Railway Signaling and Communications
November 1958

Barrier of 2-in. welded pipe protects dwarf signal on station platform. New concrete platforms and floodlights were part of Canadian Pacific modernization

CP Consolidates Interlockings

One modern panel-type machine now controls 60 switch machines and 66 home signals in territory two miles long through busy terminal

A STATION IMPROVEMENT program has just been completed by the Canadian Pacific at Calgary, Alberta. As part of this program, several mechanical interlockings were removed, new power switches and searchlight signals installed. All controls are centralized in a panel-type machine. The interlocking project cost $850,000.

A Busy Interlocking

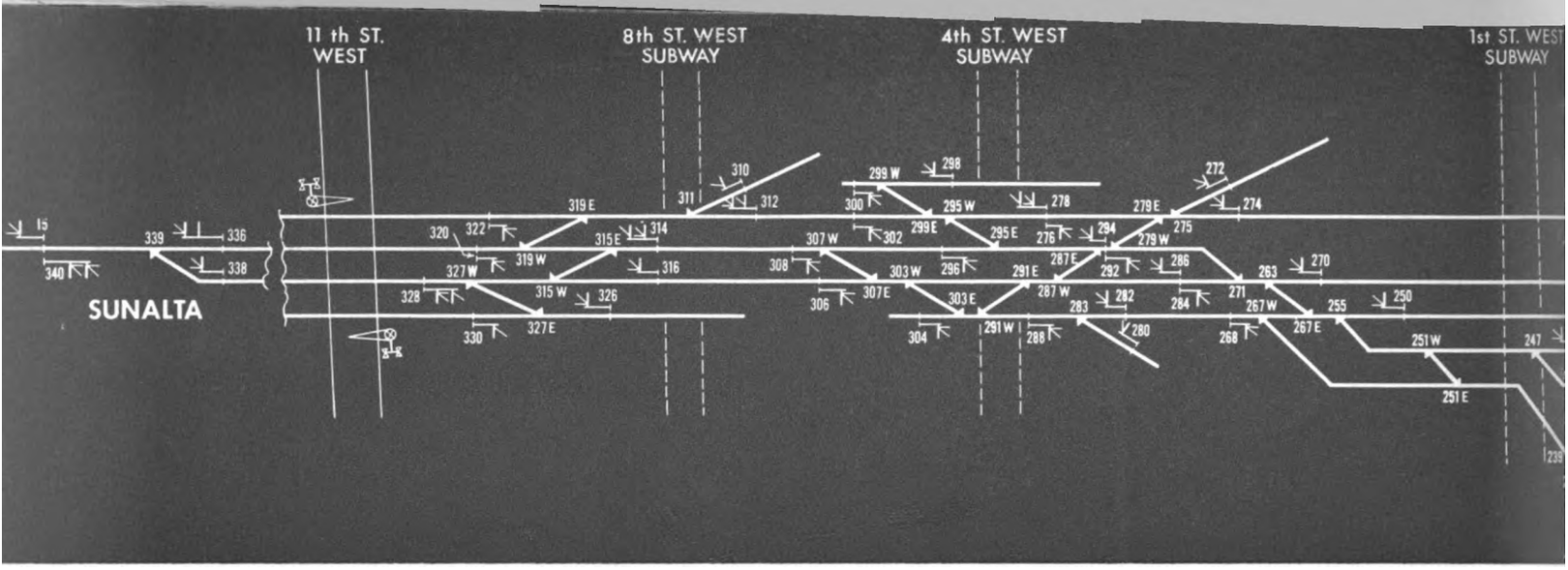
The new Calgary interlocking handles more than 150 line-ups daily. Calgary, a growing city of 220,000 population, is on the east-west main line of the Canadian Pacific. Five passenger and mail trains are operated each way daily in summer. Other CP lines extend from Calgary, north to Edmonton, and south to Lethbridge. Six to eight passenger trains to and from these lines are operated into and out of the interlocking daily. Numerous short switching moves are made to take off or add cars from some passenger trains while at the station.

In addition to its world renowned annual July rodeo, Calgary is an important milling, agricultural, cattle and oil center, as well as a distribution point for a large territory. Therefore, 50 to 75 switching line-ups are made through this interlocking every 24 hours.

Previously the switches at the east end of the former station tracks were included in a mechanical interlocking, the tower being located at Second Street East. This plant had 19 mechanical levers for switches, crossovers and 16 signals. The switches at the west end of the previous station tracks were included in a mechanical interlocking at First Street West. This plant included 24 mechanical levers for switches and 14 signals. A separate set of table levers, in this tower, controlled a power switch machine and three signals at Sunalta, which is the end of double track, 1.5 miles west of the station. Except for the interlockings listed above, all the main track switches were previously hand-thrown.

Old Interlockings Replaced

As part of the new project, the two old mechanical interlocking machines were removed, and new



electric switch machines and new searchlight signals were installed, and were connected for control from a new panel-type interlocking machine. This new interlocking includes 66 home signals, 20 single switches, 19 crossovers and two double-slip frog layouts, in the area two miles long between Twelfth Street East and Sunalta.

When the time is opportune it is the intention to add to the control machine and related tower equipment sufficient capacity to provide for the control of all main trackage between the present easterly limits of the new interlocking and the east end of Alyth Yard; a distance of 1.5 miles. This will include the old electric interlocking at 12th Street East which controls 25 signals, 6 crossovers and 10 single switches. Other switches and crossovers with necessary signals that are at present east and north of interlocking limits will be provided for.

The new interlocking tower is on the south side of the tracks opposite the station. This tower is of concrete construction, 20 ft by 60 ft, with two stories and a basement. The top floor includes not only the control room, but also offices for the terminal trainmaster and telegraph operators. The relay room and maintainer's room are on the ground floor, and the battery is in the basement.

New Control Machine

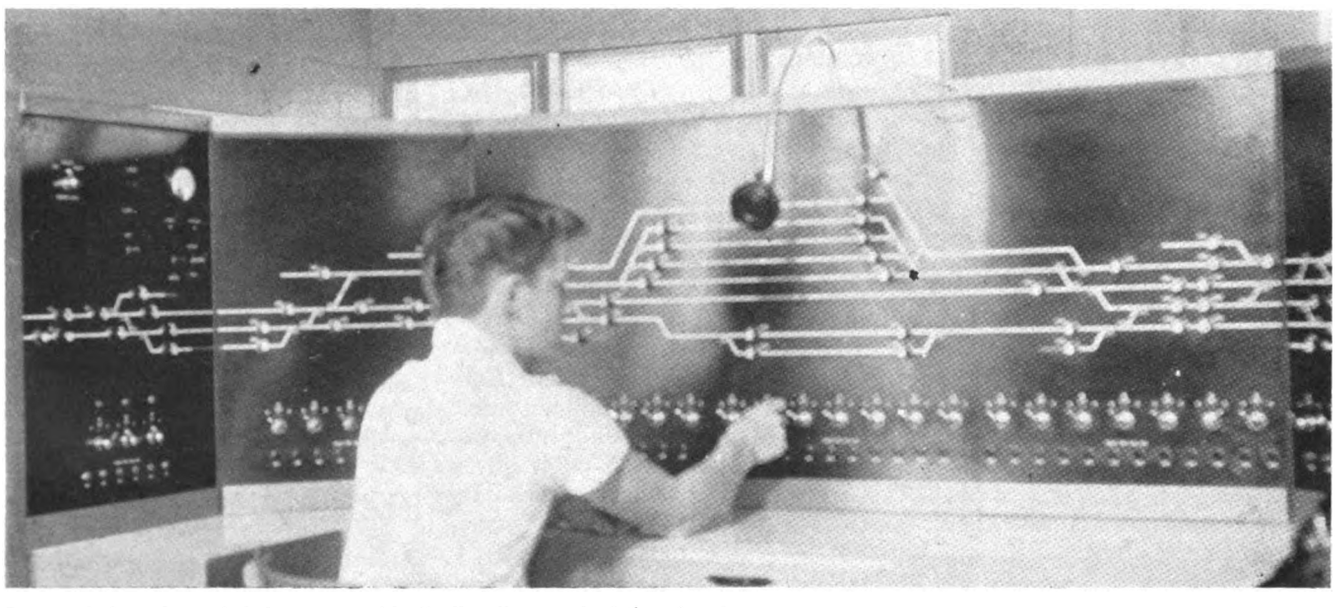
The interlocking control machine is of the panel type. Each switch or crossover is controlled by a lever, these levers being in a row near the bottom of the panel. The position of each switch is repeated by lamps above the respective lever. Each signal is controlled by a rotating knob. These knobs are mounted on the lines representing tracks on the diagram. A lamp in the face of each knob is lighted when a Proceed aspect is being displayed by the corresponding signal.

When a train accepts and passes a signal, the Proceed aspect changes to red, and the lamp in the signal lever is extinguished. Then the leverman turns the knob back to its normal position. If he does not do so, the signal will not again clear for a following train.

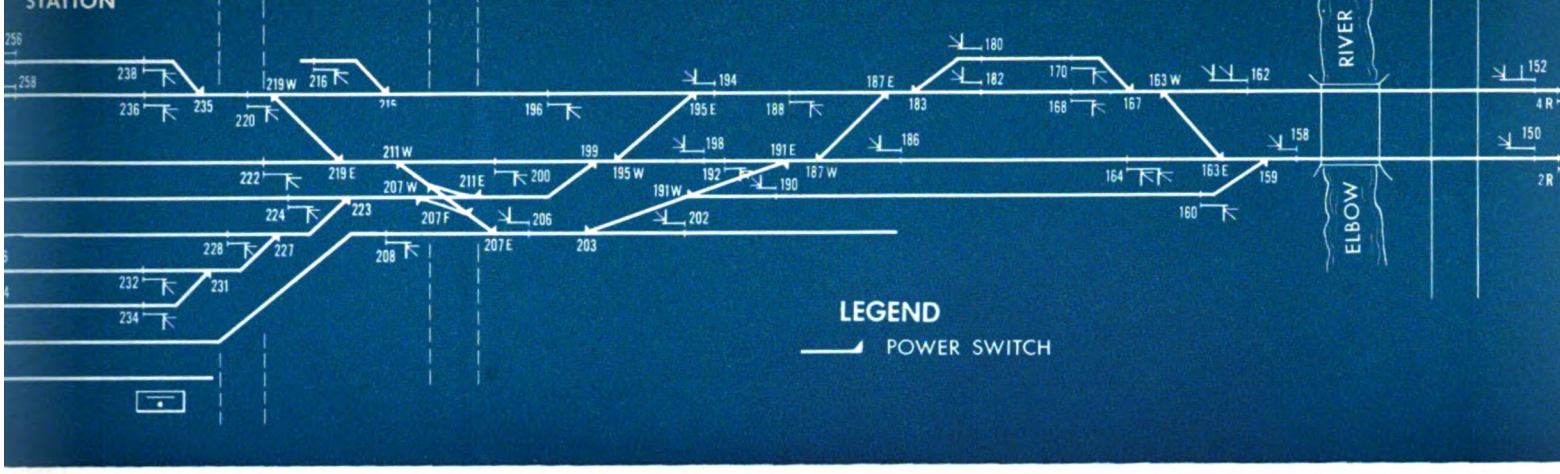
Because of the numerous switching moves, the control of each signal in the station area includes special "Call-On" control. This call-on control is accomplished by first setting the signal knob, and then pushing a corresponding button. These call-on buttons, one for each signal, are in a row at the bottom of the control panel.

Direct-wire control circuits are used from the control tower to switches and signals in the area within 2,000 ft east of the tower and 3,100 ft west of the tower. Beyond these distances the switches and signals are controlled by line code equipment, type K2.

A special feature of this project is that dwarf signals—rather than



Buttons below the switch levers provide "call-on" control of the signals



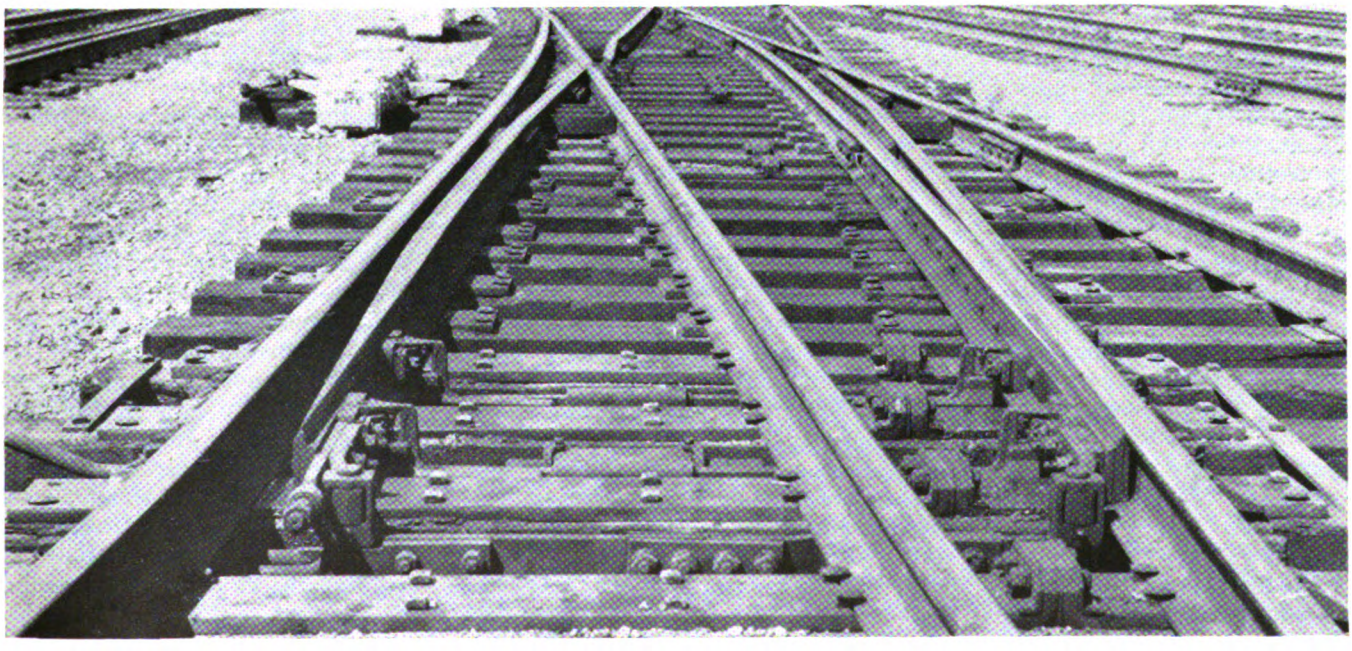
high signals—are used throughout this interlocking area, except that high signals, on masts, are used for the two home signals entering the area, westward signal 162 at Elbow and eastward signal 340 at Sunalta. Dwarfs have the advantage of locating each signal where required, to use each foot of track most efficiently. Also, dwarfs eliminate signal bridges which would have been required for high signals. Where dwarfs are located on station platforms, they are protected by guard railings made of iron pipe set in concrete.

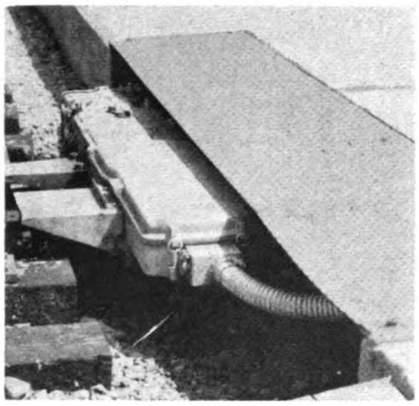
All main tracks in the entire interlocking are signaled for train movements both ways. Seven of the home signals have two searchlight heads, so that they can display better than a "Caution" aspect when proper to do so. This saves time for trains.

The new switch machines are the Model 5D. The 45 machines in the area within 3,000 ft of the tower are equipped with 110-volt d.c.

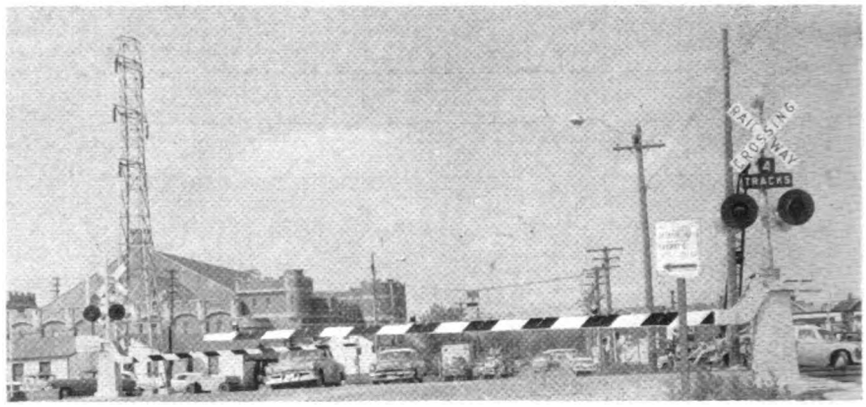
ABOVE: Dwarf signals are used throughout this interlocking. This two-arm dwarf can be cleared to provide better than a "caution" aspect, which saves train time. All four bootlegs are on same side of track (rail left of dwarf) with lead wire run through hose under near rail and in staples on side of tie to opposite rail

BELOW: Double slip switch is operated by three power switch machines. All switches have vertical pin rods as well as heavy gage plates and braces





Steel plate covers switch in platform



Crossing protection at 11th street is track-circuit controlled on main tracks

motors, which are fed from 55 cells of 120-a.h. lead type storage battery in the basement. At the outlying locations, such as at Elbow and Sunalta, the switch machines have 24-volt motors fed from local sets of battery, each including 12 lead cells rated at 120 a.h.

Each switch includes MF type vertical-pin rods made by Railroad Products Division of the American Brake Shoe Company. In some instances switch machines are depressed in the concrete station platforms, with steel plate covers at platform level.

More than 35 miles of cable was installed as part of this new interlocking. This cable is buried in a trench 30 in. deep, with a minimum of 6 in. of sand below and 6 in. above the cable. This trench was dug in part by a power machine. The connections from the track bootlegs to instrument houses are single-conductor No 9 stranded. The control circuits are No. 14 solid, in cables ranging from 9 to 19-conductor. The 110-volt d.c. for switch machine motors is on No. 4 stranded. The same kind of cable is used for distributing the 110-volt a.c. power circuit. On some of the viaducts over streets the cables are in 3-in. pipe ducts.

As part of the improvements, electric crossing gates were installed at Eleventh Street West, to replace wigwags. These gates are controlled automatically by track circuits on the two main tracks. On the two switching lead tracks, trains or switching moves must be stopped 60 ft short of the crossing at "Stop" signs. Then the leading wheels of the locomotive are moved up onto the end of a track circuit which extends across the width of the street, plus about 60 ft beyond, in each direction. The train is stopped until the gates go down. The train or switching move can then pass over the crossing.

Special porcelain signs on posts beside the curb of streets approaching this crossing, from each direction, prohibit the parking of automobiles or other vehicles that might obstruct the view of the drivers when approaching the crossing. These signs read, "No stopping in this area any time." Such signs are located every 30 ft, for 100 ft before the crossing.

This interlocking and crossing protection were planned and constructed by signal forces of the Canadian Pacific. The interlocking equipment was furnished by General Railway Signal Company and the crossing gates by Griswold Signal Company.

Extensive Track Work in Station Area

AT CALGARY, ALBERTA, the Canadian Pacific has made extensive track changes and new installations of tracks, station platforms, interlocking and street crossing protection, in an area two miles long, through the passenger station and terminal.

Previously the crosswalks from the platforms to the station were at track level. A new tunnel with stairways up to the platforms, makes it unnecessary for passengers to walk across tracks. Trains need not be cut in two to permit passengers to cross tracks. The old platforms were too narrow, and much too short for present-day trains.

To increase platform width the number of tracks was reduced from nine to eight. Tracks were respaced so that the new concrete platforms are 16 ft wide, and are arranged so that, as each train stops, there is a "service" platform on one side and a "passenger" platform on the other. Station tracks were lengthened; for example, two of the tracks and platforms are now long enough for passenger trains of 24 cars with three-unit diesel locomotives. Other tracks are for trains ranging up to 12 cars, and one track next to the station, 500 ft long, is for two-car self-propelled RDC trains. One separate main track for freight trains now extends through the station area. Extra switches and crossovers were installed to route trains to and from these tracks. All tracks are signaled for train movements both ways by signal indication.

To extend the length of the station tracks and platforms, the railroad bridge structures over three cross streets had to be widened. Now, six tracks cross First Street East, five cross First Street West, and four cross Second Street East. Switches and crossovers are located on some of these bridges.

To take out one set of tracks, and put in another entirely new set, required the moving of many carloads of dirt and gravel. Unstable fill susceptible to frost movement, was removed. In some areas this silt was 5 to 6 ft deep. About 50,000 cu yd of this old fill was removed and an equal amount of new fill put in its place. Shifting and raising

(*Continued on page 50*)

CP Interlocking

(Continued from page 24)

tracks, as well as new fill and 30(cars of new gravel ballast, involvec the movement of 3,200 carloads.

The passenger tunnel under th tracks is 8 ft high, 18 ft wide anc 200 ft long. Six stairways lead fron the tunnel up to kiosks on passen ger platforms between tracks 1-2 3-4 and 5-6. There is a servic tunnel (steam, water, gas) 7 ft i diameter and 220 ft long. Six mile of pipe was laid for steam, air water and gas. Ready-mix concrete for the tunnels, stairways and plat forms totaled about 7,000 cu yd and 300 tons of reinforced steel.

For temporary access to train and to provide temporary trackag when old tracks were coming out but new ones were not yet in, cos $60,000.

Floodlamps, on four 80-ft stee poles, illuminate the station plat forms at night. Each pole has 1 lamps, 12 are rated at 1,500 watt and four at 1,000 watts. The illum ination at platform level is about 1 lumens per square foot. About 5. miles of cable was laid for electric al power distribution.

New piping, outlet connection and meters, to supply fuel oil an water for diesel locomotives, wer constructed at each end of the nev station track layout. A power ma chine for washing the windows an sides of cars was installed 1100 f west of the west end of the statio tracks. Windows and glass roofs c dome cars are washed partly b machine and partly by hand.

The project as a whole require more than two years and cost abou $2,260,000. Of this about $360,0(was for track changes and improve ments, including the $60,000 men tioned above. Platforms, tunnel piping, etc., including the oil an water supply lines and station, cos about $500,000. The floodlightin and supply cost about $32,50(bridge extensions $200,000, powe lines $140,000, and the interlockin about $850,000.

The engineering and construc tion of tracks, bridges, tunnel platforms, etc., were under th jurisdiction and supervision of I A. Swanson, District Engineer, M S. Wakely, Division Engineer, an Hugh Gordon, Special Enginee