Derricks Do the Job on Memphis Bridge

CANTILEVER ERECTION of the four lane highway bridge over the Mississippi River at Memphis, Tenn. is notable in two respects—a minimum number of erection bents and an erection schedule requiring six derrick setups on the floor steel.

As shown in the accompanying drawing, only two erection bents are needed to span the river—at L27 and L44. Design plans contemplated placing the erection bents at L23 and L40, and cantilevering on over to Piers 3 and 2, respectively. This method, however, would have been slower than the one adopted. By placing the bents at L27 and L44, the contractor is combining cantilver and "balanced" erection to expedite the job.

Three derricks—A, B, and C—are erecting the five-spans (2,825 ft.) of cantilevered trusses, assisted by one derrickboat mounting a stiffleg derrick with 116-ft. boom. The top derricks are identical—120 ft. mast, 110-ft. boom and 40-ton capacity. They operate as travelers on the floor steel, with tie-backs to the top chords.

DERRICKBOATS AND TRAVELERS speed erection of new highway bridge over the Mississippi.

Simple spans on conventional bents

Erection of the seven truss spans was started at Pier 7. Spans 6 and 7—each a 12-panel 431-ft. simple span—were erected in conventional manner on steel bents placed at the second, fourth and eighth panel points.

Span 5 was erected in similar manner, by Derrick A. With the completed Span 5 serving as an anchor, Derrick A continued on past Pier 4, cantilevering 402-ft. to L23—the closure point for Span 4.

In the meantime, two derrickboats had erected the bent at L27, and had set up Derrick B on two panels of floor steel between bent and pier. During its initial truss erection, this derrick operated as a guy derrick. It was guyed to Pier 2, to the erection bent and to outriggers on the floorbeam over Pier 3. Later, the guys were removed and the mast backstayed to top chords of the trusses.

First closure at L23

Derrick B erected back to L23 and made the closure at that point. Derrick C was set up at L31 and erected balancing steel to L33. In the meantime, Derrick A was dismantled and re-erected at the Memphis abutment (L78). It erected span 1—on land-based bents—and will continue on past Pier 1, cantilevering 395-ft. to L57, the point of final closure.

Derrick B was dismantled after making the closure in Span 4. It will be moved ahead to Pier 2 and will erect balanced steel back to L40. Derrick C will continue on past L33, erecting steel to L40—the closure point in Span 3. Then Derrick C will be moved ahead to Pier 2 and will erect balancing steel to L50 and, after closure of Span 3, it will continue erection to final closure of the bridge at L57.

Travelers set-up by derrickboats

The derrick set-ups at Pier 5 and at the Memphis abutment were made by crawler cranes. The other four set-ups, as well as all six derrick-dismantlings will be made by one of the derrickboats. The derrickboats also assist the travelers in erecting the steel, which arrives by barge.

Hoisting and swinging power for the top derricks—when operating as guy derricks—is furnished by hoist-barge anchored beneath the bridge. It is equipped with two special three-drum hoists, each with a 20,000-lb. line pull.

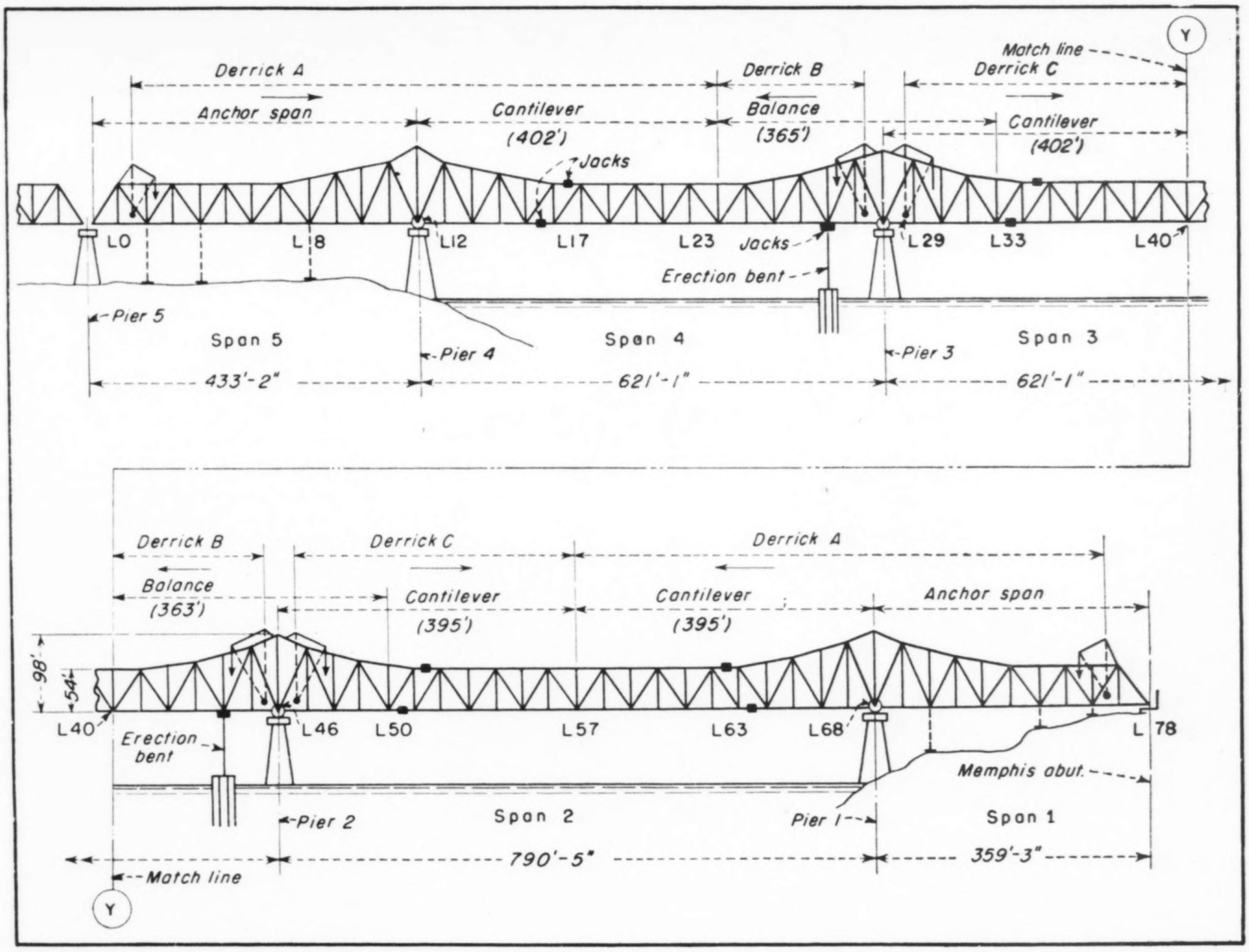
Swinging power for the travelers is supplied by a light-weight air-hoist which follows close behind the derricks as they extend their cantilevered and balanced erection. Hoisting and booming power, however, is delivered by gasoline-driven hoists anchored off the cantilvers, on previously erected steel. This saves weight on the cantilever and reduces erection hazards.

Sixteen 500-ton hydraulic jacks were built especially for the job to make truss closures. For closing Span 4 at L23, special jacking members, containing two jacks each, were erected in truss members U17-U18 and L16-L17. One jack also was placed beneath each truss, on top of the erection bent.

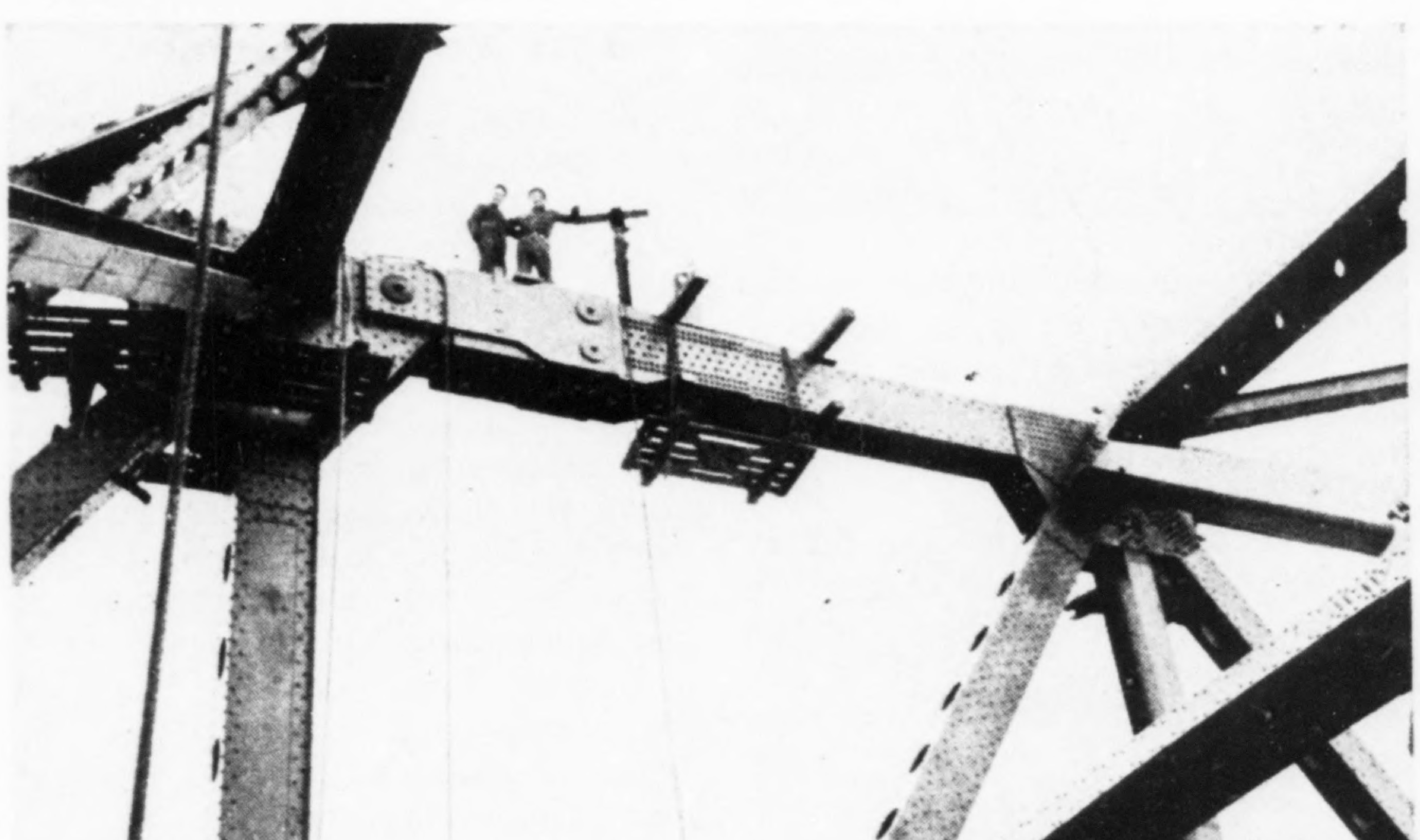
Close Span 2 with 16 jacks

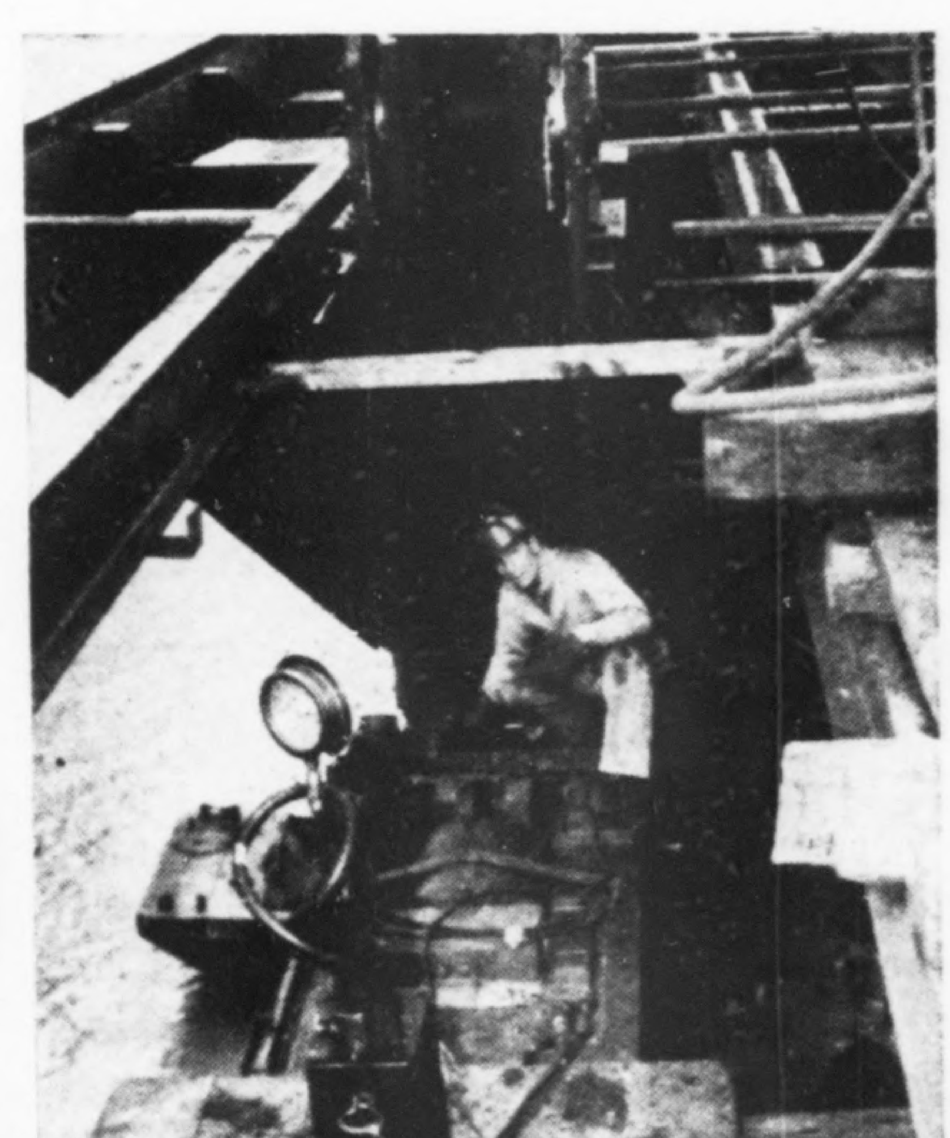
The first two sets of jacking assemblies permitted both vertical and horizontal movement of the cantilevered trusses at panel point 23. The jacks on top of the bent permitted vertical adjustment of the cantilevered portion of the "balanced" erection over Pier 3.

Span 3 will be closed in similar

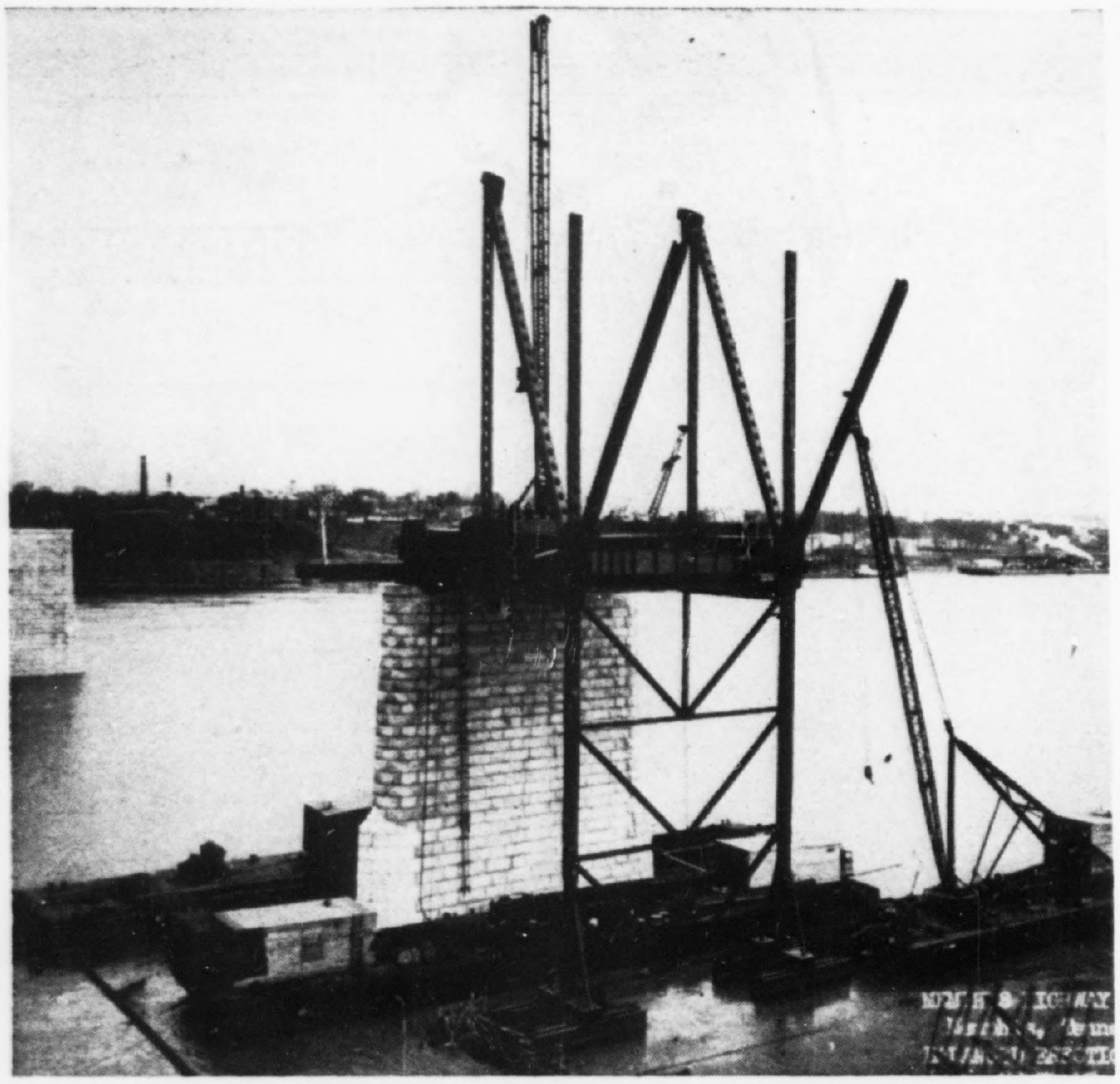


ONLY TWO ERECTION BENTS are needed to span the river channel of the Mississippi. Three traveling derricks are set up, moved ahead, and dismantled as necessary to keep the job on schedule. Truss closures are at panel points 23, 40 and 57.





TRUSS-CLOSURES for Span 4 were made by 500-ton hydraulic jacks in top-chord members U17-U18 (at left) and in bottom-chord members L16-L17 (at right).



ERECTION BENT at Pier 3 was supported on steel grillages which capped long H-piles driven into the riverbed. Derrickboats erected the bent, two panels of floor steel and set up a guy derrick for erecting trusses by "balancing" over pier and bent.

manner, with the jacks in truss members U34-U35 and L33-L34. All 16 jacks will be used to close Span 2. Two will be placed in each member U51-U-52, L50-L51, U62-U63 and L63-L54, in both trusses.

All truss members in which the jacking assemblies are placed, carry zero stress in the completed bridge since trusses between U17-U24, U34-U41 and U51-U63 are, in reality, suspended spans between cantilever arms. Jacking assemblies are replaced with permanent truss members after truss closures have been completed.

The two erection bents in the river are required to withstand high water, swift current, drift, and wind, in addition to the erection stresses. Consequently, they are well braced. Each bent is made up of a bolted steel frame, with steel-beam grillages supported on 32 H-piles driven into the riverbed. The piling was driven through a steel cage which also was anchored with long H-piles to give added stability.

Four-lane divided roadway

The completed bridge will carry two 24-ft. roadways separated by a 3-ft. concrete raised median. There will be a sidewalk along each side of the bridge—5-ft. wide on Spans 1 to 7, inclusive, carried on brackets outside of the trusses. Sidewalk width for the remainder of the bridge will be 6 ft.

Conventional reinforced concrete roadway and sidewalk slabs will be placed on Span 1 to give the required dead load weight in this anchor span for Span 2.

Roadway and sidewalk slabs on the four other cantilever spans, however, will be concrete-filled steel-grid flooring, to reduce dead-load weight. The grid flooring will be welded to its supporting stringers.

The entire bridge is just 60 ft. short of being a mile in length. In addition to the five cantilever and two 431-ft. through truss spans there are: two 175-ft. steel deck-truss spans Nos. 8 and 9; eight 85-ft. deck-plate girder spans; and 480 ft. of reinforced concrete deck-girder spans terminating at the abutment on the Arkansas side of the river.

Contractors on the project

Harris Structural Steel Co. holds a $4,606,000 contract for erecting the five cantilever spans and the two 431-ft. simple truss spans, complete with the concrete and steel deck. Total structural steel in this 3,685-ft. of bridge is 25,300,000 lb. E. L. Guerber is resident engineer for the Harris Structural Steel Co., and R. H. Smith, erection superintendent.

Merritt-Chapman & Scott Corp. built the Memphis abutment and seven main river piers under a $4,333,-000 contract, between July 1945 and July 1947. They later built the Arkansas abutment, 9 concrete piers and footings for 15 others, under a $487,-000 contract.

W. L. Sharpe, of Memphis, completed the 15 piers and constructed 15 reinforced concrete girder spans for $386,000. His construction superintendent on the job was Lester Talbot.

Virginia Bridge Co., Roanoke, Va., truss spans adjoining Harris' contract holds a contract for two 175-ft. deck- and eight 85-ft. span steel deck girder spans, complete with concrete deck. This $623,000 contract was started in December, 1948, and has 330 calendar days for completion. Harry Perfater is construction superintendent.

Modjeski and Masters, consulting engineers, prepared the design plans for the new Memphis bridge and are furnishing inspection on construction. O. F. Sorgenfrei is resident engineer. The bridge is a joint project between the Bureau of Public Roads, Arkansas and Tennessee, with both Shelby County (Tenn.) and Memphis participating in the cost.

Municipal Employees Rate Wages As Top Factor

Economic considerations ranked first among factors considered most essential to harmonious employee-employer relations by municipal employees of Tyler, Tex.

A nineteen-item checklist of considerations essential to good work relations was submitted to the city's 350 employees, who were asked to check ten items in order of their importance for job satisfaction. Of the top factors listed, six were non-material and four were economic incentives.

Results of the poll were tabulated by departments, by age groups, by tenure of office, and then recapitulated into a composite picture.

The ten top factors in preference order were: wages; retirement system, with city sharing cost; vacation and sick leave privileges; job security; co-operation of fellow employees; group life and hospital insurance, city sharing cost; equal opportunity for promotion; opportunity to learn and understand job of whole department; good working conditions; and reward or credit for work well done.

Piers Sunk by Open-Well Dredging For Mississippi River Bridge at Memphis

Contents in Brief—*Main piers in the Mississippi River for a highway bridge at Memphis, Tenn. were sunk by open-well dredging but cleaned out and sealed under pressure of about 43 psi. Willow mats were used at piers in the main channel and caissons were sunk through them. Piers on sloping banks were started on leveled fill inside sheet pile cofferdams while piers on the Arkansas flood plain were worked entirely in the open and sealed without de-watering. Sheetpiles served as part of the cofferdam walls and were withdrawn after masonry of the piers had been built up.*

FOUR of the deep piers for the new highway bridge at Memphis, Tenn., were sunk to as much as 100-ft. below low water by open dredging in sticky clay that had to be broken up by water jets at 400 psi. before it could be removed. After the piers were near final elevation, air at about 43 psi. was put on the pier structures; they were then cleaned out and the foundations poured as pneumatic caissons. Three other piers founded at shallower depths were worked entirely as open caissons with tremie-poured seals.

The present bridge is the third to cross the Mississippi River at Memphis and is the first structure for highway use only. In 1891-94 what is now the Frisco Lines (St.L. & S.F.) built a bridge at the site that for a time carried wagon traffic on a decked roadway on the tracks. In 1912-1915 several railroads combined to build the double-track Harahan Bridge, which accommodates highway traffic with 14-ft. lane roadways cantilevered outside each of the trusses. The two bridges still are in use, but more adequate highway facilities have long been necessary.

The new structure is 200-ft. downstream from the old Frisco Bridge and 400-ft. from the Harahan Bridge. Its piers were placed in line with those of the earlier structures to meet a navigation requirement that all be in line, hence the three main spans of the new structure are the same length as those of the other bridges.

From the Memphis side of the river and extending to Pier V, Fig. 2, the superstructure is a cantilever design supported over four intermediate piers across the main channel. The maximum span is 790-ft., which includes a 431-ft. suspended truss, while two spans are 621-ft., one anchor arm is 431-ft. and one is 360-ft. Beyond Pier V, but not shown in the sketch are two additional 431-ft. simple truss spans, which are identical with the suspended span of the cantilever. Over the flood plain on the Arkansas shore the bridge had to be designed to fit a plan of the Mississippi River Flood Control Commission for a 40-ft. deep, 1,000-ft.

Fig. 1. Piers for the highway bridge at Memphis line up with those of the Frisco Bridge, center, built 1891-1899, and the Harahan Bridge, at left, finished in 1915, which now carries the highway traffic on narrow roadways outside the trusses.

wide channel enlargement at the bridge site proposed for immediate construction. The enlargement will require extensive alteration of the approach structures of the existing bridges to provide suitable foundations and longer spans.

The new bridge is being built jointly by the Arkansas and Tennessee highway departments and the Public Roads Administration as a free crossing under authority granted the Memphis—Arkansas Bridge Commission. Design and supervision of construction are being handled by Modjeski & Masters, consulting engineers, Harrisburg, Pa. Members of this firm have had a prominent part in building all three of the bridges at the site: Ralph Modjeski was chief draftsman for George S. Morison, who designed the Frisco Bridge, and in 1913 Modjeski was commissioned to design and supervise the Harahan Bridge. He was represented on the work by F. M. Masters who later became a partner and is now the principal of the firm.

Contract for the substructure is held by Merritt-Chapman & Scott Corp., which is making excellent progress and probably will have all work completed to above high water before floods can normally be expected this spring. Unless exceptionally high water or some unforeseeable circumstance intervenes, the main foundations will be finished by early spring, some six months ahead of contract date.

Open dredging and air combined

The seven principal piers were constructed by three distinct methods following suggestions on the design plan, which were adopted and developed by the engineering department of the contractor. Piers II and III, in the main channel of the river, were started as floating caissons and submerged to rest on willow mattresses. By open dredging through wells in the caisson, they were sunk to a suitable clay foundation after which they were cleaned out and completed by pneumatic methods.

Piers I and IV, on sloping banks on each side of the river, were protected in sheetpile cofferdams in which the caisson was started on a sand fill and sunk similarly to the river units. Piers V, VI, and VII, on the flood plain on the Arkansas side, were constructed by setting cutting edges on the natural ground, building up and dredging out to sink the piers by open-dredged caisson methods without use of air. An abutment on the Tennessee side, high above flood water, is on piles.

For Piers II and III in the river and to protect the sloping river side of Pier I, large "mattresses" were woven from willows, weighted with stones and sunk to the river bed to prevent scour. The mattresses, (Fig. 2 and 3), were fabricated from barges moored at the site by tying the willows with wire and attaching them to 36-in. dia. headers, made of 4 to 6-in. willow poles, to which anchor cables are attached.

After a mat was completed men walked over it to deposit 25 to 75 lb. stones on the mat until it was almost ready to submerge. When it was desired to sink the mat, crews working from barges dumped additional stones on it, working upstream and over the entire mat until it was all under water except the upstream edge where it was tied to barges for buoyancy.

Permanent anchor cables for the mattresses were run under the barges to submerged anchors upstream. At a signal, ropes attaching the upstream edge to the barges were cut simultaneously and the loaded mats submerged. Specifications required that the 250 x 320-ft. mats be within 15-ft. of plan location and all were held well within that limitation by careful planning of the anchor location and cable arrangements. (It will be noted from locations shown on Fig. 2 that diffi-

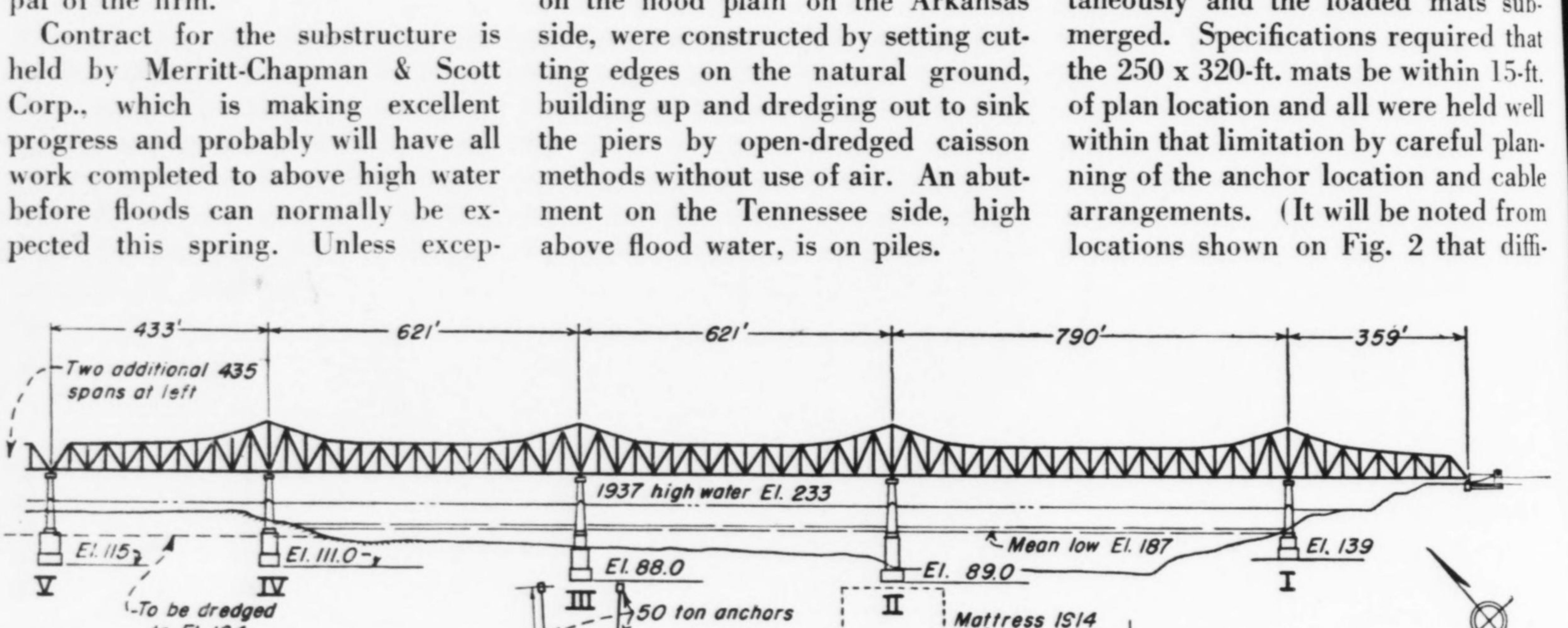


Fig. 2. Elevation and site layout for new Memphis bridge. Piers are founded on firm clay foundation after being sunk through sandy silt and clay. Mattresses are used around the piers to prevent wash. Some of the protection mats from the 1893 work were encountered but those at Pier II of the earlier bridges, where the channel has been cut deeply by water action, were not found.

culty was experienced with positioning the mats for the Frisco Bridge.) After sinking, the mattresses were loaded with 2 ft. of 50 to 250 lb. stones to prevent wash of silt up through the willows and possible subsequent loss of the mats.

Cofferdam built on caisson

The cutting edge and bottom section of the caissons—94 x 44 ft. for Pier II and 94 x 38 ft. for Pier III—were assembled on skids along the shore with fourteen 8-ft. dia. dredging wells formed in them. Welded watertight, the bottom 20-ft. of Pier III and 26-ft. of Pier II were launched as a vessel.

While the caisson was floating a cofferdam was built up to above expected high water level. Around heavily braced welded structural rings I-beams were set vertically at 3 ft. centers and covered with 3-in. T & G timbers laid horizontally and framed tightly together. Over this, a tar impregnated reinforced paper, painted with a bituminous material and protected by 1 x 8 in. shiplap made an almost watertight structure. Dredging wells were extended upward the full height of this cofferdam as air-tight 8-ft. dia. steel shells that later were capped or utilized for air locks when the caisson was put under air.

Meanwhile, work platforms 115 ft. long by 24 ft. wide were built at Piers II and III between the Frisco Bridge and the location of the corresponding pier of the new bridge. Water depth at Pier II was such that piles for support of the platform had to be 110 to 140 ft. long, so 18 in. pipe piles were used, driven open and not filled for the temporary use contemplated. Wood piles were adequate in the higher ground at Pier III. The work platform itself served as a stiffening frame for the piles and as an accurate pile guide for driving. The rigidly framed 16-ft. deep platforms were built on a barge, and then set in the water and moored at the required location. Piles were set through prepared "wells" and driven, after which the platform was raised on the piles to above expected high water and fastened at this level.

Four 50-ton blocks of concrete were set as anchors 1,000 ft. upstream and two 25-ton anchors on each of four lines were used at the sides to control lateral movement of the floating caisson, Fig. 2. Hoists located on the work platform were arranged to supply a pull through 4-part blocks on the anchor lines.

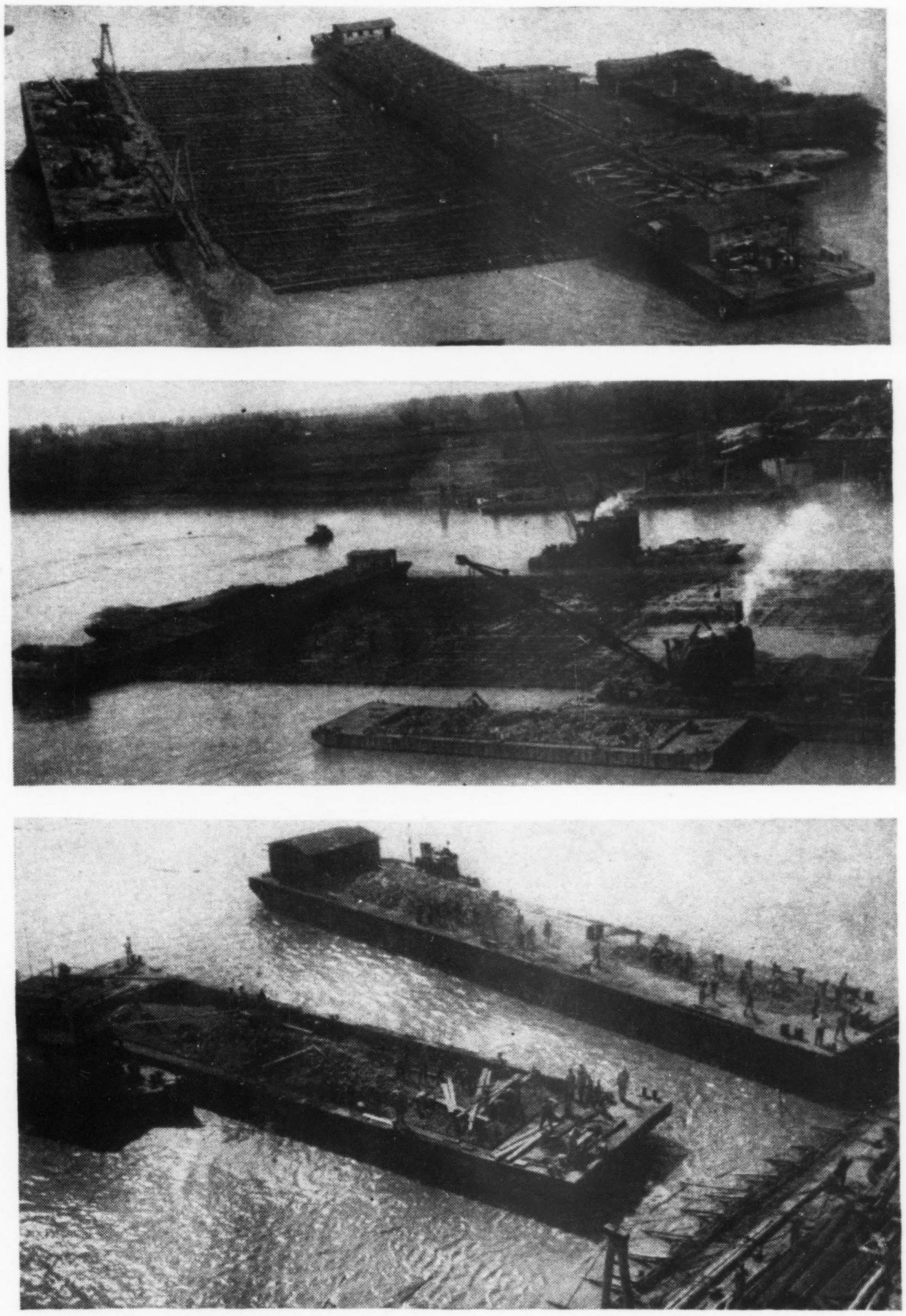


Fig. 3. Mattresses were woven at the site from willow poles tied together with wires. When completed, the mattress was loaded uniformly with stones. When the time came to submerge the mattress, barges moved over it as workmen spread additional stone until only its upstream edge was above water. With permanent anchor lines under the holding barge the manila lines to the mattress were cut simultaneously to allow it to sink.

Concrete was poured into the floating caisson to submerge it to the maximum water depth available and a tug moved the caisson into position where connections to the anchor lines were made and the unit positioned exactly. Further load was put on the caisson by adding concrete to force it to settle solidly on the mattress.

A long 36-in. beam with one end beveled to a knife edge was used to cut through the mat around the box, and dredging was carried on through ten of the 8-ft. dia. wells. The other four well-openings were reserved for equipment necessary for air work. Three conventional material locks were used, while the single man-lock had two chambers for entering and leaving, with an elevator to eliminate the 125-ft. climb out of the caisson.

Successfully dredging with clamshell or orangepeel buckets handled by floating full-revolving derricks is credited by the contractors with being the idea that gave them an edge in the bidding and with keeping the job on a rapid schedule with a minimum of labor. Piers for both of the earlier bridges were sunk entirely by hand excavation in pneumatic caissons as were many of the other piers that have reached good bearing along the lower Mississippi.

Starting to dig with the buckets is slow, tedious work, but once the sandy clay starts to shear and move under the cutting edge, excavation is reasonably rapid. Water at 400 psi. pressure delivered through a 1¼-in. nozzle on the end of a 4-in. dia. pipe was used through the dredging wells to break up the sticky clay and speed the digging.

Caps over the several well openings were designed to be used—and were used—to control the rate of sinking and position of the caisson. By closing the wells at one end or one side of the caisson and introducing a small amount of air pressure while digging the other side, the box could be tilted or even moved horizontally with little difficulty. But only experience in similar soil can be used as a guide to just what to expect from such manipulation.

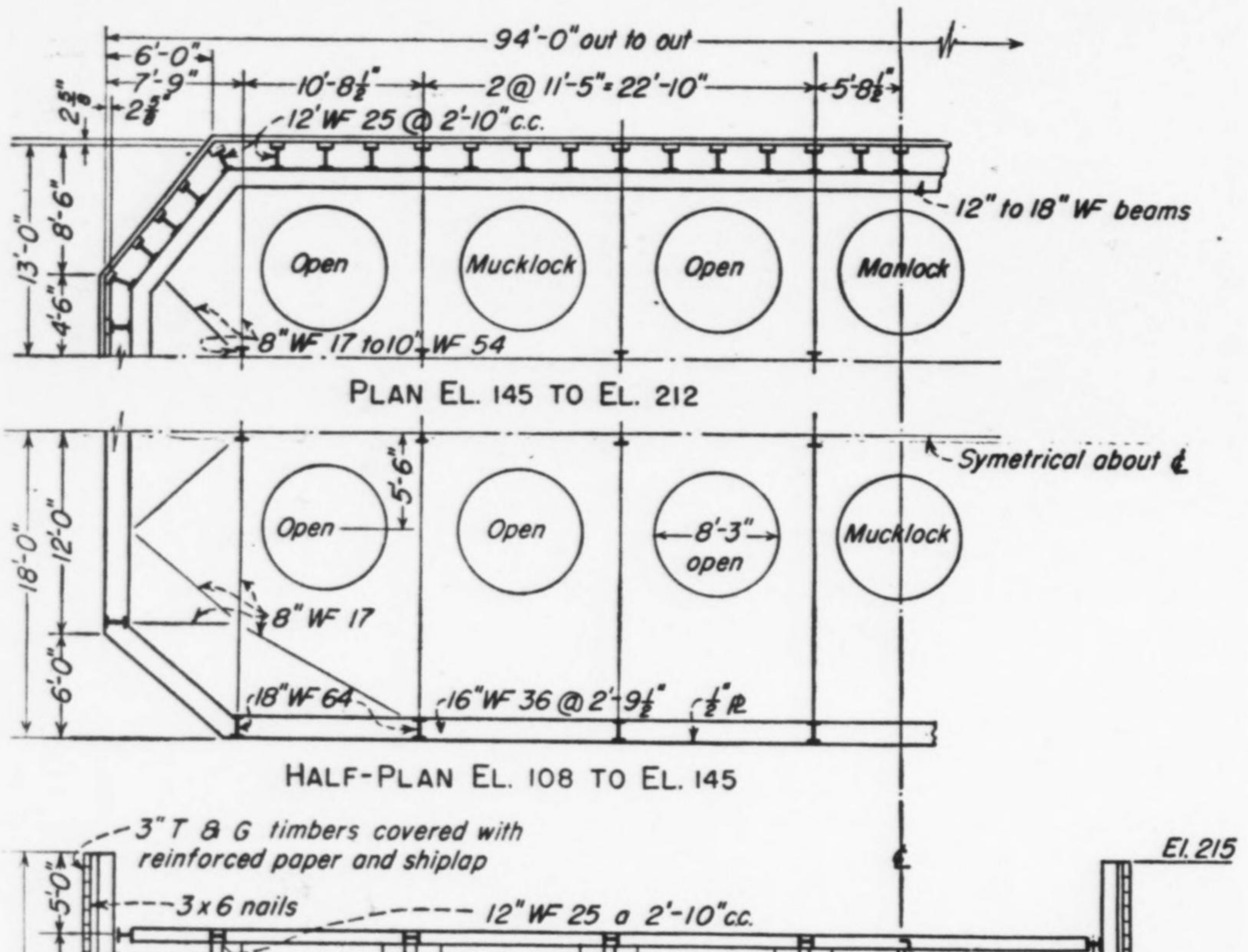


Fig. 4. Cutting edge and caisson for Pier III. The cofferdam section above El. 173 was removed after the pier was completed to above its top.

Air up to 43 psi.

Concrete was poured inside the caisson to provide the weight required to sink it as excavation proceeded. When the caisson reached the good strata of clay on which it rests permanently, the open dredging was stopped and domes put over the wells to permit completion as a pneumatic caisson. At the depth of about 100 ft. below low water, at which the caissons were founded, pressures of about 43 psi. were necessary. Under this pressure the sandhogs worked 1-hr., required 40-min. decompression time and returned after 4-hr. for a second 1-hr. trick in the work shift. Pneumatic-operated clay spades were used to cut up the clay, which was loaded by hand into small muck buckets for hoisting to the surface where it was dumped into the river.

After the bottom of the caisson was cleaned and leveled, concrete was placed through the materials locks to fill the work chamber and a little way up in to the dredging wells. The shafts of the wells are left open permanently. After the seal concrete hardened, the 8 ft. 3 in. dia. steel shafts used inside the pier caisson for material and worker access were removed to the level of previously placed concrete at about El. 173.0.

Next operation was to pour a "distribution block" over the caisson top to support the granite faced pier. This 7.5-ft. thick block was designed for placing exactly on plan alignment and elevation, correcting any deviation in location of the caissons. However, all piers are almost exactly vertical and are well within the 6 to 9 in. horizontal tolerance allowed.

Facing used as a form

Granite was set as a face form, and concrete placed inside it in two-course lifts of 5 to 6 ft. of height. As the concrete rose, the vertical beams of the cofferdam were blocked with wood against the pier, and rings of steel bracing removed successively from the bottom. When the pier was completed to above high water the bottom of the vertical columns of the cofferdam were cut loose from bolts that held them to the caisson, and thus were salvaged in large panels.

Piers on sloping bank

Cutting edges for Piers I and IV, on sloping banks on opposite sides of the river, were set up in sinking location inside a sand-filled single-line sheetpile cofferdam that served as protection against high water. Water tightness of the cofferdam was not required.

The 20-ft. high caisson and cutting edge was built up in place, again with open dredging wells, and excavation carried on in the same way as for piers II and III though not to as great a depth. These piers also were completed as pneumatic caissons with the final cleaning and concreting work done in the dry.

An innovation was used here in providing protection for masonry work required to some distance below the low water line. Sheetpiles were used as a single-wall cofferdam around the stone encased section of the pier above the caisson section. Alternate sheets were bolted down to prevent upward movement from friction as the box was lowered by inside excavation. Rings of steel waling reinforced the sheetpile cofferdam.

As the masonry-encased concrete pier was built above successive steel rings the sheetpiles were braced against the pier and bracing rings removed. After completion to above the water surface it was only necessary to remove the hold down bolts on the inside of the steel sheets, which could be done in the dry and open cofferdam, then fill with water to equalize the pressure and pull the sheetpiling.

Contractors option on land piers

Land piers V, VI and VII were designed for construction either as open-dredged or pneumatic caissons at the contractor's option. A bearing value on the soil of 3.6 tons was allowed for open-dredging compared to 5 tons for pneumatic due to the more even contact surface expected. The open-dredged caisson was required to be larger and have provision for use of pneumatic methods

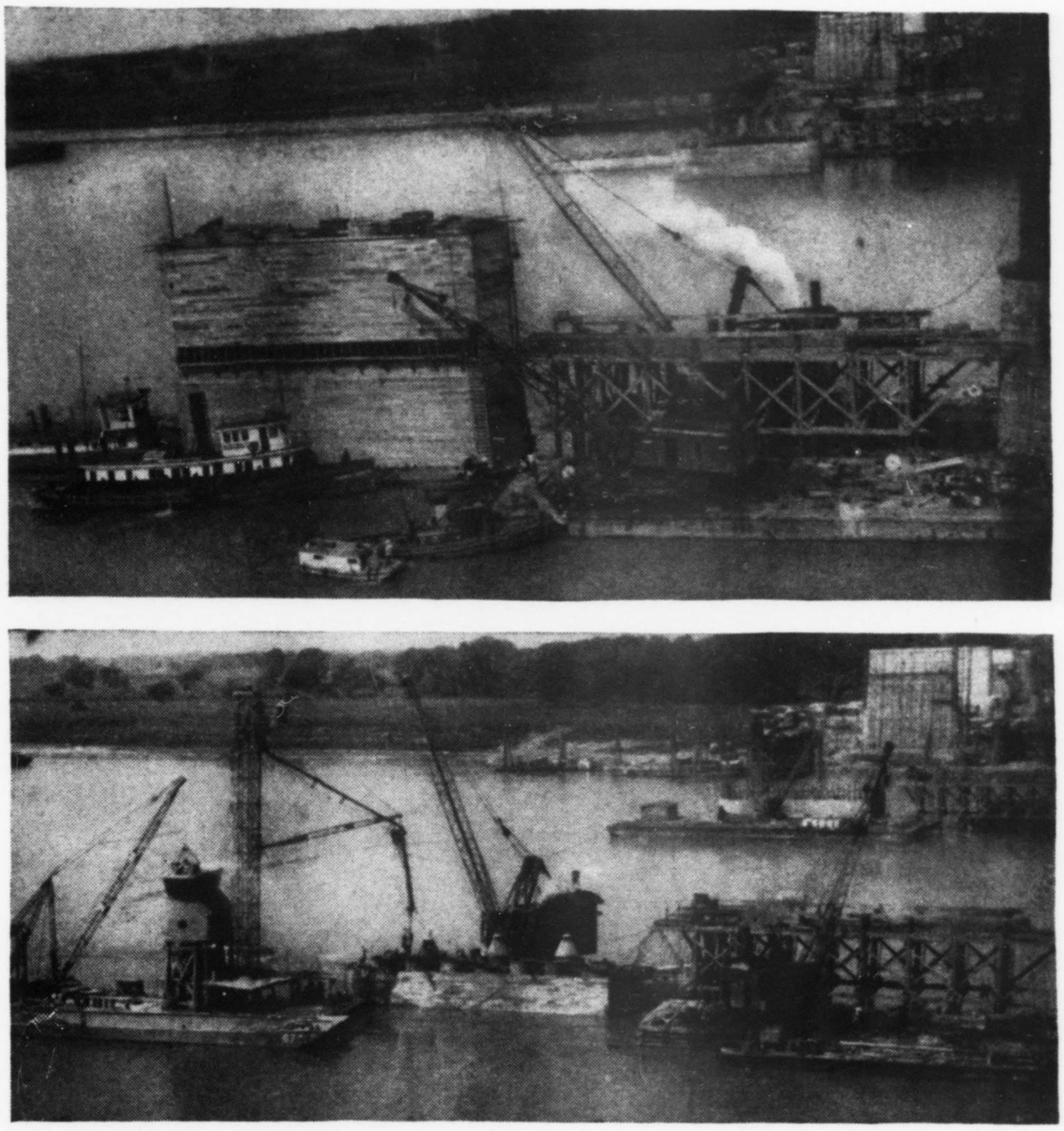


Fig. 5. ***After being floated into position (top) the caisson for Pier II was sunk by increasing the weight with concrete poured for the pier base. The cofferdam was built higher as the caisson sank.***

Fig. 6. ***A single wall of sheetpiles set on top of the caisson sections of all piers except II and III served as a cofferdam to permit masonry work down to the caisson top. Sheetpiles were pulled after pier was complete to above their tops.***

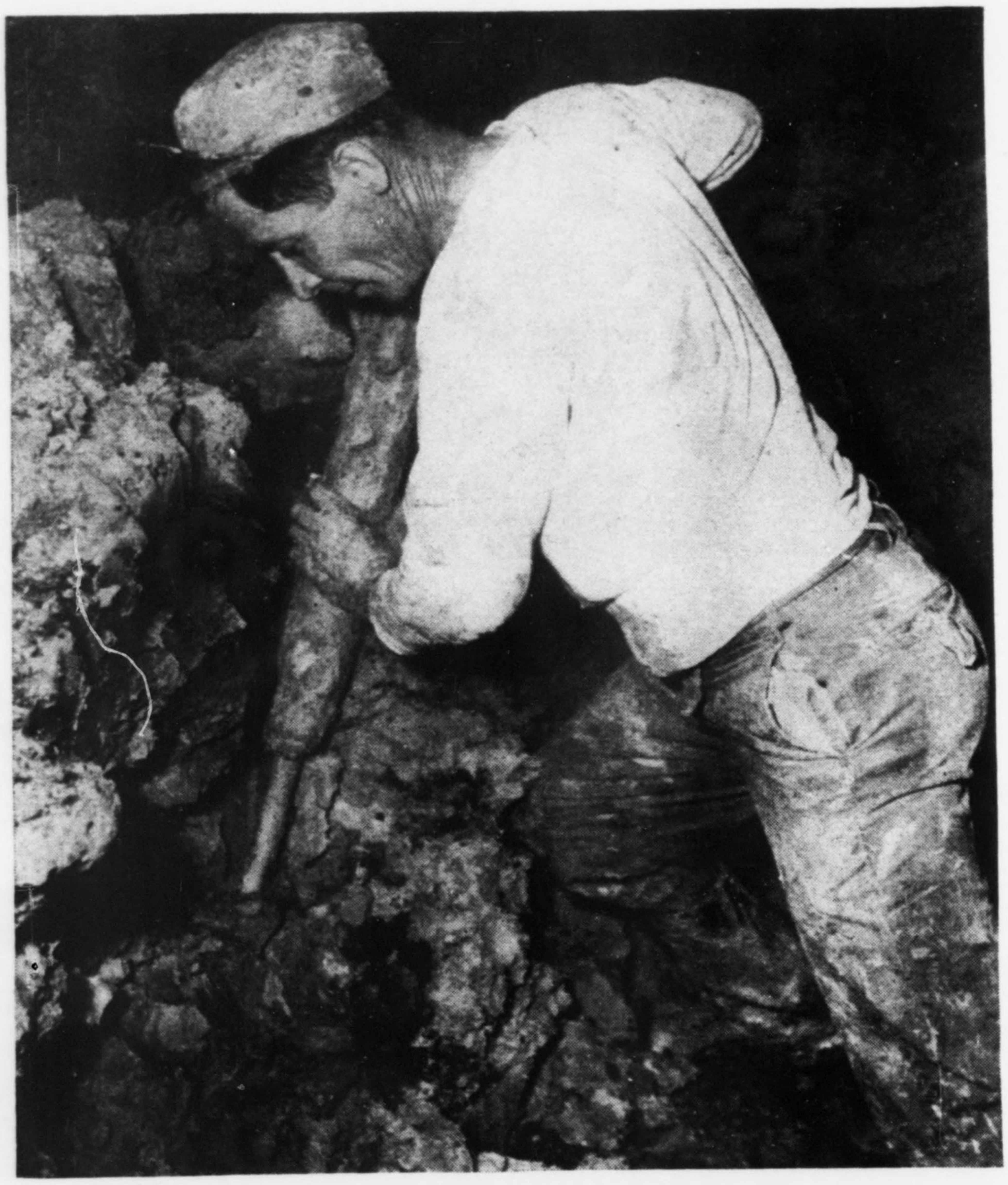


Fig. 7. Typical of the sandy-sticky clay encountered is this material being cut with a clay spade by a sandhog. Air was supplied to pneumatic tools at 105 psi, but they operated at low efficiency in the 43 psi. back pressure of the caisson.

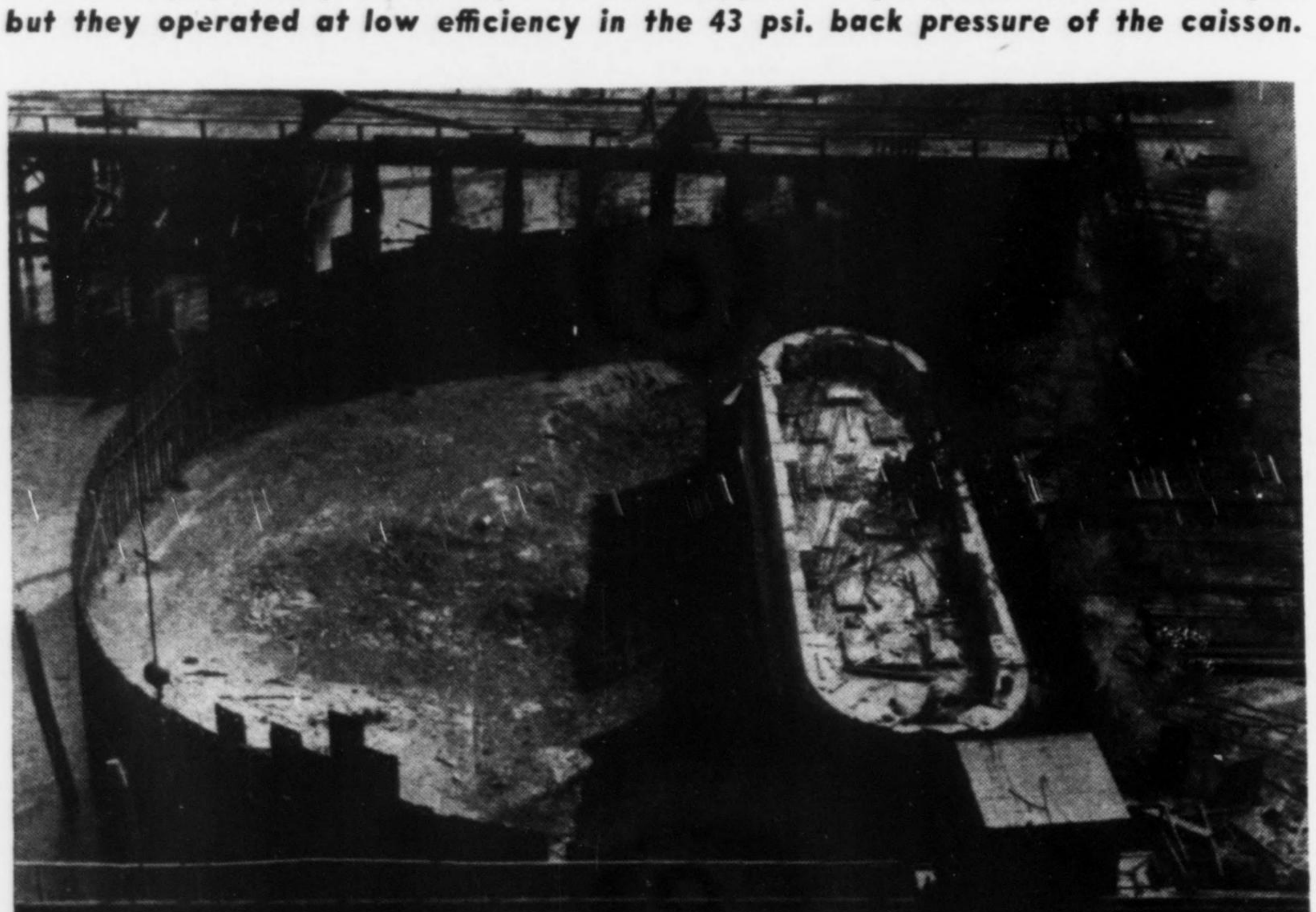


Fig. 8. Piers I and IV, on the sloping banks of the river, were built up inside sand-filled sheetpile cofferdams that gave protection against fluctuating water and provided a level work area.

if it were found necessary, but the contractor chose this method to avoid expensive air work.

The caissons were assembled on the natural ground and built up as described for Piers I and IV with a sheetpile wall attached to the caisson to permit masonry work above the enlarged bottom section of the pier after it was sunk below ground level.

For the open-dredged, tremie-sealed piers, where it was necessary to go through a considerable depth of overburden, jetting wells were provided around the periphery of the caisson. These were 8 in. dia. openings into the work chamber through which the jet pipe could be lowered to break up the sandy clay with a 400 psi. jet. These piers also had exterior air or water jets arranged to lubricate the sides, thus reducing friction and assisting the caisson to sink. Divers checked the bottom to make sure that the area was reasonably smooth and free from loose clay prior to sealing with tremie concrete. All three piers were successfully founded by open dredging.

Concrete for the shore part of the project was supplied by a land plant with two 1-yd. mixers set under batchers attached to a material bin. Pumps under the mixers were able to deliver the concrete wherever needed in the piers but were sometimes supplemented by deliveries in 1 cu.yd. buckets by truck or by rail for placing by crane.

Concrete on the river part of the project was supplied by a floating plant with two 1-yd. mixers delivering to a hoist that carried it up a tower for distribution through a counterweighted swinging chute.

The compressor plant and most other facilities required were located on shore, with pipes on the Frisco Bridge used to carry them out to each of the piers. The "hog house" for the sandhogs, a medical lock and similar facilities were mounted on a barge and moved to successive piers.

On the Merritt-Chapman & Scott Corp. substructure contract William Denny is project manager, J. M. Grieg is in charge of field engineering while R. M. Hand and D. W. Hedrick supervise construction.

O. F. Sorgenfrei is resident engineer for Modjeski & Masters, and is assisted by R. I. Senn.

BLS sees $18 billion '49 construction

Dollar value of new construction to be put in place during 1949 is expected to reach a new record of $18.75 billion, but physical volume probably will not exceed 1948 performance, the Bureau of Labor Statistics, U. S. Department of Labor, reported recently.

Forecasts of expenditures for new construction in the coming year, prepared jointly by the departments of Commerce and Labor, exceed the anticipated dollar volume for 1948 by about 5 percent, or slightly less than $1 billion. Most of the increase is expected to be in outlays for new public construction, with private expenditures remaining almost unchanged.

These predictions are in close accord with an earlier report by the McGraw-Hill Economics Staff (*ENR* Nov. 4, p. 4).

On the basis of the expected dollar volume, BLS estimates that about 2,300,000 workers will be employed by construction contractors at the 1949 peak next September. This is about the same number that were engaged on contract construction in August, the peak month this year.

The present outlook for the number of new permanent nonfarm dwelling units to be started next year is about 875,000. Upwards of 30,000 of these are expected to be financed with public funds, largely in state and municipal projects and in military installations. The 1948 volume is now expected to be about 925,000 units, of which not more than 15,000 will be publicly financed. BLS estimates that next year a greater proportion of dwelling units will be built in multifamily structures—roughly 15 percent compared with 10 percent this year.

Costs and availability are factors

All estimates are predicated on continued high levels of employment. The estimators assumed that federal expenditures for military preparedness will not exceed the amount already in sight, and that average construction costs in 1949 will be about 5 percent above the average anticipated for 1948. Furthermore, the forecast for 1949 assumes that building materials production will be adequate for the expected construction volume, even though steel products and cement may continue in tight supply.

BLS points out that maintenance of a high volume of home building in the coming year depends largely upon the facility with which builders adjust their operations to a larger proportion of lower priced homes than have been built this year. In estimating the probable number of new houses to be started in 1949, bureau officials explain that they could not take into account some influences which may or may not develop during the year, such as new legislation on housing or on mortgage financing—both discussed on p. 71 of this issue.

New York names Devendorf to head sanitation bureau

The New York State Department of Health has announced the appointment of Earl Devendorf as director of the department's Bureau of Environmental Sanitation, succeeding Charles A. Holmquist.

Mr. Holmquist, oldest member in point of service on the professional staff of the State Health Department, retired Nov. 1 after 40 years of service with the organization. A 1902 graduate of the University of Rochester, Mr. Holmquist's long service has included membership on many interstate and national groups dealing with sanitation and he has lately been a member of the Subcommittee on Minimum Requirements for Plumbing of the American Standards Association.

Mr. Devendorf, associated with the department for over 30 years, has been assistant director of the bureau since 1927. He is a graduate of Union College (1912) and has served New York State as state coordinator in collaboration with the State Council of Defense. He is holder of the George Warren Fuller Memorial in recognition of outstanding service to the waterworks profession.

Highway research group formed in Virginia

The Virginia Department of Highways will move its research section from Richmond to Charlottesville where the offices and laboratories will associate with the department of engineering at the University of Virginia to form the Virginia Council of Highway Investigation and Research.

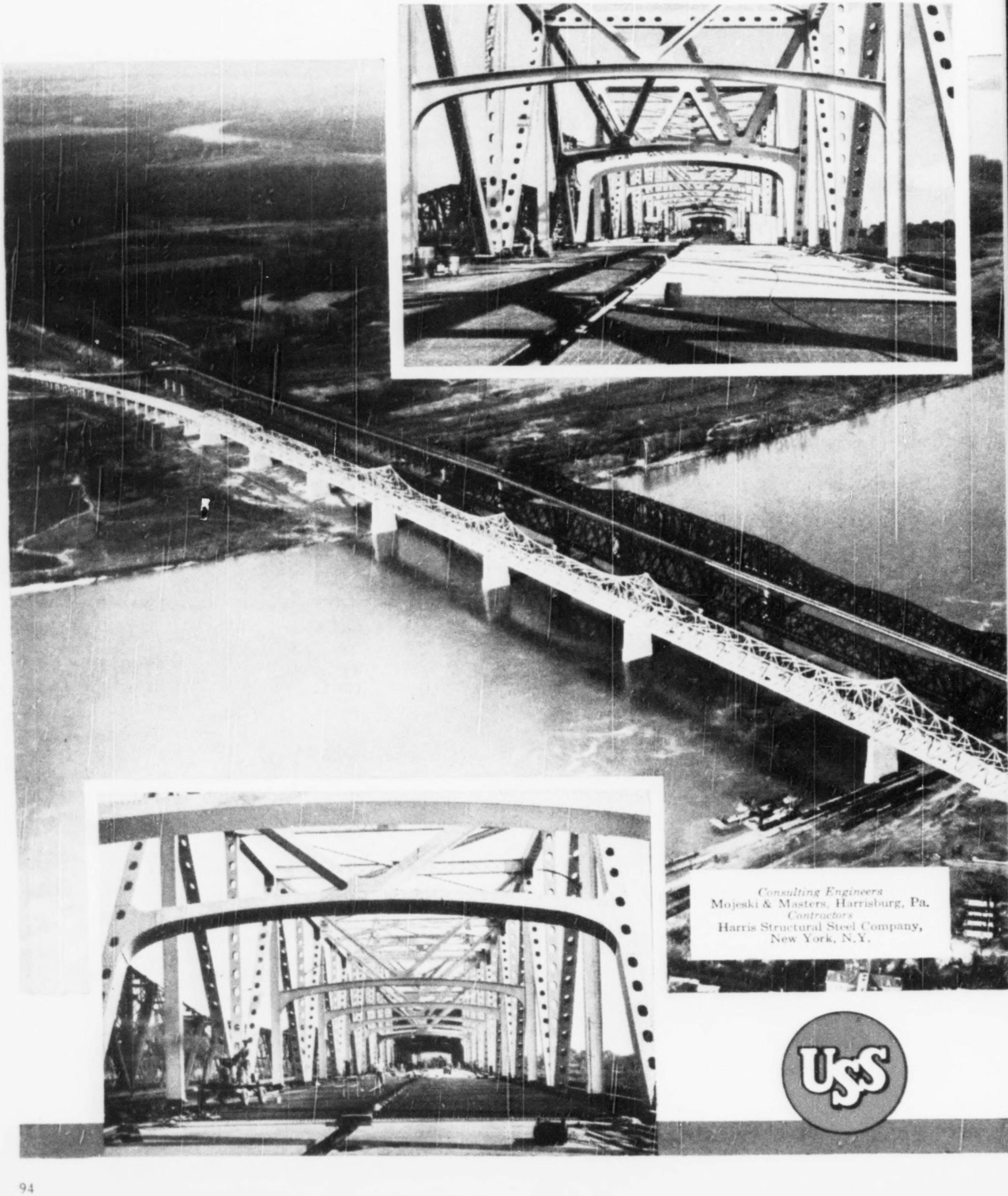
The new council will be administered by a board composed of C. S. Mullen, chief engineer for the department of highways, as chairman; Edward W. Saunders, university dean of Engineering; and T. E. Shelburne, director of research for the department of highways.

Heads of the civil engineering departments of Virginia Military Institute and Virginia Polytechnic Institute will be members of a highway research advisory committee.

Objectives of the project are to carry out research programs for economic design, construction, and maintenance of highways; to train men in fundamentals of highway engineering and related subjects; and to cooperate with research divisions of other highway departments, universities, and public and private agencies.

BRIDGING THE MISSISSIPPI progresses at Memphis, Tenn., where Harris Structural Steel Co., Inc., has superstructure between piers VI and VII well under way. Erection goes on over one temporary bent while another is being dismantled. Merritt-Chapman & Scott Corp. are substructure contractors. (A Corps of Engineers Photo).

Newest and Largest Bridge Floored with 167,000 Sq.Ft.

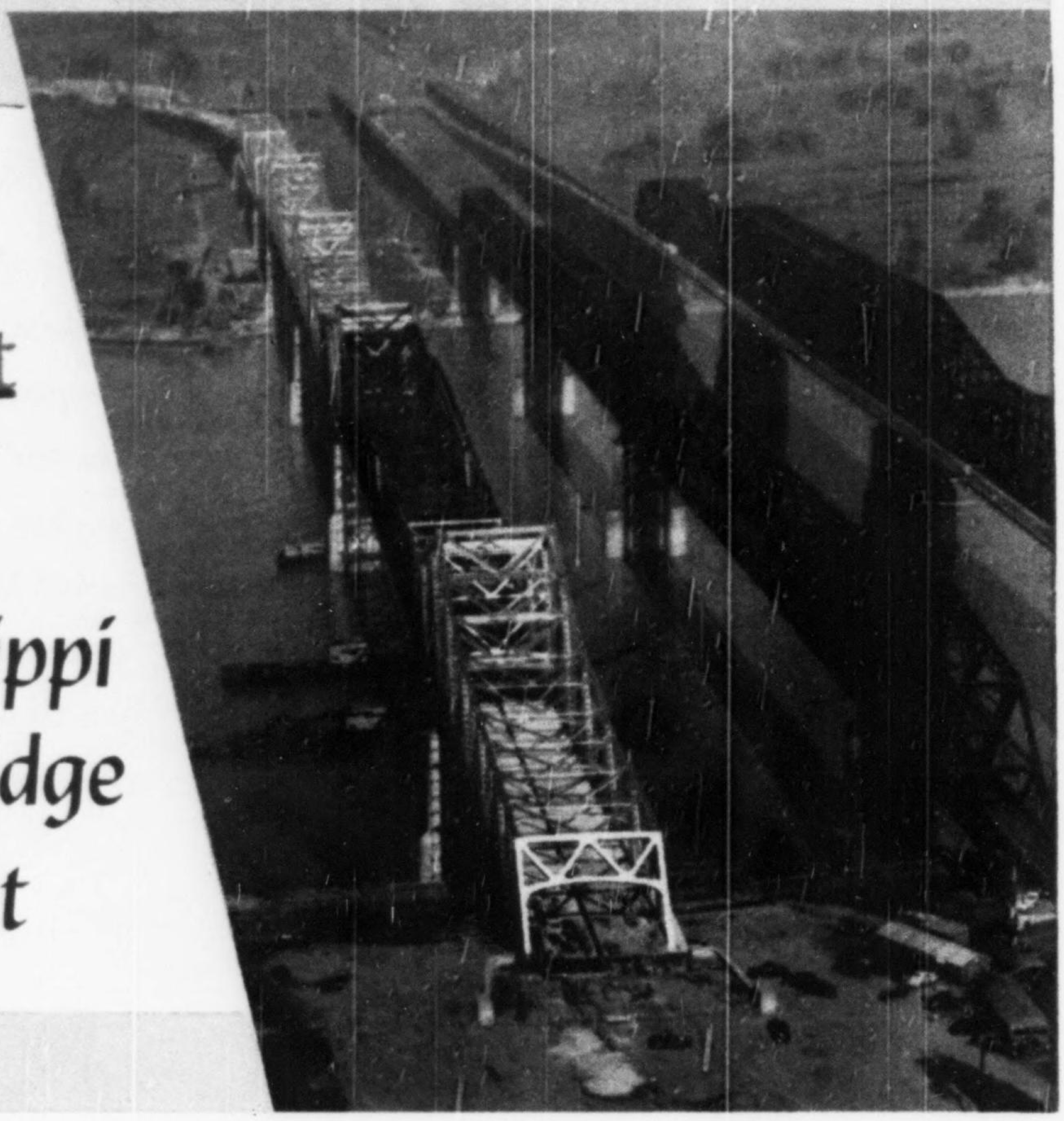


Consulting Engineers
Mojeski & Masters, Harrisburg, Pa.
Contractors
Harris Structural Steel Company,
New York, N.Y.

USS

Gulf Products and Fine Service

keep equipment rolling on Mississippi River Bridge Project



The recently completed Memphis & Arkansas Bridge, shown above left in the process of construction, is over 5,200 feet long, carries a 4-lane roadway, and cost $13,566,000. The main bridge steel superstructure was erected by Harris Structural Steel Co., Inc., New York, N. Y., whose equipment delivered top performance with Gulf lubricants and fuels. This contractor had an outstanding safety record on this big job—not a single loss of life, and 69,000 man-hours of operation before the first lost-time injury.

ANOTHER big construction project where equipment made an outstanding record of dependable performance with the help of Gulf quality products and services.

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