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 Hovey, W. G., Sales Dept., Hall Signal Co.  
 Howe, W. K., Chief Eng., Genl. Ry. Signal Co.  
 Hudson, E. E., Mgr. Sales, Edison Manufacturing Co.  
 Jacob, Frank E., Signal Engineer, C. & W. I. R. R. Co. and Belt Ry. Co. of Chicago.  
 Johns, C. W., Asst. Engr. M. of W., Chesapeake & Ohio R. R.  
 Johnson, Robt. C., Asst. Signal Engineer, N. Y. C. & H. R. R. R.  
 Johnson, T. L., Supt. Signals, Delaware, Lackawanna & Western R. R.  
 Johnson, W. M., Jr., Trainmaster, Bessemer & Lake Erie Ry.  
 Kelloway, C. J., Signal Engr., A. C. L. R. R.  
 Kelly, A. J., Supvr. Sigs., Big Four R. R.  
 Kimbell, E. E., Representative, General Electric Co.  
 Kinch, W. M., Signal Engr., Lutz-Lockwood Mfg. Co.  
 Kinder, James F., Secy. Duplex Metals Co.  
 Klemm, W. J., Signal Maintainer, Pere Marquette R. R.  
 Kolb, E. W., Sig. Engr., B., R. & P. Ry.  
 Krum, Paul, Light Insp., Lake Shore & Michigan Southern Ry.  
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 Launbranch, M. E., Sales Engr., U. S. Electric Co.  
 Lee, Frank, Div. Engr., Canadian Pacific Ry.  
 Lepreau, F. J., Salesman, Edison Manufacturing Co.  
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 Mann, L. R., Supervisor Signals, Missouri Pacific Ry.  
 Manuel, W. N., Supt. of Sigs., G. R. & I. Ry.  
 Marshall, E. L., Chemical Engineer, National Carbon Co.  
 McKeen, A. H., Signal Engr., O. R. & N. Co.  
 McWain, W. J., S. E., Pere Marquette R. R.  
 Moffett, M. H., Asst. Sales Mgr., National Carbon Co.  
 Miskelly, Sam, General Signal Inspector, C., R. I. & P. Ry.  
 Moore, A. G., Chief Draftsman, I. C. R. R.  
 Moore, P. W., Gen. Mgr., Railway Specialty & Supply Co.  
 Morris, D. R., Signal Inspector, I. C. R. R.  
 Nutting, A. G., Lamp Insp., Chicago, Rock Island & Pacific Ry.  
 Oglesby, E. R., Div. Repairman, Chicago & Eastern Illinois Ry.  
 Oppelt, J. H., Supervisor Interlocking, New York, Chicago & St. Louis Ry.  
 Osgood, J. O., Ch. Engr., Central R. R. of New Jersey.  
 Parrish, F. J., Engr. M. of W., Kentucky & Indiana Bridge & R. R. Co.  
 Patenall, F. P., S. E., Baltimore & Ohio R. R.  
 Patterson, H. D., Representative, Lauder & Patterson.  
 Patton, George J., Supervisor Signals, Delaware, Lackawanna & Western R. R.  
 Peabody, J. A., S. E., Chicago & North Western Ry.  
 Peck, J. W., Gen. Sig. Insp., Union Pacific R. R.  
 Phinney, R. M., Asst. Engr., Signal Dept., C. & N. W. Ry.  
 Poor, C. O., Genl. Supt., General Ry. Signal Co.  
 Poor, F. A., Western Sales Agent, The Rail Joint Co.  
 Pry, E. B., Signal Insp., Pennsylvania Lines West.  
 Ragland, R. R., Supervisor Signals, Mo. Pac. Ry.  
 Raymer, I. S., Asst. S. E., Pittsburgh & Lake Erie R. R.  
 Relph, E. J., Supt., Massey Batt. Co.  
 Rhea, Frank, Genl. Electric Co.  
 Rose, L. S., S. E., Cleveland, Cincinnati, Chicago & St. Louis Ry.  
 Rosenberg, C. C., Consulting S. E.  
 Rudd, A. H., S. E., Pennsylvania R. R.  
 Salmon, W. W., Pres., General Railway Signal Co.  
 Sconce, E. M., Signal Foreman, Chicago & Eastern Illinois Ry.  
 Seaman, J. C., Signal Inspector, L. S. & M. S. Ry.  
 Shaver, A. G., Signal Engineer, C., R. I. & P. Ry. Co.  
 Smith, F. G., Signal Supervisor, Chicago & Eastern Illinois Ry.  
 Smith, E. B., Spl. Sig. Inspr., N. Y. C. & H. R. R. R.  
 Smith, F. C., Salesman, American Conduit Co.  
 Smith, M. E., S. E., Delaware, Lackawanna & Western R. R.  
 Spafford, James H., retired.  
 Spencer, C. H., Engr., Washington Terminal Co.

Sperry, H. M., Sales Manager, General Ry. Signal Co.  
 Spicer, V. K., Canadian Manager, Union Switch & Signal Co.  
 Squire, Willis C., Consulting Engr.  
 Stephens, Charles, S. E., Chesapeake & Ohio R. R.  
 Stevens, Thos. G., Sig. Eng., A., T. & S. F. R. R.  
 Stradling, E. G., Signal Insp., Chicago, Indianapolis & Louisville R. R.  
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 Trout, G. W., Signal Supvr., C., R. I. & P. Ry.  
 Unger, O. R., Signal Supervisor, Mo. Pacific Ry.  
 Warren, S. D., Signal Inspector, C., M. & St. P. Ry.  
 Weld, H. K., Asst. Sales Rep., McRoy Clay Works.  
 ern Ry.  
 Wentworth, C. C., Prin. Asst. Engr., Norfolk & Western R. R.  
 Whitcomb, F. E., Eng. of Maint. of Signals, Boston & Albany.  
 Wiegand, F. B., Asst. S. E., Lake Shore & Michigan Southern Ry.  
 Wight, S. N., Signal Inspector, L. S. & M. S. Ry.  
 Wilby, R. L., Asst. Engr., Toledo, Peoria & Western Ry.  
 Wiley, J. R., Western Mgr., Standard Underground Cable Co.  
 Willis, W. H., S. E., Erie R. R.  
 Wilson, A. G., Mgr., Hanlon & Wilson.  
 Winans, E., Chief Draftsman, Atchison, Topeka & Santa Fe Ry.  
 Whitcomb, L. L., Supervisor Signals, Lake Shore & Michigan Southern Ry.  
 Workman, W. S., Signal Foreman, Pennsylvania Railroad Lines East.  
 Wrecks, H. T., Secretary, Wire Inspection Bureau.  
 Wuerpel, M., Asst. Gen. Mgr., General Railway Signal Co.  
 Wyman, C. L., Sales Engineer, Millard Storage Battery Co.  
 Young, H. W., Sig. Maintainer, Chicago & North-Western Ry.  
 Young, John V., Supt. Signals, Boston & Maine and Maine Central Railroads.

**EIGHT-TRACK SCHERZER BRIDGE.**

The bridge now being built over the Sanitary and Ship canal, at Campbell avenue and Thirty-first street, Chicago, is composed of four double track single leaf Scherzer rolling lift bridges, placed alternately side by side.

It will carry four tracks of the Pittsburg, Cincinnati, Chicago & St. Louis, two of the Chicago Terminal Transfer and two of the Chicago Junction Railway. The bridge is being built and paid for by The Sanitary District of Chicago, under

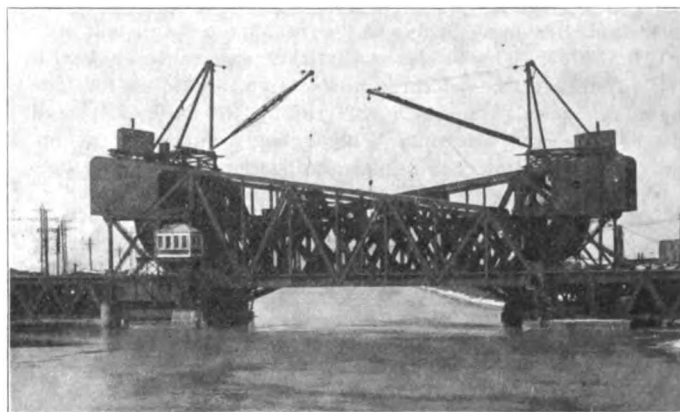


Fig. 1. Progress Work on Bridge.

an agreement with the railway companies to provide a moveable bridge of an efficient design subject to their approval. The Sanitary District also pays the railways such a sum of money as will draw interest sufficient to pay the expenses of maintenance and operation of the bridge.

Competitive designs for the bridge were first invited in 1898, and from the plans submitted at that time, those by the Scherzer Rolling Lift Bridge Co., Chicago, were selected. Contracts for the substructure were let to McArthur Bros., and for the superstructure to Pencoyd Iron Works, Philadel-

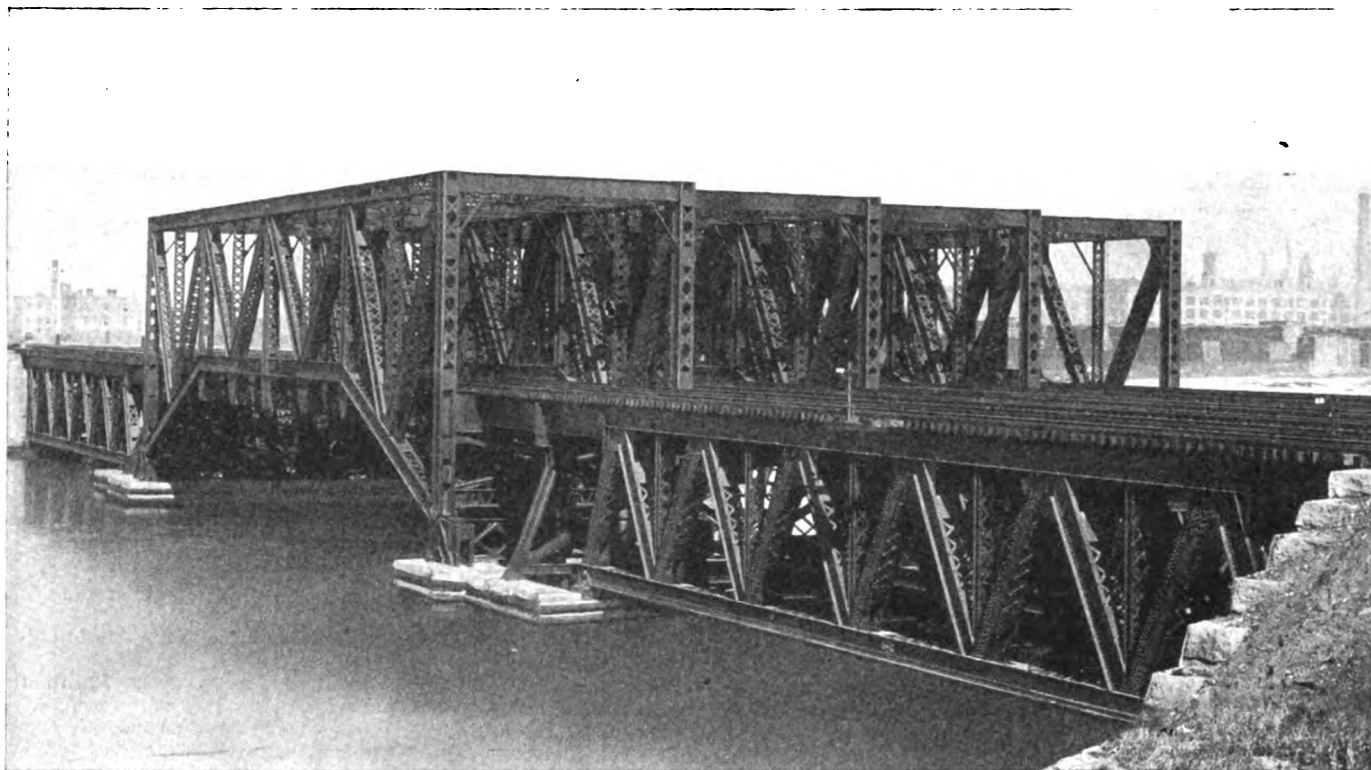


Fig. 2. Fixed Span Over Sanitary and Ship Canal Being Replaced by Eight-Track Scherzer Bridge.

phia, Pa. The bridge was built and placed in service in 1901. However, only those portions of the superstructure necessary to carry the moving loads when acting as a fixed span were erected at this time, and the structural parts and machinery required to make the bridge movable were to be furnished later when it was necessary to open the canal to navigation. Fig. 2 shows the bridge as first placed in service. The part constructed formed four three-hinged arch spans; when completed for operation as a movable bridge, each span was to be a double leaf rolling lift bridge.

When plans were made in 1908 to open the canal to navigation, it seemed advisable to abandon the original plan for the Campbell avenue bridge and substitute a single-leaf rolling lift bridge. The Scherzer company was contracted with by the Sanitary District for a new design, providing for four single-leaf, double-track Scherzer rolling lift bridges, placed side by side, the alternate bridges being supported at opposite ends to allow the minimum spacing between tracks.

Fig. 3 shows the plan of the bridge and Fig. 1 its location with reference to the canal and adjacent railway tracks.

The bridge crosses the canal on a skew, the intersection angle being about 68 deg. The span is 154 ft. center to center of bearings; width of each bridge, 29 ft. 1 in. center to center of trusses; clearance above Chicago datum, 16 ft.; and clear width of channel for navigation, 120 ft. The waterway is increased by an 89 foot channel under each approach span. These approach spans are the deck trusses which were placed when the first bridge was built.

The foundations as placed for the old bridge are used for the new with the exception that it was necessary to place concrete cylinders behind the piers to support the end of one of the track girders for each bridge. The length of roll of the new bridge is about 10 ft. greater than that of the old design, and in addition to this, the bearings were set back about 4 ft. on the pier, thus making the rear support of the girder about 14 ft. back of that for which the piers

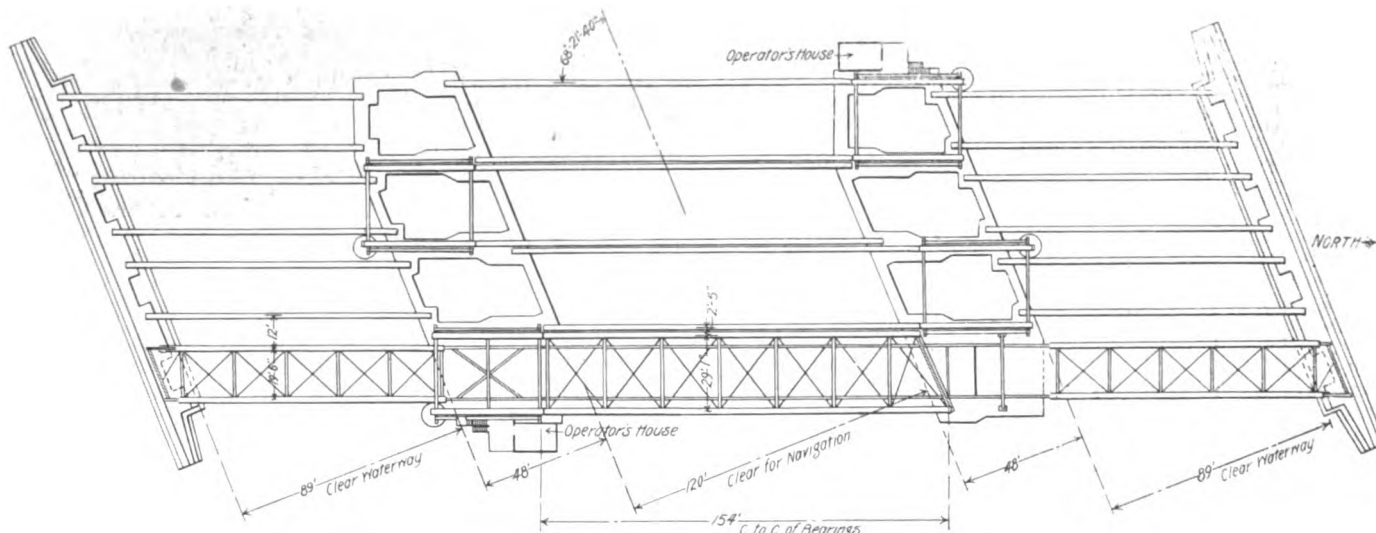
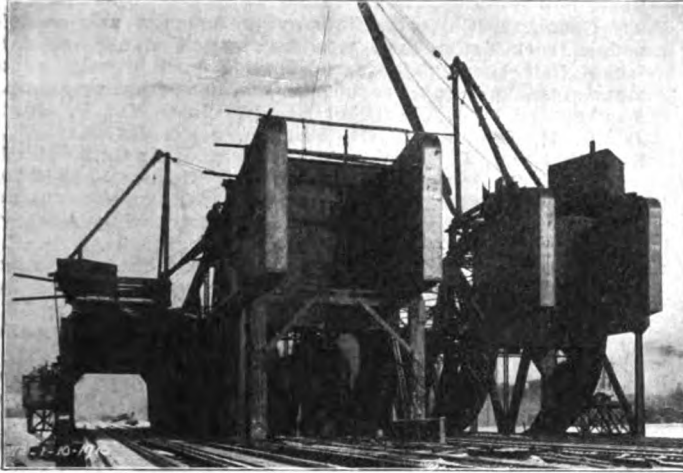


Fig. 3. Plan of Rolling Lift Bridge Over Sanitary and Ship Canal.

were designed. These cylinders are 9 ft. in diameter and were sunk to rock. They are made of a ½-in. steel shell filled with concrete, reinforced around its circumference by 1 ¼-in. square bars set vertically.

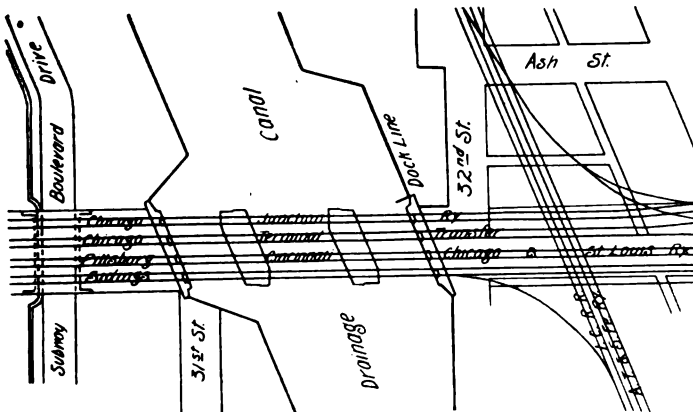
For in each truss the total rolling load is 852 tons, the track girder weighs 65 tons, the segmental girder 52 tons, and the structural steel 363 tons. The counter weight amounts to approximately 500 tons, which is made up of concrete, weighing 140 lbs. a cu. ft. in which pockets are pro-



The Scherzer Rolling Lift Bridge.

vided for adding pig iron for the final adjustment of balance.

The movements of the four bridges are to be controlled from two operator's houses, the two bridges supported on the south pier being operated from the south house, and the two on the north pier from the north house. Each leaf is operated by two, 50-h.-p. direct current motors from a series-parallel controller in the operator's house. The latch at the front of each leaf is operated by a 3 h.-p. motor. The control of each leaf is independently interlocked with the signals protecting the two tracks passing over it, so that



Layout of Scherzer Rolling Lift Bridge Over Sanitary and Ship Canal.

it is impossible for the operator to unlock the bridge until the signals have all been set. The operations of unlocking the bridge and of raising the leaf are also interlocked to prevent any attempt of the operator to raise the leaf before the bridge is unlocked. This interlocking is by contact switches operating in the closing circuits of the mill type contactors on the switchboard. Electric light indicators in both operator's houses show the positions of the bridge leaves and locks. Each motor is provided with a solenoid brake. Those on the end latches are automatically applied when the latch reaches the end of its stroke, and the cur-

rent is automatically cut out from the motor at the same time. The operating machinery for each leaf is provided with an emergency brake in addition to the solenoid motor brake. The emergency brake is controlled by a motor-operated mechanism, which allows it to be applied instantly at the will of the operator, or automatically when the current is cut off.

In replacing the old spans with the new movable spans, traffic was diverted from two tracks at a time, the other six being always open for operation. It was 62 days after diversion of traffic from an old span before traffic could be turned back on to the new bridge.

Figs. 4 and 1 show the progress that had been made up to February, 1910, in the erection. Three of the spans are in place and the erection of the fourth is under way.

The contract for the fabrication and erection of the structural steel was taken by the Chicago Bridge & Iron Works, Chicago, the complete electrical equipment was sublet to George P. Nichols & Bro., Chicago, and the erection to the Ketler-Elliott Erection Co., Chicago. The design was made by the Scherzer Rolling Lift Bridge Co., Chicago, Albert H. Scherzer, president and chief engineer, with the co-operation of the engineers of the Sanitary District of Chicago, C. R. Dart, bridge engineer, S. T. Smetters, assistant bridge engineer, and F. R. Williamson, assistant engineer in charge of construction. Ralph Modjeski represented the railway companies as consulting engineer and the chief engineer of each company also approved all plans.

LIST OF EXHIBITS.

The following is a complete list of all exhibits in place or being installed in the Coliseum yesterday (Monday) afternoon. The completeness was a compliment to the committee in charge.

- Adams & Westlake Company, Chicago.—Signal lamps, lanterns; railway specialties. Represented by W. H. Baldwin, G. L. Walters, H. G. Turney, A. S. Anderson, C. B. Carson, W. J. Pierson. Spaces 83 and 84.
- Adreon Manufacturing Company, St. Louis.—Clark tension set tie plate, Security rail brace and tie plate. Represented by E. L. Adreon, Jr. and Wm. Miller. Space 109.
- Advance Power Company, Chicago. Inspection car. Represented by Mr. Warner. Space 215.
- Alamo Manufacturing Company, Hillsdale, Mich.—Gasolene, gas, kerosene and distillate engines for railway service, pumping outfits, charging storage battery plants. Represented by L. A. Hopkins, J. L. Benedict, B. L. Winchell, Jr., R. A. Paterson, H. F. Worden, L. C. Thompson. Space 99.
- Alexander Crossing Company, Clinton, Ill.—Continuous-rail, non-pounding crossings. Represented by M. J. Hinchcliff, C. R. Wescott, I. N. Brown. Spaces 204-5-8-9.
- Allith Manufacturing Company, Chicago.—Approved fire-door; warehouse door; continuous parallel door; merchandise carrier. Represented by W. D. Jameson, W. C. Lang. Space 116.
- American Concrete Company, Chicago.—Reinforced concrete pipe, piling and girders. Represented by O. J. West, G. H. Scribner, Jr., O. P. Scribner, D. S. Edwards. Space 15.
- American Guard Rail Fastener Company, Philadelphia.—Anchor guard rail clamps, tie plate guard rail fasteners, Vaughan automatic rail anchors. Represented by D. F. Vaughan, Chas. Z. Vaughan. Space 118.
- American Hoist & Derrick Company, St. Paul, Minn.—Moving pictures, "American" railway ditcher, hoisting engines, etc. Represented by Frank J. Johnson, W. L. Manson, W. O. Washburn. Spaces 189, 190 and 191.
- American Locomotive Company and Atlantic Equipment Company, New York and Chicago.—Photographs, catalogues and pamphlets of steam shovels, locomotives, dredges, rotary snow plows and automobiles. Represented by John H. Wynne, Otis Parsons, Edwin M. Hall, A. M. Sheffer. Space 30.
- American Rail Joint Company, Toronto, Canada.—Reinforced angle bars. Represented by Tho. D. Beddoe. Space 194.
- American Railway Device Company, Chicago.—Track specialties, tool grinder attachment for handcars, anti-rail