed sensing units, manufactured by American Brake Shoe Co. Because the yard handles 1200 to 1400 cars every 24 hours, it was considered necessary to have automatic route switching for prompt handling of cars into the various class tracks. By this means, the retarder operator need press only a button to direct a cut to the correct classification track.

"We are combining what were two yards—eastbound and westbound—into one which handles classification in both directions. This eliminated crossover cars, speeding their delivery. It also eliminated duplicate deliveries and duplicate tracks," stated Herbert M. Phillips, PRR vice-president and general manager, western region.

Another time saving procedure that can be carried out in the new





Semi-automatic controls are within easy reach of retarder operator.

yard is that a departing eastbound train can be made up while westbound cars are pushed over the hump for classification. Although not rigidly held to, tracks numbered 1 through 20 are generally used for westbound cars and tracks numbered 28 through 42 are for eastbound cars. Tracks 21 through 27 are what might be considered "swing tracks", being assigned as requirements dictate.

When classifying a train, cars are pushed over the hump, whose crest is 12.8 ft above the class tracks (beyond clearance). Cars roll down a 2.64% grade as they approach and go through either of two 4-section, 156 ft master retarders. As the car approaches the retarder, it runs over a 39 ft section of rail containing ½-inch notches spaced about two inches apart in the top of the rail. Vibrations produced by car wheels running over these notches indicate the speed of the car. A transducer attached to the web of the rail picks

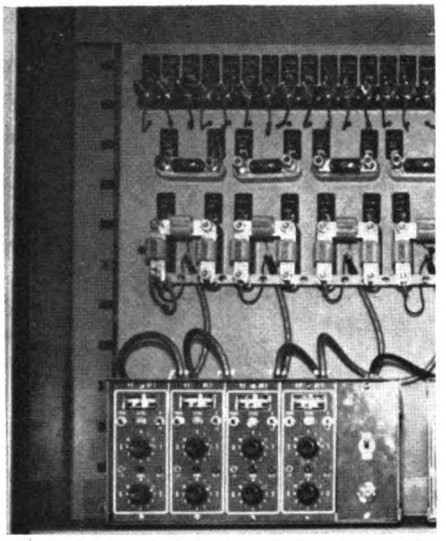
up these vibrations, which are sent to an electronic control unit. This unit "tells" the hydraulic controls to set the single-rail, weight-responsive retarder jaws to the proper position to grip the car wheels. When the car has been slowed in the retarder to the speed selected by the retarder operator (by means of a toggle switch), the retarder releases.

The notched speed sensing rail runs the full length of the master and group retarders, as well as extending 39 ft in approach to each retarder. If the car speed increases above that desired, in the master retarder for example, a succeeding retarder section will close to slow down the car. For group retarder controls, the retarder operator selects the leaving speed for the particular track to which the cut is destined. He operates a toggle switch to low, medium or high. At the present time, these speeds are being used at 59th street: master retarder-low is 7 mph; medium is 8 mph; and high is 9 mph. On the middle class tracks where curvature is least, the speeds are: low is 4 mph; medium is 5 mph; and high is 6 mph. For the outside class tracks where curvature is greater, 6 mph is the low speed, 7 mph is medium speed and 8 mph is high speed.

These speed ranges can be varied according to weather conditions by changing electronic plug-in modules in the speed control equipment. PRR engineers state that the speed ranges now being used should not be considered final, because the yard has been in service only a few months, and more testing and checking remains to be done.

To classify 1200 to 1400 cars every 24 hours and do it at a humping rate of 2 mph was felt by PRR officials to be quite difficult for the retarder operator to handle individual switch positioning. Therefore, automatic route switching was considered a must for the 59th street yard. Transcontrol Corp. furnished the automatic route switching system in which four routes can be stored.

In addition to retarder controls and a track diagram, the retarder operator's panel has buttons for each of the 42 class tracks, plus indication lamps for the routes he has set up. He can cancel any or all stored routes if he desires. Also he can manually override the retarder



Presence detectors in housing.

controls, and he can position individual switches with a selector button. A feature of the switch control is that if the retarder operator desires to protect a class track from cars being dropped into it, he can position the green switch position knob with the white button at the top (or away from him). This will take the automatic route switching away from that track. This can be helpful when carmen or track forces desire to work on a track, in that cars cannot be automatically routed to the blocked track. Lights on the panel also indicate switch position.

The automatic route switching system controls Racor model 22 switches equipped with hydraulic operating mechanisms that throw the switch in 0.6 seconds. Each switch has a 3-phase, 220-volt AC motor for operation. Controls are handled over a single-phase, 110-volt AC circuit. For automatic switching controls, the 110-volt AC from each switch indicating position is brought into the retarder tower ground floor relay room. This 110-volt AC is fed through transformer and bridge rectifier circuits to Struthers Dunn 20-28 volt DC indication relays. From these relays the switch position is fed to the Transcontrol automatic switching system equipment.

To prevent a switch being thrown under a car, Radio Corp. of America presence detectors have been installed. These detectors make use of the track as a loop circuit for carrying alternating current at various frequencies. At this yard, frequencies range from 91 to 106 kc, each particular loop circuit carries current at only one frequency. Having nearby circuits operate with different frequencies, eliminates interference. Basically the presence detector measures the inductance of the loop and detects the decrease in inductance caused by a freight car over the loop. PRR installed the loop so that it extends from a minimum of 22 ft (averages 25 ft) in approach to the switch points to about 12 to 13 ft toward the heel on each track. A coaxial cable pair #14 gage is run from the bootleg in the center of the track to each presence detector in a nearby trackside instrument case. Four detector readout units are mounted in one housing. Also in these instrument cases are three-way fuse holders for the power circuits to each switch. Thus it is possible to cut the power to an individual switch. The switches have insulated throw rods to keep presence detector current confined to the rails. Indication lamps on the retarder operator's panel are lighted when a car is over the loop circuit.

In addition to improving operations at 59th street, particularly such as reduced car time, other benefits have accrued from the new yard project. For example, duplicate trackage formerly required at the old yards can now be removed.

Also switch list handling has been upgraded. Train consists are sent via Stewart Warner Data Fax (facsimile) from the 59th street yard office to the yardmaster's office on the second floor of the control tower. Here, the switch list is prepared for the yard conductor and the retarder operator (upstairs in a third floor office). Instant communications is available between yard crews, yardmaster and retarder operator via two way radio. Humping operations are directed by a colorlight hump signal controlled by the retarder operator.

As stated by PRR's Phillips, the success of the semi-automatic yard was demonstrated by the prototype constructed by the railroad at Grandview in Columbus, Ohio (RS&C Mar. 1965 p. 13). "We applied the same principals with refinements, to the 59th street yard. Increased safety, and reduction in damage potential are certain results. The time of deliveries in many instances is speeded up from 12 to 24 hours." **RS&C**