TRUCK COST SYSTEM

DAILY RECORD. MONTH OF ______: HOURS IN WORKING DAY ______ FROM ______ TO ______ TRUCK NO. ______

OPERATING DATA

DATE	WEATHER	TEMPERATURE	NUMBER OF TRIPS	DELIVERY OR PICK-UP STOPS	TOTAL UNITS		MILES	TIME IN HOURS AND MINUTES							
								AVAILABLE BUT NOT USED		LOADING		RUNNING INCLUD. STOPS		LAID UP FOR REPAIRS	
					OUT	IN		HRS.	MIN.	HRS.	MIN.	HRS.	MIN.	HRS.	MIN.
1															
2															
3															

COST DATA

DATE	GASOLINE OR CURRENT		CYLINDER OIL		DRIVER COST	HELPER COST	COST OF REPAIRS				SUBSTITUTE VEHICLE RENTAL
							ORDINARY			ACCIDENT	
	GALS. OR K.W.H.	COST	PINTS	COST			MATERIAL CHASSIS	LABOR CHASSIS	LABOR AND MATERIAL BODY	BODY AND CHASSIS	
1											
2											
3											

FIG. 6—FORM FOR TRUCK PERFORMANCE AND COST DATA

Good concrete cannot be made when the customer wants a very wet mix, and the contact engineer therefore tries to help the contractor to work out a placing scheme that makes for quick truck getaway, and to educate him to the use of the drier, plastic and yet more workable concrete. Winter operation of the plant is being prepared for by completely inclosing the structure, and by the installation of a boiler to heat the water. It is expected that considerable educational work will be necessary to get the contractors to protect properly the concrete delivered to them during the winter season, and definite recommendations have been drawn up covering various probable conditions.

To know what kind of concrete is being produced a large number of tests were made. A set of six standard 6x12-in. specimens is made several times a week on the job by a local testing organization. Three of these are tested at 28 days and the other three at some other period ranging from one day to one year. These tests are made available to the customer and to the city. When concrete is delivered to projects in Boston, a form must be made out and sent in to the city building department. A weekly report must also be made giving the totals for the current week. This is not the only check the city has on the ready-mixed concrete plants, as the material weighers at the plants are really city inspectors, since they have to be approved by the building commissioner.

Merchandising Practices

The ready-mixed concrete plant has a problem not usually met with in ordinary construction, since it must produce in each batch a definite quantity of concrete. This is necessary so as not to give either more or less than the customer is charged for. The quantities for the batches were determined on the basis of the absolute volumes of the materials and numerous checks have shown that the actual delivered yardage per batch agrees well with the theoretical quantity. A 1-cu.yd. open cylinder is used for checking the volume produced. When there is any question, this cylinder is taken to the job and loads are checked there in the presence of the contractor. The usual cause of controversy in regard to quantity is due to the contractor neglecting to measure the forms with the concrete in place and thus including the increased volume resulting from the give of the forms.

The concrete is sold only through members of the organization and not direct to the consumer. The material dealers receive approximately 50c. per yard commission for their sales. An extra charge is made for admixtures equal to the cost of material and labor. It is planned to charge an extra 50c. a yard for the heated concrete supplied during cold weather. At present there is no limit specified for the length of the haul, but an extra charge at the rate of $4.50 per hour is made for delays on the job caused by the customer where the time exceeds 20 minutes.

The maximum daily output of the plant has been 523 cu.yd. and the average is 350 cu.yd. for an average working day of eleven hours. The plant manager is Myron A. Howe, with the Thompson & Lichner Co., Inc., of Boston, retained as consulting engineers to advise on problems of operation, quality control and investigations.

Concrete-Arch Mississippi Bridge at Minneapolis

Third of Type—Two-Rib Arches With Spandrel Walls Across Ribs—Curved Approach Spans—Built by Day Labor

TWO reinforced-concrete rib-arch spans of 265½ ft. in the clear form the channel portion of the new Cedar Ave. bridge across the Mississippi River at Minneapolis, Minn. They have a rise of 90.5 ft., with the crown about 110 ft. above low water. This is the third city bridge of this type over the river at Minneapolis, and like the first one, at Third Ave. South, it is partly on curves, although this was done for location purposes in the new bridge and not on account of foundation conditions, as in its predecessor. The two main spans are on a tangent of 611 ft., crossing the river on the skew. Three flanking arch spans on the west side and two on the east side are of 93-ft. span and are on curves of 5 deg. 41 min. and 5 deg. 18 min. respectively. The general design of the bridge is shown in Fig. 2.

All the arch spans have two ribs 12 ft. wide and 24 ft. apart in the clear, with a thickness for the main spans of 3.5 ft. at the crown and 7.5 ft. at the haunches. A three-center radius of 154 and 48.5 ft. is used for the intrados, and a single radius of 167.5 ft. for the extrados. Each rib of the main spans is reinforced with five steel ribs 31½ in. deep at the crown, having the chords composed of pairs of angles 3½x3½x⅜ in., with smaller angles for the web members. In the 93-ft. spans, each rib is reinforced with sixteen longitudinal bars at top and bottom, tied together with loop bars 4 ft. apart. Footings for the three river piers are 30x54 ft. At the east and center piers they rest on the sandstone bedrock at 11½ ft. and 22½ ft. below low water, while the west pier footings are supported on 180 piles 32 to 42 ft. long, driven in gravel formation and spaced 3 ft. c. to c. in both directions.

Transverse spandrel walls practically the full width of the arch ribs, and spaced 13 ft. 4½ in. c. to c. in the main spans and 12 ft. in the flanking spans, have cantilever brackets for the sidewalls and carry pairs of transverse 24-in. I-beams which support the 12-in. reinforced-concrete deck slabs. This construction is shown in Fig. 1. At the middle of the 40-ft. roadway this slab is dropped 4 in. for a width of 19 ft. to provide for a future double-track car line, as shown in Fig. 1, but no tracks have

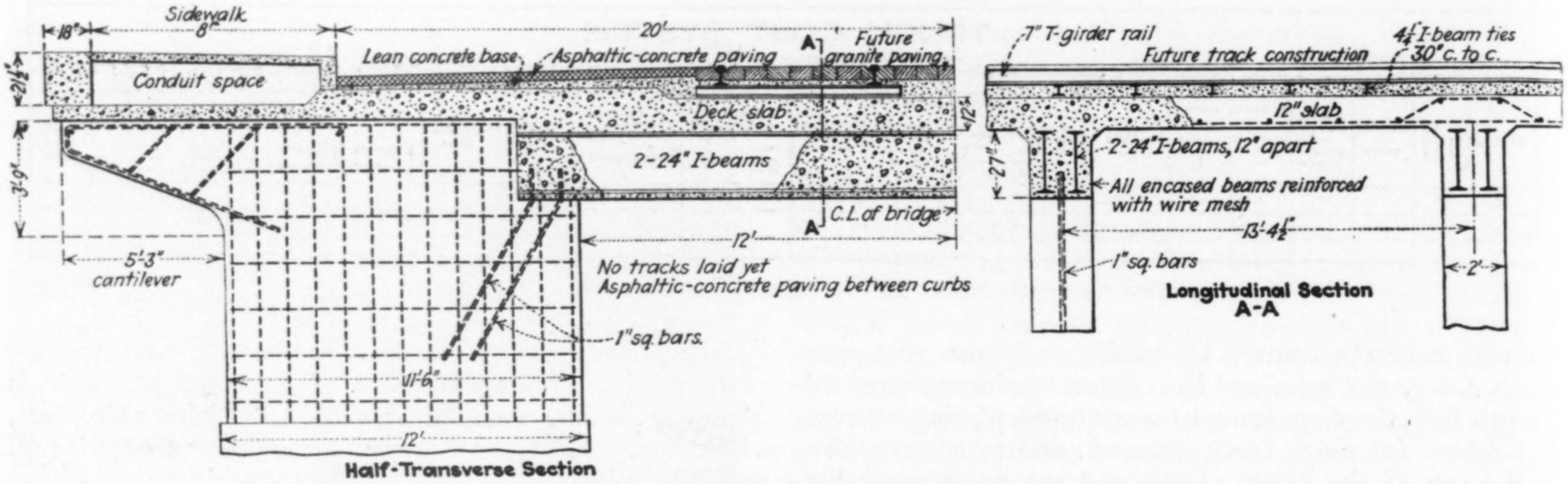


FIG. 1—CROSS-SECTION OF ARCH SPANS

been laid as yet. A filling of lean concrete supports the paving, which is of asphaltic concrete for the full width of roadway. Creosoted woodblock paving was proposed at first, the change being made on account of the tendency of the blocks to swell and heave in wet weather.

The paving details shown in section in Fig. 1 are those proposed to be used when the streetcar tracks are added to the bridge. The lean concrete fill makes it possible to add the tracks at a minimum of expense.

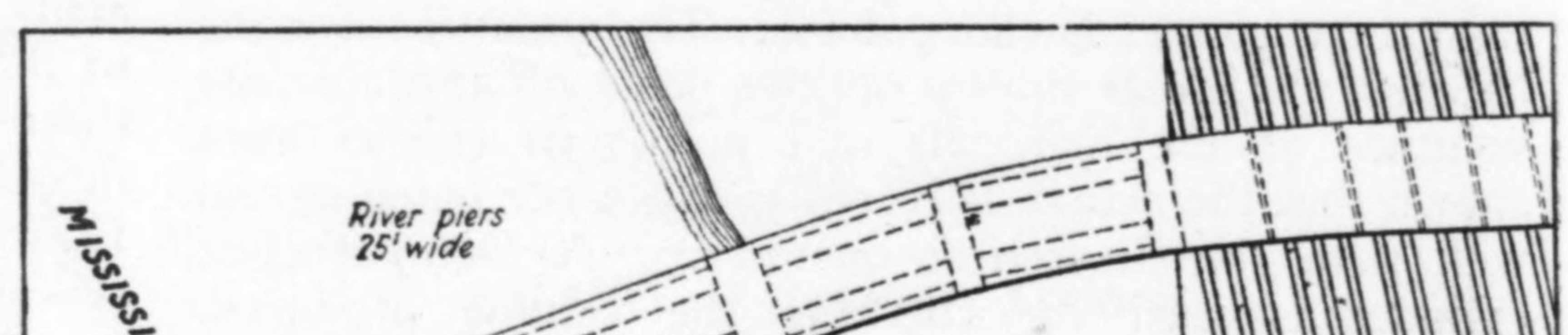
For each sidewalk a 6-in. deck slab over the spandrel columns carries a curb at the roadway and a heavy concrete beam 18x21½ ft. at the outer edge. Between the sidewalk slab and the deck slab is a space for gas mains and electric utility conduits, with a separate compartment for the city's electric conduits. Upon the outer beam is the concrete railing. Except for the rubbing of this railing to a smooth finish no special treatment was given to the exposed concrete surfaces for the sake of appearance.

Viaduct approaches on each side consist of concrete bents supporting closely spaced I-beams upon which is a 5-in. concrete deck slab. On the east approach there are ten spans of 25 to 46 ft. The west approach is somewhat longer and is complicated by skew spans and bents where the viaduct crosses a street intersection. From the west side there is a grade of 0.3 per cent on the approach fill and 0.75 per cent on the viaduct and flanking spans, beyond which the roadway has a grade of 0.75 per cent to the east end.

The two streets connected are not in a continuous line. From Washington Square, on the east side, at the junction of Cedar Ave., Washington Ave. South and Fifteenth Ave. South, the west approach is an extension of this last street for about 1,200 ft. A fill between concrete retaining walls forms the first half, beyond which is the viaduct construction already described. Then the three 93-ft. arch spans are on a curve of 5 deg. 41 min. to the north, with the two 265½-ft. spans on a tangent, followed by a curve of 5 deg. 18 min. to the south, which includes the two 93-ft. arch spans and the end spans of the 350-ft. girder viaduct of the east approach. Beyond this the viaduct and the 350-ft. fill form an extension of Tenth Ave. Southeast. This location and alignment was adopted in order to avoid the plant of the Minneapolis Gas Co. on the west side of the Mississippi River.

The Cedar Ave. bridge was designed by K. Oustad, city bridge engineer, and Frederick T. Paul, assistant bridge engineer, under the direction of N. W. Elsberg, city engineer. It was built by day labor under the supervision of Mr. Paul, as was the case with the two other city bridges already mentioned. It was completed Sept. 1, 1929, at a cost of about $1,260,000 provided by bonds.

Descriptions of the other concrete arches over the Mississippi River at this point were published in *Engineering News-Record* Jan. 25, 1923, p. 148; Nov. 4, 1926, p. 732; and Nov. 10, 1927, p. 754.



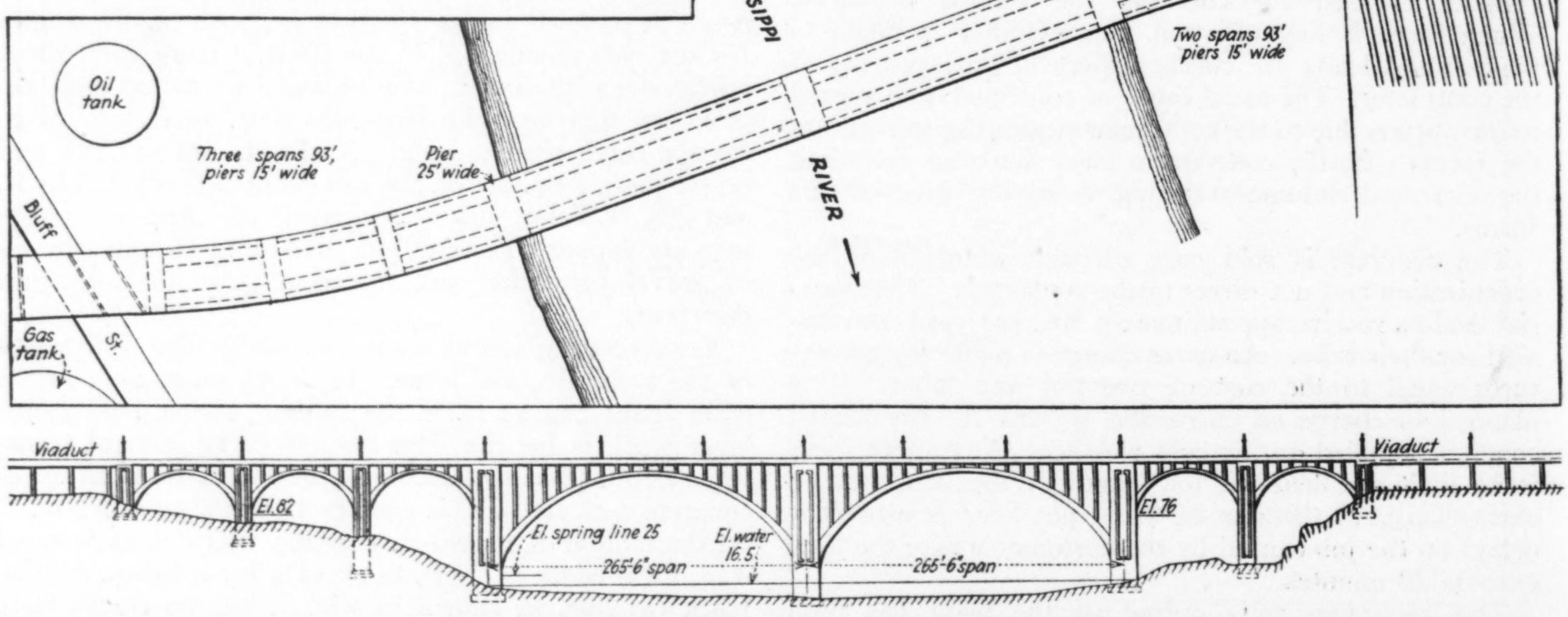


FIG. 2—CEDAR AVE. BRIDGE, MINNEAPOLIS, MINN.