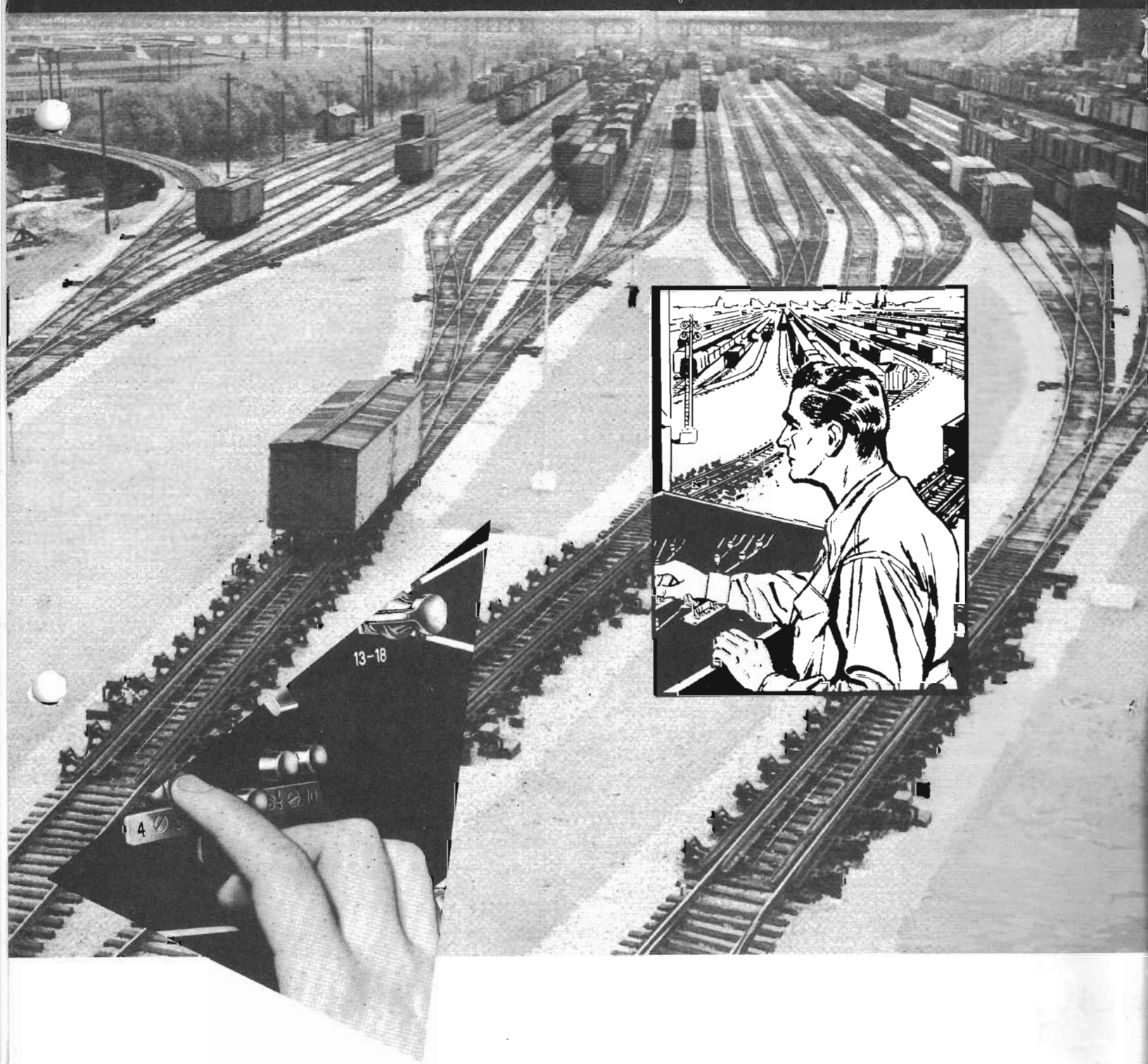
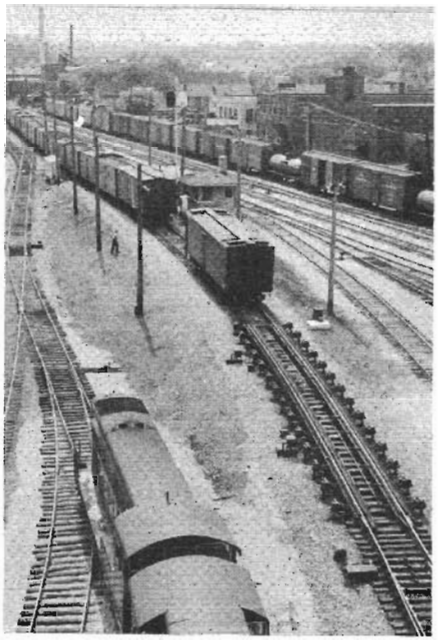
CHICAGO, MILWAUKEE, ST. PAUL AND PACIFIC RAILROAD COMPANY



AUTOMATIC
Freight Classification Yards

at Milwaukee, Wisconsin • at Chicago, Illinois
at St. Paul, Minnesota

THE MILWAUKEE ROAD



A view of the incline, with cars being pushed over the crest, as seen from the 35th Street viaduct, looking west.

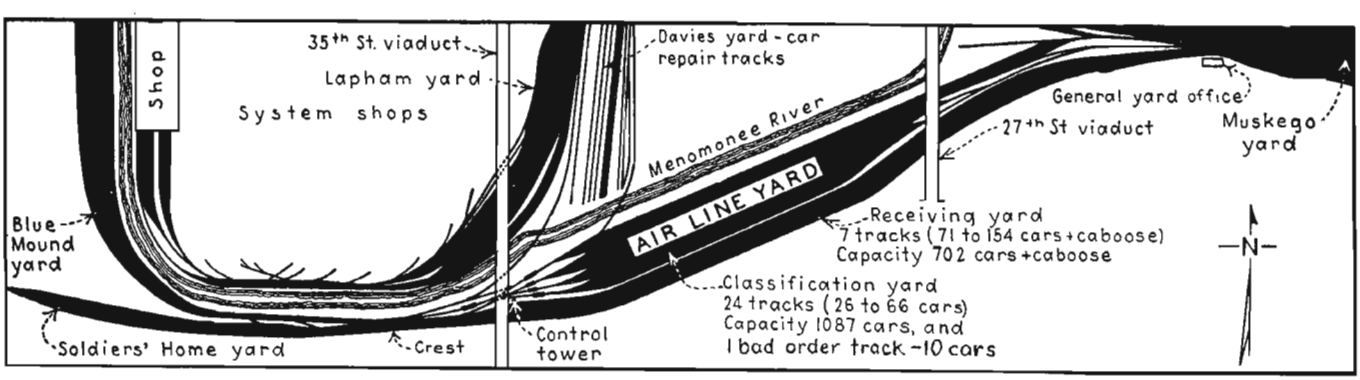
Yardmaster is stationed in the second floor office of the control tower. The microphone suspended over the desk is for the paging and talk-back speakers in the yard: In the foreground is the teletype.

AIR LINE YARD at Milwaukee, Wisconsin

The first of The Milwaukee Road's automatic yards combining for the first time in railroad history both automatic switching and retarder speed control was completed and placed in operation in the middle of 1952. Its installation represents an investment of $3,000,000 and provides a facility with a capacity for classifying 2,400 cars every 24 hours.

Left: Floodlighting and a complete communication system make operation around the clock a simple matter. Here an uncoupled car goes over the crest at 1 o'clock in the morning.

A diagrammatic sketch showing the general layout of Air Line yard and adjoining facilities. A view of Air Line Yard is shown on the cover of this pamphlet.



Air Line yard is very important to the handling of Milwaukee Road business. It is a receiving yard for trains arriving from the north and west, as well as being the main yard for the classification of cars for outbound movement to the south and east. All outbound trains going in those directions, averaging 12 daily, are assembled there and at Muskego yard, which adjoins it on the east.

In classification yard proper, the 24 classification tracks hold from 26 to 66 cars. The yard is equipped with banks of flood lights for night operation; paging and talk back speakers; a pneumatic tube system two miles long, plus teletypes for the speedy handling of waybills and the transmission of other information for train make up; devices for the detection of dragging equipment; an arrangement for assembly-line journal box oiling; automatic shunting of damaged cars onto repair tracks, and many other refinements.

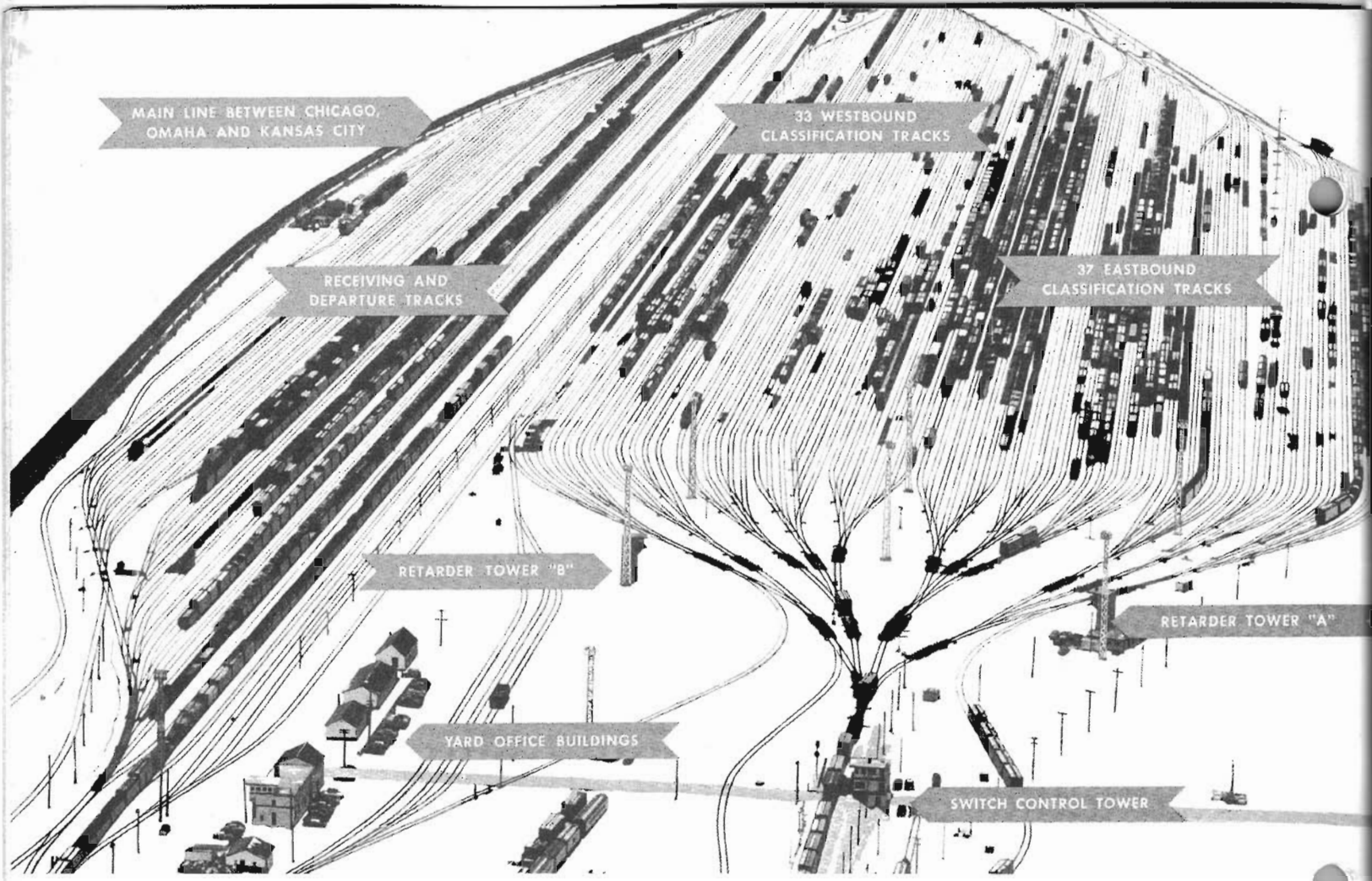
The number of tracks in Air Line yard could not be increased, as the yard is confined between the winding Menomonee River and the company shops on the north and established industrial plants and the steep slope of the river valley rising on the south. As constructed, the layout provides tracks that will hold as many as 154 cars in the receiving yard. The arrangement is such that some of the tracks in this yard also can be used for departure purposes.

Cars to be classified at Air Line yard are pushed in long strings to the crest of a graduated incline where they are uncoupled either singly or in groups (cuts) according to their destination. The operator (one for each eight hour shift) on the third floor of the control tower overlooking the yard, is trained to determine quickly on which of the 24 classification tracks (or the bad order track) the next car in line is to go and at what speed it must travel in order to go the required distance. By being able to line the switches for five consecutive cars or cuts of cars at a time, the operator is free to devote full attention to the degree of retardation each requires as it proceeds through the master retarder and one of the four secondary retarders. Loaded cars are controlled to leave the final retarders at 4 miles per hour, and empty cars at correspondingly suitable higher speeds. The grade of the tracks after leaving the final retarders is such that the cars gradually slow down approaching other cars on the same track.

The operator on duty in the control tower sits before a console no larger than an office desk. On it, the entire yard layout is reproduced in miniature, with a numbered button for each classification track. Projecting above it is an illuminated panel on which appear the numbers of the tracks for which the operator has set the switches in advance for the next five consecutive cars or cuts of cars. Other sets of buttons permit the operator to change the speed of a car as it goes through each retarder. Also, before the operator in the control tower is a list of the cars to be switched including the car number, its contents, weight and destination. This list, originally sent from the yard office to the yard master on the floor below the operator's quarters, has been marked by the yard master to indicate the track to which each car is to be directed. It is sent upstairs by "dumb waiter," while another copy is sent to the engine foreman who supervises the uncoupling operation from a small office at the crest.

Seated in the glass-enclosed third floor office of the control tower, the retarder operator makes up trains on 24 tracks and sends bad order cars to the repair yard with the push of a button. On the console before him are the buttons controlling switches and retarders. The device at the left shows the numbers of the tracks for which the switches have been lined up. The teletyped switch list lies on the console before him.

View from the roof of the engine foreman's office at the crest shows most of the yard layout. The master retarder appears in the middle distance and the final retarders, control tower and classification tracks beyond. The receiving yard is at the extreme right, while the track leading off to the extreme left, No. 25, crosses the Menomonee River into Davies repair yard.



The world's largest and most modern freight car classification yard employing both route switching and retarder speed control is located in Bensenville, Illinois—17 miles west of the Chicago Loop district.

BENSENVILLE YARD at Chicago, Illinois

The Milwaukee Road's automatic freight car classification yard at Bensenville was placed in operation in November 1953. It was designed to provide better service to patrons through faster handling of cars, and to reduce the possibility of damage to the contents of cars by effective speed control during switching operations.

The entire yard consists of 33 westbound classification tracks and 37 eastbound classification and departure tracks, ranging in capacity from 52 to 102 cars, ar a total capacity of 5,311 cars. It was designed to classify 3,600 cars in a 24-hour day.

The westbound departure yard has 5 tracks with capacities ranging from 120 to 125 cars each for a total capacity of 611 cars. These 5 tracks are equipped with shove signals at the east end which indicate the number of car lengths of room at the west end and thereby eliminate the necessity of yardmen protecting such movements from the west end. These signals are of a 4 indication dwarf type and, as cars are shoved in from the east end, they indicate whether there is room for 12 cars, then 8 cars and, finally, 4 cars, which latter indication means that there is room left for a 4-unit diesel-electric locomotive to enter the track to pull the cars at the west end of the yard.

The eastbound and westbound receiving yard consists of a total of 20 tracks ranging in capacity from 54 to 119 cars each for a total of 1,575 cars. Located at the entrance of this yard from both the east and west end are illuminated yard track indicators. These indicators are operated by the yardmasters at both ends and control the movement of all trains entering the yard.

Bensenville yard has a total capacity of 8,823 cars including auxiliary tracks for the storage of equipment as well as stock yard and icehouse facilities.

Trains arriving in Bensenville yard, where all freight cars to, from and through the Chicago area on The Milwaukee Road are switched, are pulled past a train checker who records the car numbers on a tape recorder. Typed lists showing the car numbers together with the weight, description of contents and the track numbers to which the cars are to go, are dispatched by pneumatic tubes to all involved in switching operations.

Continuing to a receiving track the cars are inspected and journal box lids raised for lubrication of axle bearings.

Next the trains are pushed by diesel locomotives to the crest of the grade which is about 20 feet above the area where the cars enter the classification tracks. On the way

the cars pass over a device that detects dragging equipment carried underneath the car, and pass a facility where lubricating oil is squirted into journal boxes previously opened.

At the crest a switchman "cuts off" or separates cars that continue by gravity into the various tracks.

In an office at track level at the crest a switch foreman seated at a desk-type routing panel, by pushing one of 70 buttons can automatically line up the switches that permit a car or groups of cars to "roll" onto any of 70 tracks. An illuminated panel indicates to the foreman-operator how he has set up in advance in consecutive order the next five "cuts" or groups of cars to be switched.

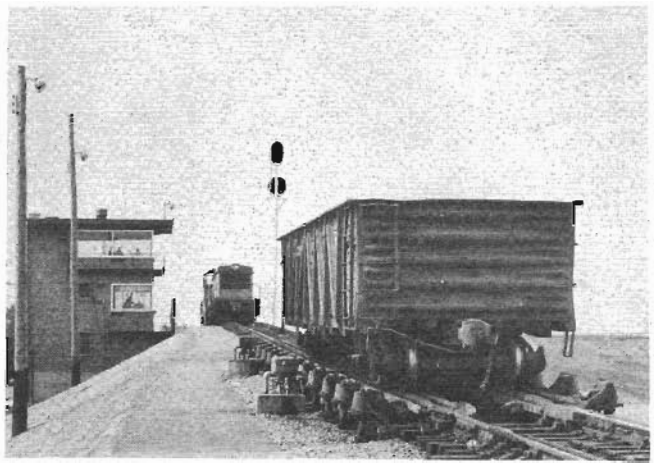
Half way down the gravity grade there are two towers, one on each side of the yard, from which operators seated at desk-type consoles control the speed of the cars into the classification tracks. Through huge windows located about 30 feet above track level the operator has exposed to his view the crest of the yard, the retarders and all switches.

On each console is a minature diagram of the yard layout and an illuminated panel showing the next five routes set up by the switch foreman at the crest.

On the console in each tower are levers which the operator can set to control the speed at which cars will leave the retarder. By pushing a lever in one direction for a heavily loaded car and reversing it for a light car, the retarders will automatically apply the required pressure to slow the car to the desired speed as well as provide required spacing between cars being switched.

Loaded cars are controlled to leave the final retarders at 4 miles per hour, and empty cars at correspondingly suitable higher speeds. The grade of the tracks after leaving the final retarders is such that the cars gradually slow down approaching other cars on the same track.

There is a unique signaling system for the control of engines working on the retarder leads. A color light and position light signal are mounted on a single mast back to back facing both directions. The color light signal controls the movements exclusively of one designated engine and



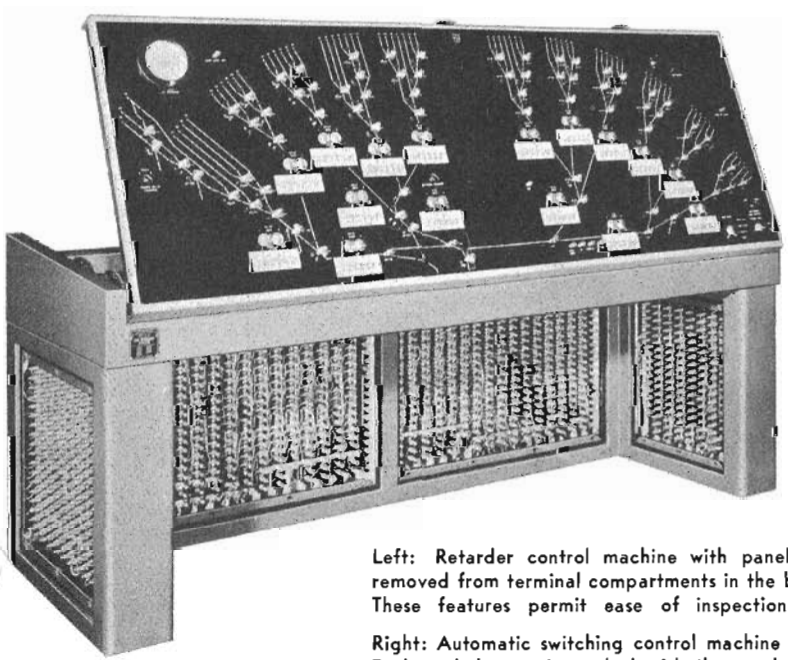
the position light controls the other. A colored disk is provided in the cab of each locomotive indicating to the enginemen the signal that governs their movements. These signals are electrically interlocked between the yardmaster and switchtender to prevent conflicting movements.

The yard is equipped with a paging and talk-back loud speaker system to direct activities of personnel on the ground; telephone communication between offices; a pneumatic tube system to transmit way bills, train lists, and switch lists, and a flood lighting system for night operation.

At the extreme west end of Bensenville yard and to the south of the auxiliary yard is located a diesel service house with a capacity of 14 units and a roundhouse with 28 stalls.

Also located in this area at the entrance of the yard is an interlocking controlling the movement of all inbound and outbound road trains from two divisions. Track layouts at this interlocking permit trains to enter and leave the yard on either one or both divisions simultaneously.

The project cost $5,200,000.



Left: Retarder control machine with panel raised and covers removed from terminal compartments in the base of the machine. These features permit ease of inspection and maintenance.

Right: Automatic switching control machine of Bensenville Yard. Each push button is marked with the number corresponding to its classification track. Routes set up are indicated in the panel at the top of the machine.

ST. PAUL YARD

Serving Minneapolis-St. Paul and the Northwest

The Milwaukee Road's new automatic freight car classification yard at the Twin Cities has 35 classification tracks with a capacity of 1,692 cars, 7 long receiving tracks for trains coming into the yard, and 6 long departure tracks for making up trains which are leaving the yard.

Trains arriving at the new automatic yard in St. Paul, where most of the cars to, from and through the Minneapolis-St. Paul area are switched, are pulled past a train checker who records the car numbers on a dictaphone. Typed lists showing the car numbers, together with the weight, description of contents and the track numbers to which the cars are to go are dispatched by pneumatic tubes to all involved in switching operations.

Continuing on to a receiving track the cars are inspected and journal box lids raised to permit lubrication of axle bearings.

Next the trains are pushed by diesel-electric locomotives to the crest of the grade which is about 20 feet above the area where the cars enter the classification tracks. On the way the cars pass over devices that detect flaws, should there be such, in the brake rigging carried underneath the car and also pass a facility where operators squirt lubricating oil into journal boxes previously opened.

At the crest a switchman separates the cars or cuts of cars that continue by gravity into the various classification tracks.

In an office at track level at the crest, or top of the gravity grade, a switch foreman seated at a desk-type routing panel, by pushing one of 38 buttons, automatically lines up the switches so that a car or group of cars will "roll" onto any of 38 tracks—35 classification tracks and 3 of the departure tracks. An illuminated panel indicates to the foreman-operator how he has set up in advance in consecutive order the next five "cuts" or groups of cars to be switched.

Half way down the gravity grade is a retarder tower from which an operator, seated at a desk-type console, controls the speed of the cars into the classification tracks. Through huge windows located about 30 feet above track level the operator has an exposed view of the crest of the yard, the retarders and all switches. On the console there is a miniature diagram of the yard layout under the control of the operator, also an illuminated panel showing the next five routes set up by the switch foreman at the crest.

Also on the console are six levers for each of the 8 retarders which may be set to vary the speed at which the cars leave each retarder. By pushing a lever in one direction for a heavily loaded car and reversing it for a light car the retarders automatically apply the required pressure to slow the car to the desired speed as well as provide required spacing between cars being switched.

Loaded cars are controlled to leave the final retarders at 4 miles per hour, and empty cars at correspondingly suitable higher speeds. The grade of the tracks after leaving the final retarders is such that the cars gradually slow down approaching other cars on the same track.

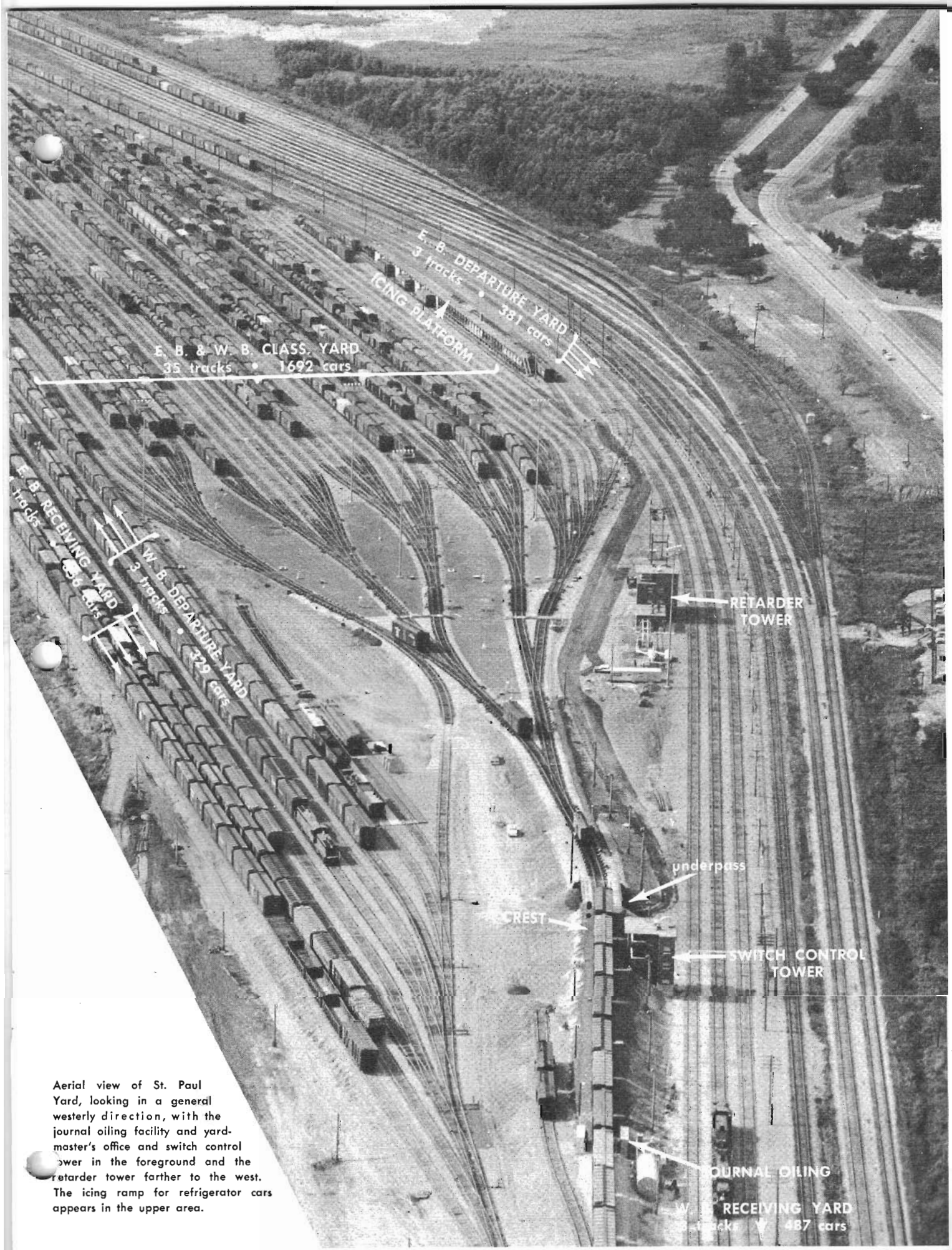
The diesel-electric locomotives employed in the classification operation are equipped with cab signals to facilitate the directing of their movements. There is a "paging" and "talk back" loud-speaker system to direct activities of personnel on the ground; telephone communication between offices; a teletype system to transmit train lists; a pneumatic tube system to transmit waybills and train lists, and a flood-lighting system for night operation.

An innovation at St. Paul Yard, never before installed in an automatic classification yard, is a Yard Track Fullness Indicator which shows the yardmaster at all times the number of cars on each track. It is a mechanical device in the form of a control panel, located in the yardmaster's office at the crest of the yard, that automatically registers and visually indicates the number of cars that enter each track in the classification yard.

Adjacent to the classification yard there is a new car icing facility where ice may be unloaded onto a continuous conveyor and carried up and along an elevated platform at car-roof height to any one of 30 cars which may be spotted alongside.

A modernized shop facility for servicing diesel-electric locomotives has been provided at the west end of the yard. Adjacent to the shop area is a freight car repair yard where about 130 cars may be spotted for light repairs. Facilities for cleaning and washing cars have also been provided.

The project cost $4,900,000.



Aerial view of St. Paul Yard, looking in a general westerly direction, with the journal oiling facility and yardmaster's office and switch control tower in the foreground and the retarder tower farther to the west. The icing ramp for refrigerator cars appears in the upper area.

FACTS ABOUT THE MILWAUKEE ROAD'S AUTOMATIC YARDS

	Air Line Yard Milwaukee, Wis.	Bensenville Yard Chicago, Ill.	St. Paul Yard St. Paul, Minn.
A. Work Done at Yard	classifies eastbound and southbound cars	classifies cars to all destinations	classifies cars to all destinations
B. Date Placed in Service	May 1952	July 1953—**37** tracks Nov. 1953—**33** tracks	August 1956
C. Tracks and Capacity—Receiving	**7** tracks **702** cars	**20** tracks—**1,575** cars	**7** tracks— **843** cars
Classification	**25** tracks **1,097** cars	**70** tracks—**5,311** cars	**35** tracks—**1,692** cars
Departure	directly from yard classification — cars	**5** tracks— **611** cars	**6** tracks— **710** cars
	1,799 cars	**7,497** cars	**3,245** cars
D. Retarder Control Towers	**1**	**2**	**1**
E. Automatic Retarders—Master	**1**	**1**	**1**
Intermediate	■	**4**	**2**
Final	**4**	**11**	**5**
	5	**16**	**8**
F. Estimated Switching Capacity	**2,400** cars per day	**3,600** cars per day	**2,400** cars per day
G. Miles of Track (In yards and operating facilities)	**25** miles	**125** miles	**47** miles
H. Acreage (of yards and facilities)	**60** acres	**330** acres	**120** acres
I. Approximate Cost of Project	**$3,000,000**	**$5,200,000**	**$4,900,000**

THE MILWAUKEE ROAD

Issued by PUBLIC RELATIONS DEPARTMENT • 356 Union Station Building
Chicago 6, Illinois