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Placing Concrete By Several Methods on Same Job

Chuting, Batch Boxes Moved by Crane and on Trucks and Buggies All Needed in Building New Bridge at Bethlehem, Pa.

In the construction of the Hill to Hill bridge at Bethlehem, Pa., a structure being erected under the supervision of the Bethlehem Bridge Commission by Rodgers & Hagerty, New York City, the concreting plant layout is such that concrete can be chuted to piers and arches on practically all of the work. However, at the extreme ends of the three main approaches and at other more or less inaccessible points, other methods of handling concrete had to be devised. In all, four methods are used.

Mixing Plants—The bridge proper is about 2,000 ft. in length but with the approach ramps and the three main approaches this length is extended to about 6,000 ft. By referring to the accompanying figure the difficulty of devising one system to handle all concreting work is apparent. To handle the heaviest portion of the concreting both in piers and arches, the chuting system as indicated in the accompanying figure was devised. Inasmuch as the two mixing plants (also indicated in the figure) were utilized to mix for tranportation to those portions of the bridge inaccessible by chuting, large capacity mixing plants were required. Each of the two concreting plants was fitted with two 1-yd. mixers, a sand bin holding about 400 cu.yd., a stone bin of 800-cu.yd. capacity and cement sheds holding approximately 1,000 bags each. Sand and stone is clamshelled from stockpiles at the mixing stations into the bins.

Handling concrete by chutes is carried on with little difficulty and as many as 600 batches were chuted an average distance of 400 ft. during a ten-hour day. The chuting plant consists of three towers one 160 ft., another 240 ft. and the third 200 ft. high and approximately 3,500 lineal ft. of chuting of various types. In addition approximately 18,000 ft. of cable guys and chute supports are needed. Cable guys are of 5/8-in. and the chute supports 1¼-in. steel cable.

The second method of placing concrete was used at the south approach and will be used on the approach ramps at the southern end of the bridge. A locomotive crane which had been used in excavating for piers and abutments at the south approach was also used in handling concrete batch boxes from trucks to placement points in piers and abutments.

Handling Concrete by Truck—For other points, concrete is handled by batch boxes hauled in trucks from the two mixing stations. Each truck usually carries two 1-yd. steel batch boxes, except in those instances where spilling outside the forms is not feared. In that case larger batch boxes are used. Where possible these batch boxes are handled direct by derrick from motor truck to pier forms. This method was possible on piers just outside the radius of operation of the 200-ft. tower on the northeast approach. On the southeast approach concrete is handled first by batch box and truck, then dumped to an inclined material bin and transported to place by concrete buggies.

A feature of this job is the use to which stiff-leg derricks with 80-ft. booms are used as anchorage points and redistribution towers for the chuting system. The derricks were mounted on 40-ft. timber towers. The utility of such a scheme is fully recognized by referring to Fig. 2.

Materials and Their Procurement—Approximately 107,000 cu.yd. of concrete will be placed in the entire structure. Of this the amount in footings and piers will be about 46,000 cu.yd. and the rest in the superstructure.

All cement is trucked from Bath and Allentown, Pa. So far the contractor has discovered that cement costs less by using this method of transport than by the rail-

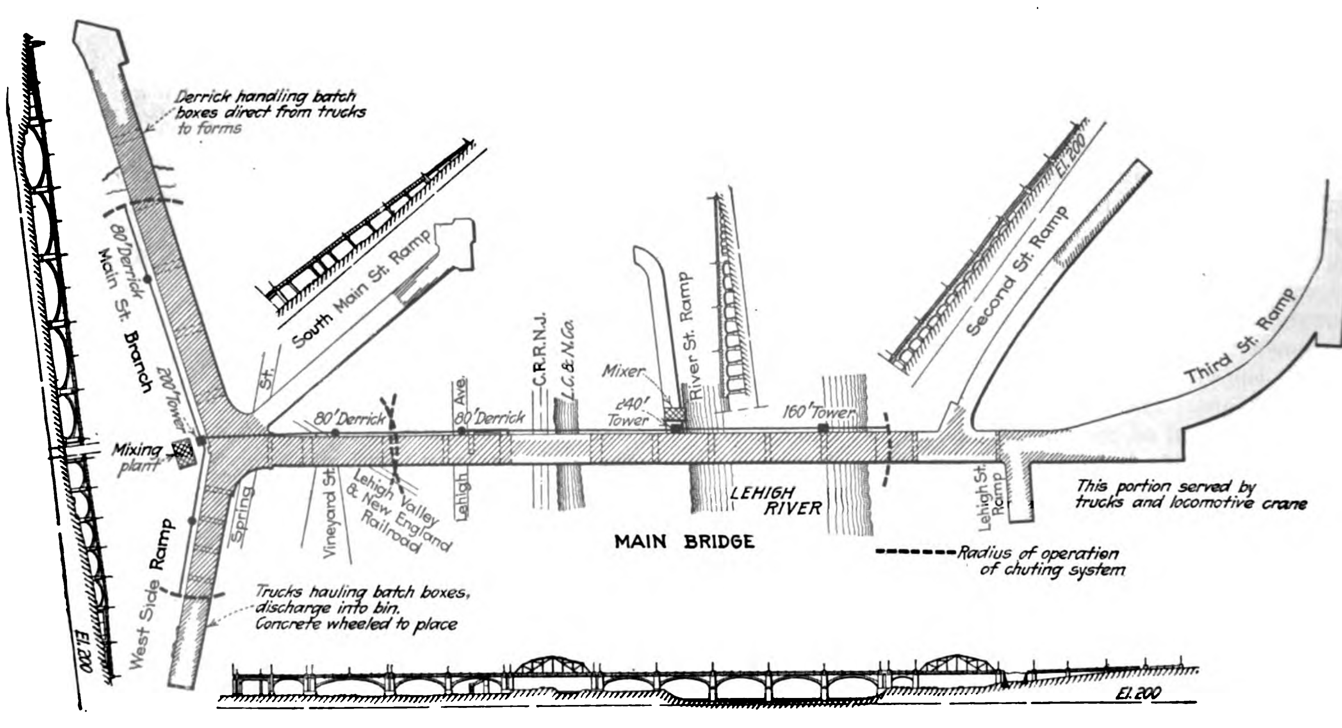

FIG. 1—PLAN OF BRIDGE SHOWING METHODS OF CONCRETE PLACEMENT USED

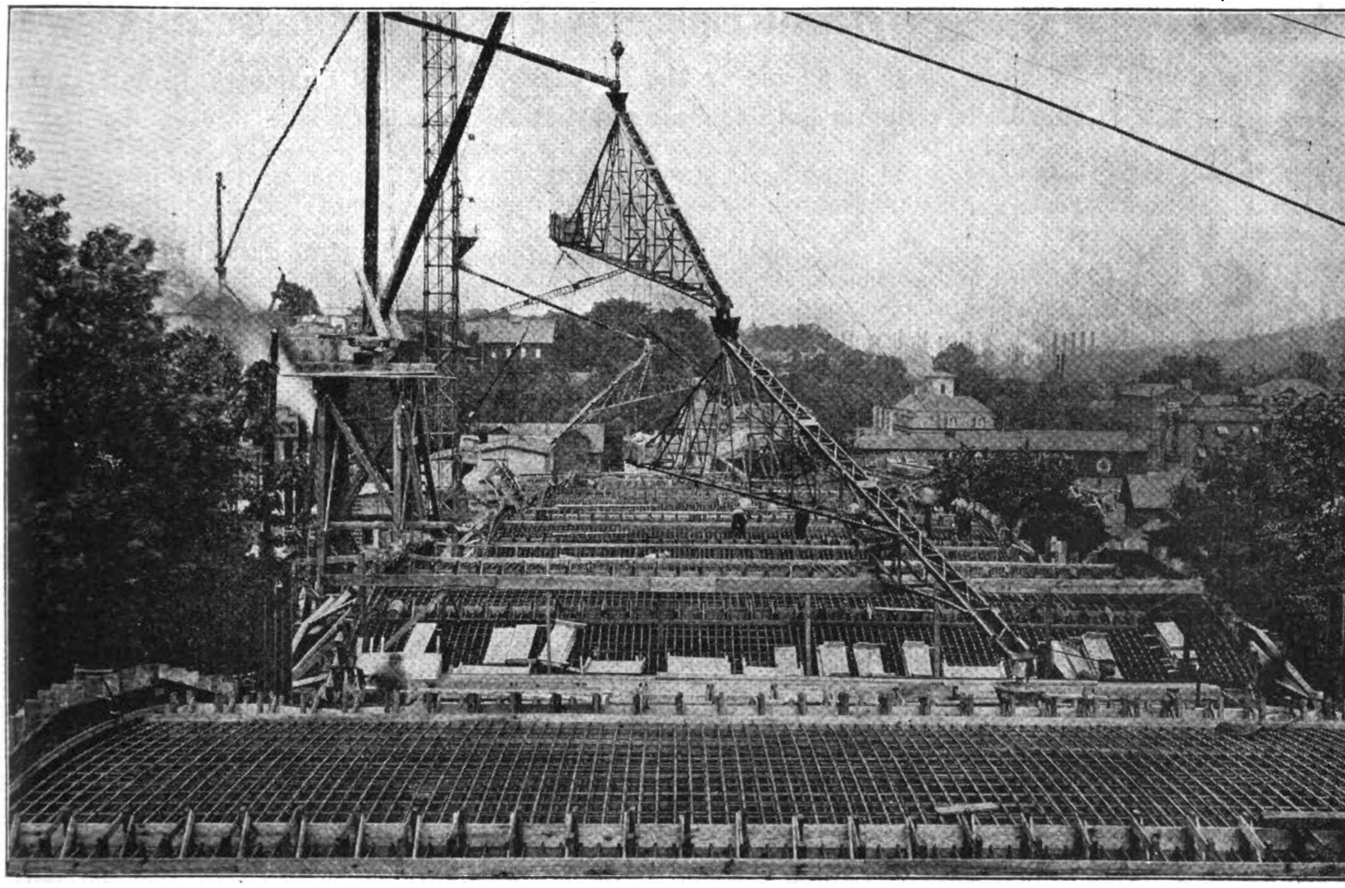

FIG. 2—STIFF LEG DERRICKS MOUNTED ON 40-FT. STAGING ARE REDISTRIBUTION TOWERS

road. Rehandling charges necessitated by rail haul is a saving the trucks effect.

The contractor has opened his own stone quarry about a mile and one-half from the bridge site. There is being operated a quarry face about 70 ft. high and with a length of 200 ft. Three crushers have been installed, a primary jaw crusher 24 x 36 in. and two secondary gyratories. The smaller of the secondary crushers is used for crushing screenings. There is a scalping screen used from the jaw to the gyratory crushers for removing the dirt from the stone. About twenty men are employed in the quarry and it is estimated that 100,000 tons will be used from this quarry.

Clarence W. Hudson is the designer of the bridge and consulting engineer to the Bethlehem Bridge Commission. H. J. Finebaum is resident engineer for the Commission. W. Caccia is resident engineer for Rodgers & Hagerty, the contractors, with George Angel as general superintendent.

The cost of the bridge will be in the neighborhood of $2,500,000. It will be completed early in 1924.

Health Ministry Rules for Refuse Tips

Suggestions for preventing nuisances at municipal refuse tips have been formulated by the British Ministry of Health. The main point of the suggestions are that refuse be tipped in layers which should not exceed 6 ft. in depth, and should be covered wherever exposed to the air with "at least 9 in. of earth or other suitable substance"; that reasonable precautions should be taken to prevent the breeding of flies, the breaking out of fires, or the blowing about of paper, etc.; and that so far as practicable each layer of refuse should be given time for settlement before another is added.

Relative Durability of Native Wood

A TABLE showing the relative durability or resistance to decay of untreated woods has been prepared by the Forest Products Laboratory. Service records and information collected by the laboratory form the basis of the table but it is stated not enough records exist on some of the woods to be accepted conclusively and the rating is subject to correction. The table follows:

RELATIVE DURABILITY (RESISTANCE TO DECAY) OF UNTREATED WOODS

Durability of commercial white oak taken as 100 per cent

Conifers

Cedar, eastern red (juniper)	150-200	Pine, pitch, sugar	45-55
Cedar, southern white	80-100	Pine, shortleaf	60-80
Cedar, other species	125-175	Pine, So. yellow (dense)	80-100
Cypress, bald	125-175	Pine, western white	65-80
Douglas fir (dense)	75-100	Pine, white	70-90
Douglas fir, (ave. mill run)	75-85	Pine, western yellow, pond, loblolly, lodgepole	35-50
Fir (the true firs)	25-35	Redwood	125-175
Hemlock	35-55	Spruce, Engelmann, red, Sitka, white	35-50
Larch, western	75-85	Tamarack	75-85
Pine, jack	35-45	Yew, Pacific (western)	170+
Pine, longleaf, slash (Cuban)	75-100		
Pine, Norway	45-60		

Hardwoods

Ash	40-55	Gum, red	65-75
Aspen	25-35	Hickory	40-55
Basswood	30-40	Locust, black	150-250
Beech	40-50	Locust, honey	80-100
Birch	35-50	Magnolia, evergreen	40-50
Butternut	50-70	Maple	40-50
Catalpa	125-175	Mulberry, red	150-200
Chestnut	100-120	Oaks, red oak group	40-55
Cottonwood	30-40	Oaks, white oak group	100
Elder, pale	25-35	Oak, chestnut	70-90
Elm, cork (rock), slippery	65-75	Osage orange	200-300
Elm, white	50-70	Poplar, yellow	40-55
Gum, black, cotton (tupelo)	30-50	Sycamore	35-45
		Walnut, black	100-120
		Willow	30-40