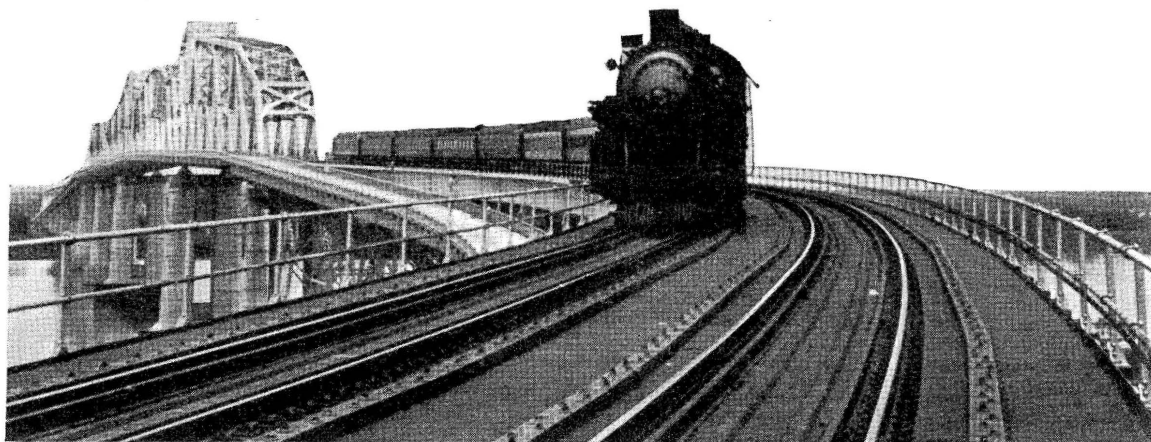


# Interlocking and Signaling



Westbound Southern Pacific train just leaving main span of bridge

THE INTERLOCKING and automatic signaling installed on the new Mississippi River bridge and its approaches, at New Orleans, La., form an important part of this gigantic project. The new bridge, the first to be built across the Mississippi south of Vicksburg, Miss., is located 3.3 miles west of the business section of New Orleans, or about 9 miles upstream (following the meandering of the river) from the foot of Canal street.

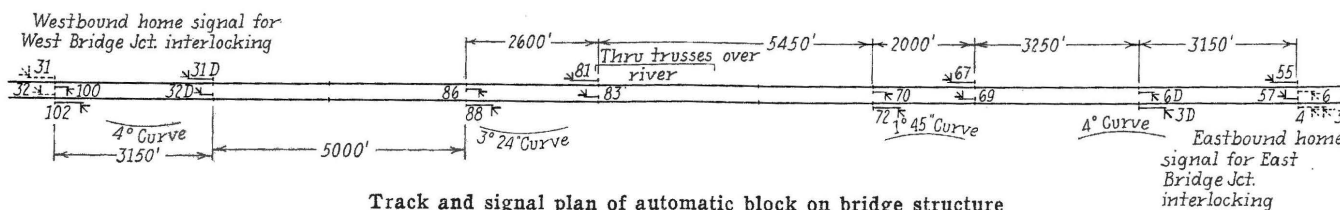
Because of the low level of the land bordering the river, and because of the requirement of the United States engineers that the river spans provide a clear headroom of 135 ft. above high water level, it was necessary to construct approaches of unusual length. Thus, with a track grade of 1.25 per cent, compensated for curvature, the east approach viaduct has a length of 8,680 ft., and the west approach 10,791 ft. The main bridge is 3,524 ft. long so that the entire length of the combined structure is 22,995 ft., or, in other words, 4.3 miles. The bridge carries a double-track railroad which is a

## Either-direction operation provided on two tracks—Interlocking facilities installed at each end of the bridge

part of the New Orleans Public Belt Railroad. And as a part of the construction project, automatic signaling was installed for the protection of train movements; normally, trains are operated right-hand running, but signaling is provided for operation of trains in either direction on each track, so that either track can be left open for maintenance or repairs if necessary, or both tracks can be used for operation of trains in the same direction when the preponderance of movements are in one direction.

The principal rail lines into and out of New Orleans from the west are those of the Texas & Pacific and the Southern Pacific. Under the previous arrangement, all trains to and from the west were ferried across the river. The Southern Pa-

cific ferry slip on the east side of the river is located about 2,500 ft. upstream from the new bridge, from which point the Southern Pacific line extended to a connection with the Illinois Central, over whose tracks the Southern Pacific passenger trains are operated into and out of New Orleans. The Southern Pacific also has a line extending on down the west side of the river to yards and docks at Westwego on the river front opposite the city of New Orleans. Now that the bridge is complete, the Southern Pacific passenger trains connect with the new line of the New Orleans Public Belt, at West Bridge Junction, and operate on this line over the bridge and to East Bridge Junction, where connection is made to the line of the Illinois



# For New Bridge at New Orleans



Automatic block provides for either-direction operation on both tracks

Central, used previously enroute to and from New Orleans. Freight service is routed on the Public Belt line.

On the west bank of the river, the main line of the Texas & Pacific runs practically parallel with the Southern Pacific line and at West Junction is about 300 ft. east of it, so that the Texas & Pacific line crosses the new New Orleans Public Belt double-track line in the limits of the new interlocking. The Texas & Pacific line extends on south to a ferry and freight terminal located in the vicinity of the business section of the city, the Texas & Pacific having its own yards and station on the New Orleans side. The location of the Texas & Pacific station is such that Texas & Pacific trains can be operated over the bridge from West Bridge Junction and then over the tracks of other roads to the Texas & Pacific station. Negotiations have not as yet been completed for the Texas & Pacific trains to use the bridge. However, it would be practicable to make a connection between the Texas & Pacific and the New Orleans Public Belt lines at West Bridge Junction, although no such connection is included in the new track layout of the new interlocking.

As a part of the bridge project, a new electric interlocking was installed at West Bridge Junction at the west end of the bridge where the new double-track line of the New

Orleans Public Belt crosses the double-track line of the Texas & Pacific and connects with the main line of the Southern Pacific to the west, as well as to the yards of the Southern Pacific just north of West Bridge Junction. This interlocking, as well as the automatic signaling for the tracks over the bridge and approaches, is a part of the property of the New Orleans Public Belt; however, this signal and interlocking construction was handled by the signal department forces of the Southern Pacific, the Texas & New Orleans Lines. The interlocking at the east end of the bridge at East Bridge Junction, where the tracks of the bridge line connect with the Illinois Central, was de-

scribed in an article published in the May, 1936 issue of *Railway Signaling*.

## Automatic Signaling on the Bridge

On account of the great height and length of the bridge structure, it has been considered advisable to restrict the speed of trains on the structure to 15 m.p.h. Therefore, in order to permit comparatively close spacing between following trains, it was decided that the section of track over the bridge from one interlocking to the other should be cut into four automatic blocks.

The grades, as well as the curves on the approach structures, had to

Westward home signals at West Bridge Jct. interlocking—S. P. train crossing over



be taken into consideration when planning the exact location of automatic signaling on the bridge. Considering the eastward track in the accompanying track and signal plan, it will be seen that signal 3D is located braking distance from signal 3, the home signal at East Bridge Junction. Signal 102 is the first eastward automatic serving to direct

authorizes a train handling rated tonnage to pass the signal, when indicating red, without stopping, and proceed at restricted speed prepared to stop short of train or obstruction. Normally, all signals between East Bridge Junction and West Bridge Junction display "proceed" aspects except the first, or entering, signal which displays "stop" normally, and

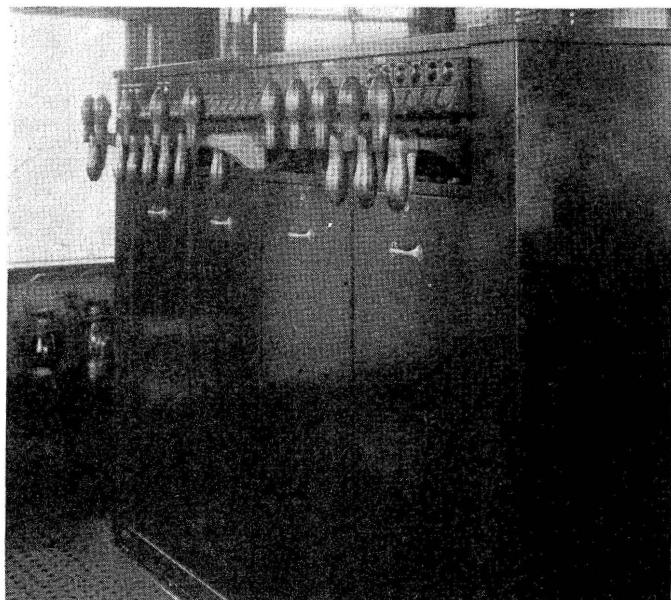
not be reversed for an opposing movement until the route has been cleared. In brief, the directional control for automatic signals is accomplished by neutral relays whose control is selected through the opposing traffic lever and the intervening track circuits.

### Type of Signals

The signals are of the searchlight type operated and controlled by low-voltage d-c. circuits. The signal lamps are of the double-filament type rated at 12 volts, 12.5-3 watts. These lamps are normally fed through transformers from the a-c. source but are switched to battery in case of an a-c. outage. At each signal location there is a set of 6 cells of Type DMGO-7 storage battery used normally to feed the control circuits and to act as a stand-by source of power for the signal lamps.

All signals are located at the right of the track governed. The high signals are on masts mounted on bracket platforms on the bridge structures. The dwarfs are mounted on short pipe masts bolted to the metal bridge deck between the tracks. In order to prevent live coals and sparks from falling onto the track, the ties are covered over completely with sheet metal. As a means of preventing these plates from shorting the track circuits, two gaps, one inch wide, are left open and are covered by one-inch planks of wood treated with fire-resisting compounds.

The line control circuits and traffic-direction circuits extending over the bridge are in an Okonite manufactured aerial cable of 23 conductors which is run in metal cable rings supported from the pipe rail-

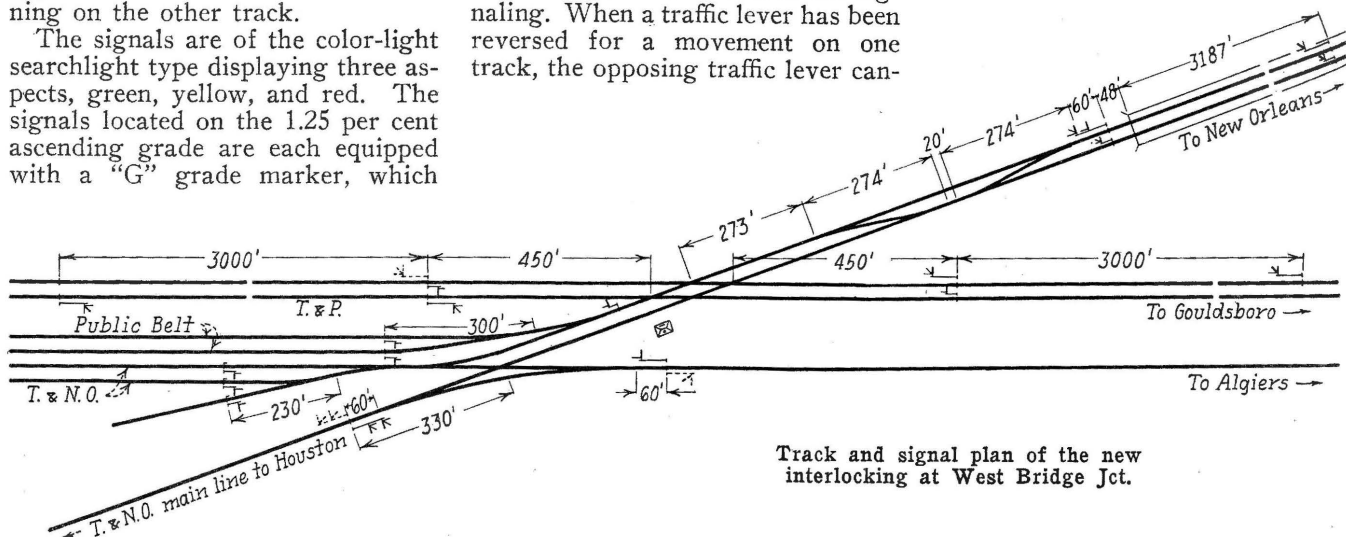


Electric interlocking machine in steel cabinet at West Bridge Jct. plant

trains leaving West Bridge Junction interlocking and entering on the automatic territory. The track between signal 102 and 3D was then divided into three blocks of approximately equal lengths on a time-distance basis, locations being shifted as necessary to stagger the locations for opposing direction signals on the same track, and also to get the high signal for normal direction operation opposite the dwarf for reverse running on the other track.

The signals are of the color-light searchlight type displaying three aspects, green, yellow, and red. The signals located on the 1.25 per cent ascending grade are each equipped with a "G" grade marker, which

goes to "proceed" when the traffic lever for that route is reversed. One traffic lever for each track is located in the interlocking at West Bridge Junction and one for each track at East Bridge Junction. These levers are mechanically interlocked with levers in their own machine and electrically interlocked with track relays and traffic levers in the other machine. No preference is given to either direction of traffic in the signaling. When a traffic lever has been reversed for a movement on one track, the opposing traffic lever can-



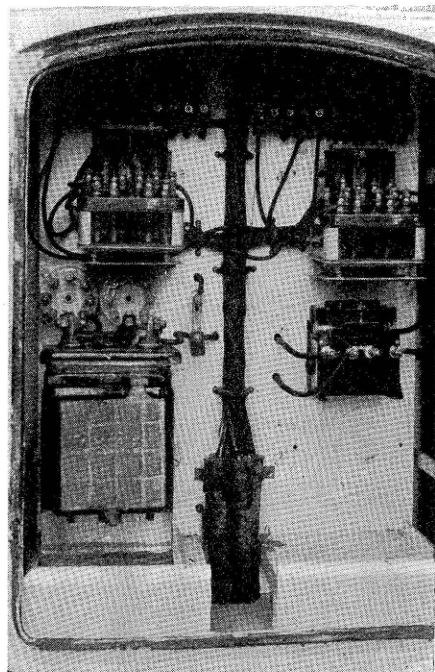
Track and signal plan of the new interlocking at West Bridge Jct.



ing. On account of the special deck covering on the bridge, the rail connections are made by using a Raco bootleg outlet screwed to a  $\frac{3}{4}$ -in. pipe nipple run through the metal covering. This is insulated above with a fiber washer and below with a 2-in. wood block and fastened with a faced lock-nut. The parkway cable is brought up from below the cover through this nipple. The signals, relays, and rectifiers used on the automatic signaling are, for the most part, of Union Switch & Signal Company manufacture.

### Interlocking at West Bridge Junction

At West Bridge Junction, the double-track line of the New Orleans Public Belt from the bridge crosses the double-track line of the Texas & Pacific and then connects with the



Track feed location showing rectifier and battery

main line of the Texas & New Orleans extending westward to Houston, Tex., as well as connecting to the yard of the Texas & New Orleans and to the line of the Texas & New Orleans extending east along the south side of the river to Algiers, located on the south side of the river opposite downtown New Orleans.

The two crossovers east of the crossing are for routing Texas & New Orleans trains to and from the main line to the west as well as to and from the yard and are each 274 ft. long, being made up with No. 14 turnouts so as to permit trains to be operated at speeds up to 25 m.p.h.



Three insulated gage plates are used in each switch layout

The plant is controlled by a General Railway Signal Company Model 2 unit-lever electric interlocking machine mounted in a sheet metal case. This machine has 20 working levers, 11 levers for the control of signals, 7 levers for switches and 2 levers as traffic-direction control for the signals on the tracks over the bridge. Spare levers are provided for the control of switches and signals which may be needed if connecting tracks are installed to connect the Texas & Pacific tracks with the line over the bridge.

### Switch Construction

The switches are operated by G.R.S. Model 5, d-c. 110-volt machines equipped with facing-point detectors, the G.R.S. system of dynamic indication being used. "KR" relays are used for signal selection through switches. The interlocking machine is equipped with the usual arrangement of lever indication lamps. A large illuminated track diagram made of sheet metal is suspended by bracket irons from the ceiling over the interlocking machine.

The relays and battery are located in the ground floor of the tower. The relays, rectifiers, etc., are housed in sheet metal cabinets equipped with glass front doors. The relays are all equipped with spring mountings to assist in absorbing vibration caused by passing trains, vibration at this location being excessive on account of the swampy nature of the soil. The main battery for operation of the 110-volt switch machines consists of 56 Exide DMGO-9 cells which are on floating charge through an RP-41 rectifier. A set of six cells of the same type charged by an RT-11 rectifier is used for the feed of lock circuits.

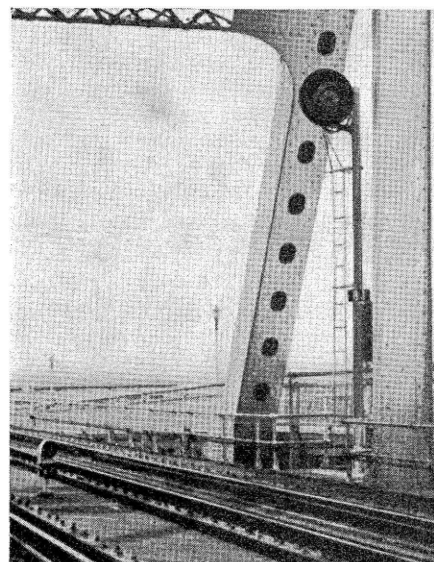
The wiring distribution from the

tower to the switches and signals is all in Okonite underground cable made up with a protecting covering including a lead sheath, steel tapes, jute, etc.

### Interlocking Signals

The interlocking signals are of the searchlight type operating on 10-volt d-c. The signal lamps are the double-filament type rated at 12-volt, 12.5-3 watts and are normally lighted. The switch layouts are well constructed, insulated gage plates being used on the tie ahead of the point and on the first two ties under the point, the plate on the two ties being extended and attached to the switch machine to prevent lost motion.

This plant was constructed by the signal department forces of the Texas & New Orleans, Southern Pacific Lines, according to plans approved by the New Orleans Public Belt Railroad.



Signals at west end of main span