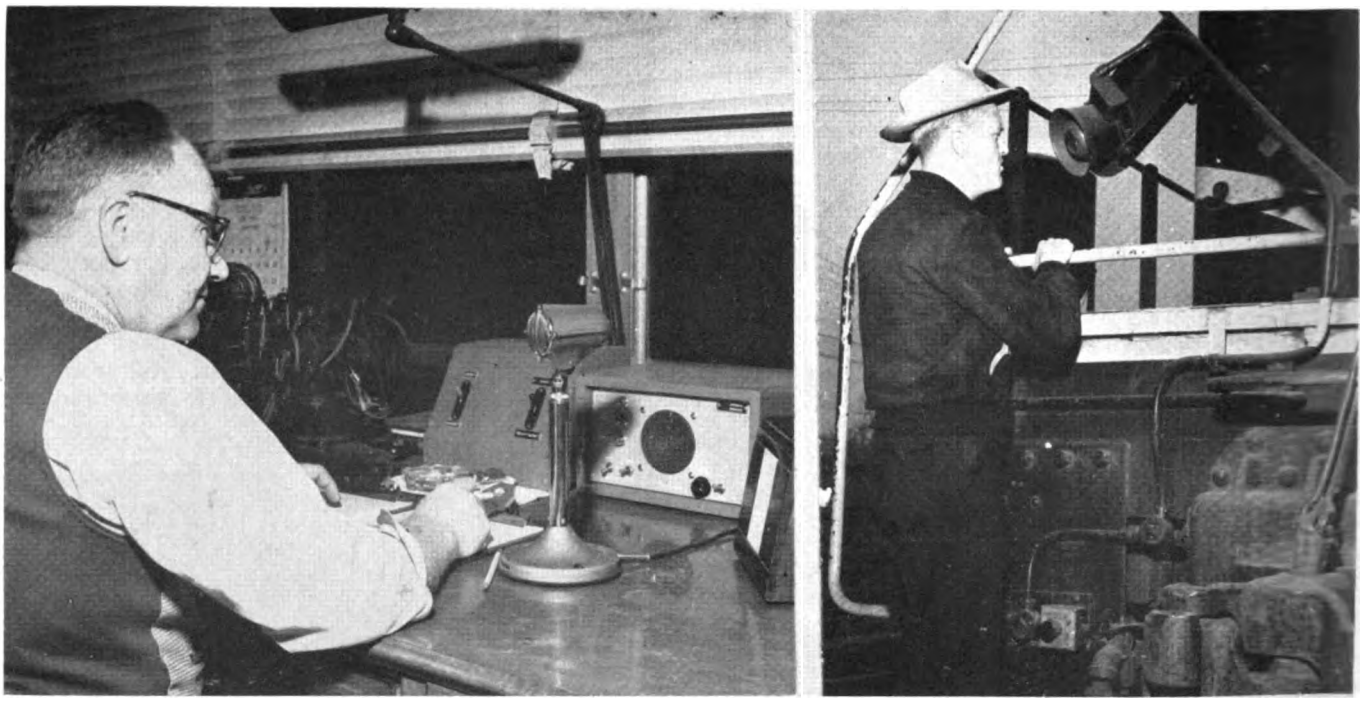


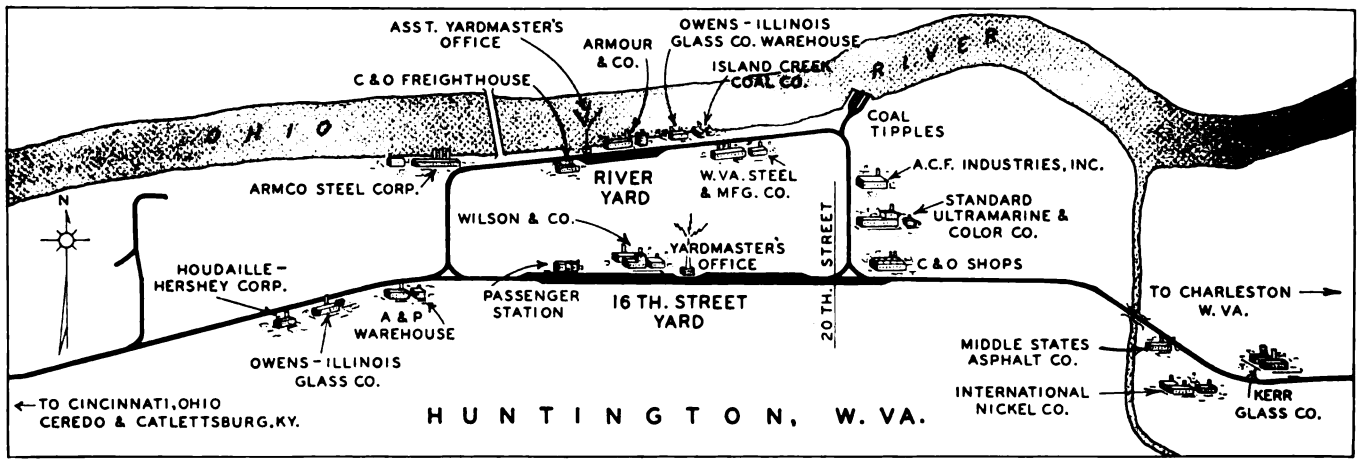
YARDMASTER receives radio call from switch crewman on locomotive footboard. Push-button at right of man's knee is for intercom between footboard and locomotive cab

Yard Radio Pays Its Way . . . On the C&O

Radio equipped switch engines handle work assignments at railroad shops, main freight train yard, industrial switching area and haul coal to washing plant and river docks

THE CHESAPEAKE & OHIO has installed radio on 17 locomotives and in four yard offices at Huntington, W. Va. These locomotives are used in switching service in a yard and industrial area 5.5 miles long by 1.5 miles wide, and in local freight service extending 25 miles east and 10 miles west. A port city on the south bank of the Ohio river, Huntington is on the east-west, three-track C&O main line, near the Kentucky state line.

The main yard at Huntington, where trains are handled, is at 16th street. About 22,000 cars per month are received and forwarded at this yard, which are set off and picked up by road freight trains. All classification of cars in this yard is done by radio equipped diesel switchers. One fixed radio station is at the 16th street yard with a remote control unit in the yardmaster's office, and a master remote unit in the terminal trainmaster's and chief clerk's. Now the yardmaster keeps in constant communication with switch engine crews and is able to give them "up to the minute" instructions concerning their work. These radio equipped locomotives also work at the passenger station and the C&O shops (lo-



comotive, passenger cars and general stores.)

Industrial Switching Covers Wide Area

Besides the 16th street yard, the C&O has a river yard parallel to and north of the main line. Belt lines at 3rd and 23rd streets connect this yard to the main line. Another line at 15th street west runs from the main line north to the river. The C&O freighthouse is at River yard and 10th street. Many of the 135 industries which the C&O serves in Huntington are concentrated in this area. Switching service here is also done by radio equipped locomotives, and crews work under the direction of two assistant yardmasters; one at River yard near 10th street, and the other at the River yard lead at 20th street. To facilitate these operations, particularly for the assistant yardmaster at 10th street because he also directs switching operations at the freighthouse, a fixed radio station was installed in a separate wood building near the freighthouse. This building serves as an office for the assistant yardmaster, and the radio enables him to keep in close contact with switchers working in the River yard.

Radio equipped locomotives also are used in local freight service along the main line as far east as Hurricane, W. Va. (24.9 miles from Huntington) and as far west as Catlettsburg, Ky. (9.8 miles away). The 16th street yardmaster is able to call these trains by radio and give them "last minute" instructions. Also when they approach Huntington they radio in to find out what yard track they are to pull in on.

Coal Traffic Is Important Too

Much of the coal handled at Huntington comes from branch lines east of the city, ranging from 10 to 65 miles away near Charleston, W. Va. Each month approximately 10,500 70 ton cars are set off at Huntington and are classified in 16th street yard. About 7,000 cars per month are destined for three coal tipples on the Ohio river (River yard) where the coal is dumped into barges for shipment down the river to Cincinnati and further south; and 3,500 cars per month are taken to the Truax-Traer coal washing plant at Ceredo, 7 miles west of Huntington. Radio equipped switchers handle the coal down to the River yard, and return the empties to 16th street yard. Radio equipped road switchers haul the coal to Ceredo, and return with loads and empties, and interchange from the Norfolk & Western. After washing and grading, some of the coal taken to the washing plant is transferred to barges, and the rest is reloaded into C&O cars for further shipment on the railroad. Radio has played an important part in this operation because the 16th street yardmaster now is able to call a crew and tell them "to button up everything, and rush back." Previously he had to telephone to someone in Ceredo, asking them to locate the crews and relay the message (often time consuming.)

Radio Provides Flexible Operations

Not only is better service being rendered by the C&O in the Huntington area because its switch engines are radio equipped, but a more flexible operation has been achieved. For instance, the yardmaster will not hesitate to call an engine off a regular switching assignment to do a special job, mainly because he can so quickly call the crew and explain the job in detail, enabling them to get on it right away. Recently No. 95 (westbound merchandise train) had a bad order car to be set out; so the yardmaster radioed the depot switcher to set out the bad order car. This the crew did promptly, so that they had time to return to the passenger station to work passenger trains No. 3 and 47. Without radio, the yardmaster would have spent 10-15 minutes contacting them, probably by telephone; which in this case would have been too close to allow them to do the job. Thus the nearest switching crew was able to pull the bad order car because the yardmaster was able to give them practically instantaneous instructions.

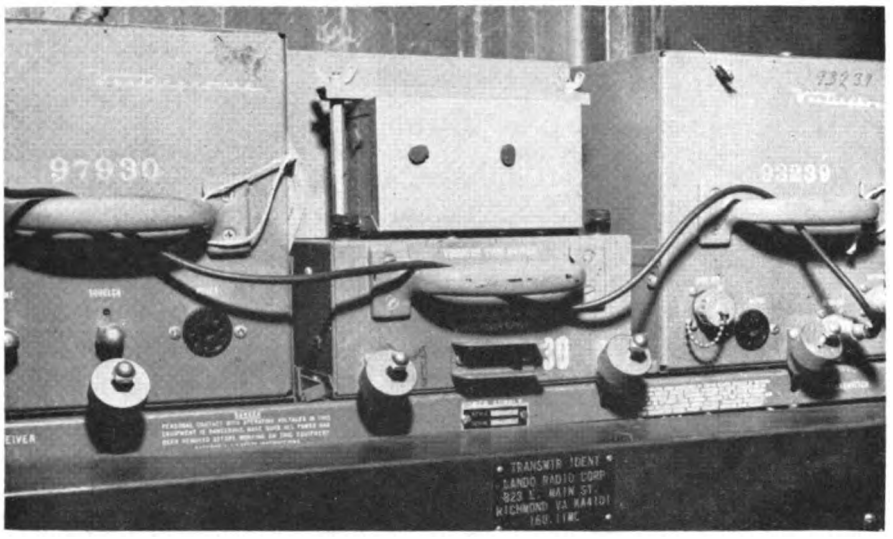
Radio has reduced delays to the local freight trains. For example, the conductor of the Catlettsburg local freight run sometimes had to wait for his switch list before he could leave 16th street yard. Now with the radio equipped locomotive, the local leaves when ready, and the yardmaster radios the switch list to the conductor en route.

Most switching crews start out with definite assignments on their trick and the yardmaster changes their instructions and work assignments as required. Often a crew was "lost" from the time they left the yard office until they returned. Now they are called regularly and they radio in when they finish a particular job, keeping the yardmaster informed of their whereabouts. Also, industries call in now requesting "rush spots," i.e., extra cars or loaded cars to be pulled for a train connection. The yardmaster radios a crew to answer the call; often an engine working in the area will do the special switching job. Now that the industries have been informed by the railroad about the radio equipped switch engines, most companies are using the improved switching service, and do not hesitate to call in for "rush jobs." Before radio, it was customary for a switching crew to cover a certain route doing each industry in turn with little or no backtracking for special switching. After the crew left an industry, it would receive no more switching service until the next day. As a result, cars loaded late in the afternoon often were not picked up for outbound trains until the next day. Now this 24 hour delay has been practically eliminated because when an industry calls the yardmaster telling him that they have loads ready to be pulled, he instructs switching crews to backtrack to pull loads for outbound connections, or he assigns another crew to pick up the late cars. Radio also helps the yardmaster in planning the make-up of outbound trains, because switching crews radio in and tell him the number of outbound cars or loads they are picking up.

Armour, Swift, Wilson or the A&P often have rush cars of meats or perishables which they want delivered to their warehouses as soon as possible after the cars arrive in Huntington. Without tieing up a switching crew to wait for the inbound merchandise train, the yardmaster radios a switching crew "at the last minute" to pull the cars from the arriving train and rush them over to the packers or grocers. Such operations are now being performed in 50 per cent less time than previously. Often a car is spotted at the Swift unloading dock less than 30 minutes after the car arrives in the 16th street yard.

Footboard Speakers Prove Helpful

Footboard speakers are on the front ends of all locomotives. Two pushbuttons are provided; one for intercom between the footboard and the locomotive cab, the other for broadcasting over the radio. When the yardmaster calls an engine, his voice is also heard over the footboard speaker, so he can page the crew foreman. The foreman goes to the footboard to answer, using the radio push-to-talk button. The intercom enables the foreman on the footboard to confer with the engineer about switching moves.



VIBRATOR mounted on radio power supply (center) enables it to operate on d.c.

At 16th street, the radio is at a floodlight tower, with intercom provided between the three remote control units. Thus the yardmaster, chief clerk and the terminal trainmaster can talk to each other without "going on the air." At River yard, the radio equipment is in a separate wood building which the assistant yardmaster uses for an office. He uses radio to talk to yard engines and also to the 16th street yardmaster. Although these two yardmasters can call each other by telephone, they now use radio because they can pick up the handset and call directly to each other and "the line is never busy."

The radio in yard offices and on the locomotives has provided improved service to the public and shippers, and also increased the efficiency of yard operations in that each locomotive now works a greater area. Economies thus effected amount to approximately $28,000 annually.

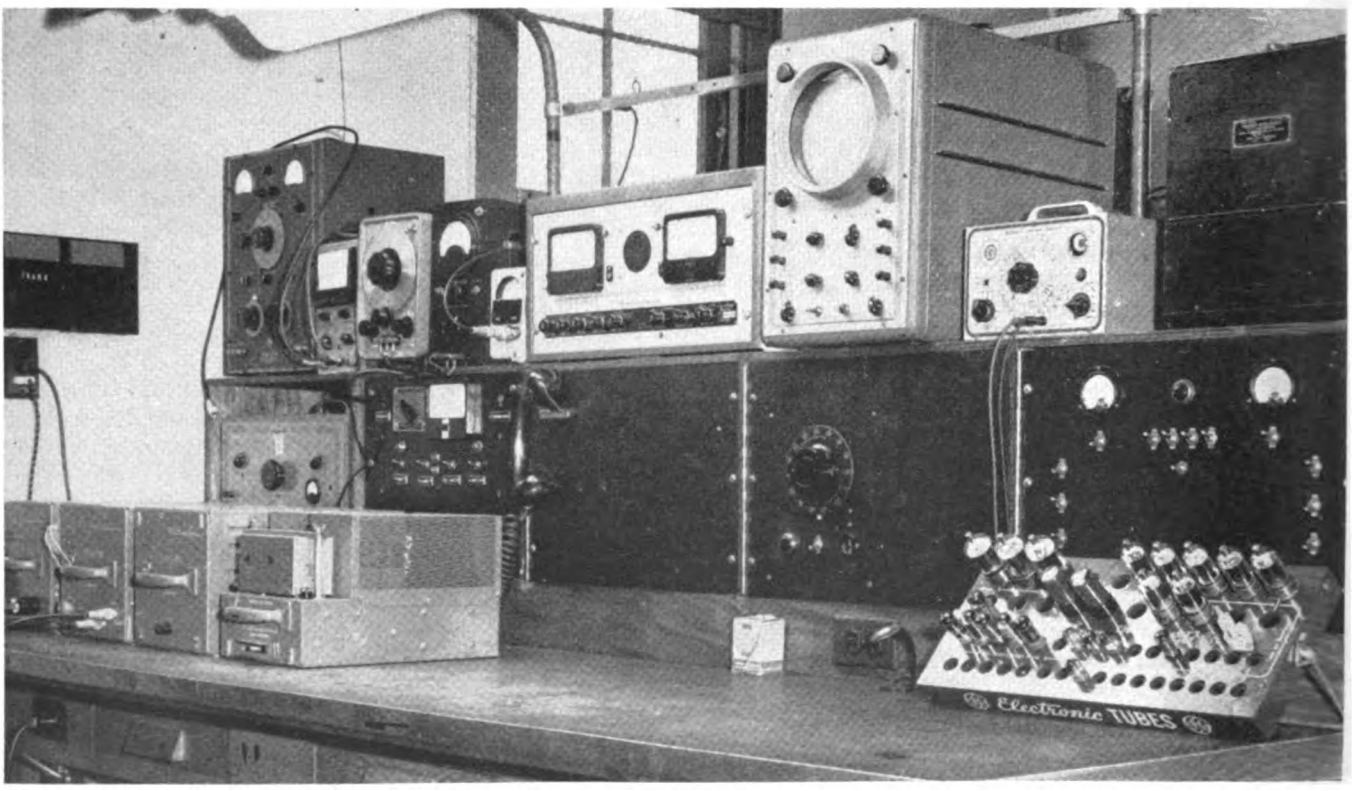
Radio Operates on 160.11 mc

The radio (Westinghouse type FE) on the locomotives consists of three plug-in units: transmitter, receiver and power supply. A feature of this installation is that the radio power supply operates directly off the 64 volt d.c. engine starting battery. A small (2 in. by 3 in. by 6 in.) Cornell-Dubilier vibrator, manufactured to Westinghouse specifications, is mounted on top of the radio power supply unit. On the yard locomotives, the radio equipment is in a weatherproof equipment box on top of the hood in front of the cab. On the roadswitchers, the radio equipment is rack mounted on one wall in the steam generating compartment behind the cab. The handset and control unit are mounted on the engineer's throttle control stand with the loudspeaker mounted on the front wall of the cab near the ceiling. The antenna is a quarter-wave whip mounted on the cab roof, with a small loop in the end of it for safety purposes. The antenna lead is RG-8/U coaxial cable.

The footboard speaker is mounted on the hand rail over the front footboard, and control is effected by two pushbuttons. A metal shield covers the pushbuttons, preventing a man from catching his clothing on them. One end of the shield is painted red for radio TRANSMIT, and the other end is painted black for INTERCOM. Either pushbutton can be operated by a man pushing on the end of the metal shield with his knee.

At 16th street yard, the radio equipment is in a weatherproof box at the base of a 90 ft. floodlight tower, atop of which is an Andrew omni-directional antenna with an RG-8/U lead. A telephone pair (No. 14 wire), run underground, connects the remote control units of the yardmaster, chief clerk in the yard office and terminal trainmaster to each

(*Continued on page* 56)



C&O Radio

(*Continued from page* 34)

other and to the radio equipment. This pair is used for intercom among the offices as well as for keying the transmitter. The terminal trainmaster's master remote control unit has a disabling switch which, when operated, cuts the other remote control unit "off" (but he can listen,) and allows the trainmaster to control the radio station.

At the River yard, the radio equipment (three plug in units) in shelf mounted with the handset and loudspeaker on one wall in the yardmaster's office. The omni-directional antenna is mounted atop a 70 ft. wood pole with RG-8/U coaxial cable lead. These base stations operate on 117 volts a.c., commercial power being used.

Radio Shop for Maintenance

At West Huntington, the C&O has a radio maintenance shop with a full complement of radio testing equipment (see RS&C Aug. 1954, p. 48) In addition to the standard test equipment, a Cornell-Dubilier power converter is used to supply a varying direct current from zero to 130 volts. A built in Variac varies the alternating current from zero to 130 volts, which is then fed into a rectifier.

A problem in this and many other radio shops is that of reducing interference due to radiation from a transmitter during frequency checks and testing. W. W. Adams, the C&O maintainer, has effectively solved this problem by using a screen made of aluminum hardware cloth. The screen is shaped like a box without a cover, with holes for test leads. When checking a transmitter, the aluminum screen is placed upside down over the transmitter (which sits on a sheet of hardware cloth) and the test leads inserted through the holes. The radiation, when the transmitter is "on," is effectively reduced. Before Mr. Adams evolved the portable screen idea, radiation caused interference with the 16th street base station, about two miles away. Now all such interference is gone. Besides checking and maintaining the radio equipment, the West Huntington radio shop also monitors the yard radio at Huntington and Ashland, Ky.

Planning and installation work was carried out by railroad men under the direction of P. A. Flanagan, superintendent of communications. Radio equipment was furnished by the Westinghouse Electric Corp.