

Braddock Gated Dam

LOCATION
Braddock, PA

ARCHITECT
Bergman Associates

STRUCTURAL ENGINEER
Ben C. Gerwick

LIGHTWEIGHT PRODUCER
Haydite - Hydraulic Press Brick Co.

CONTRACTOR
J.A. Jones
Traylor Brothers
(Joint Venture)

READY MIX SUPPLIER
Beaver Concrete

PUMPER
Howard Concrete Pumping

OWNER
Army Corps
of Engineers

ON-SITE LAB
Construction Engineering Consultants, Inc.

SPECIFICATIONS
Weir Bay Sections:
110 ft. x 103 ft.
Dam Section One:
333 ft. x 103 ft.
Dam Section Two:
265 ft. x 103 ft.



Floating dam Section # 1 being transported up the Ohio river

Structural Lightweight Construction (SLC) was begun in March 2000. Precast and cast-in-place elements were used to construct dam sections in dry-dock 30 miles down river from the dam site. SLC (1,500 yd³) was used in the pre-cast interior dam support walls and (2,600 yd³) in the floor sections. Sections were floated up river and set in place on a pier foundation system. Because lightweight concrete was used, the actual draft was only 11 feet. Additional precast and cast-in-place construction was done to accommodate lock gates, control facilities and a pedestrian bridge.

This project is the first ever “in-the-wet” dam construction and is scheduled for completion in November 2003.



Dry dock construction at Leetsdale, PA

Mix Design:

Specified Compressive Strength at 28 days: **5,000 psi**

Specified Maximum Saturated
Density at 28 days: **125 lb/ft³**

Air: **6% (+/- 1.5)**

Super Plasticizer (Bottom Slab only): **48 oz/yd³**



Job Site Test Results:

Average 28-day compressive strength (6 x 12 Cylinders): **5,886 psi**

Standard deviation of precast panels: **455 psi**

Average saturated density at 28 days: **124 lb/ft³**

Slump at truck: **3" (no super plasticizer), 7" (with super plasticizer)**

Slump at point of placement (end of discharge hose):
1"-3" (no plasticizer), 4"-7" (with plasticizer)



Dry dock construction

**DEPARTMENT OF THE ARMY
Pittsburgh District, Corps of Engineers**

In accordance with Section 03308, Paragraph 1.5.1, the concrete mixture proportions for the specified density concrete (Mix 4) are as follows:

MIX DESIGN	Mix 4 Specified Density	Actual Batched
w/c	0.40	0.40
Cement: Southdown Neville Island Plant	683 lb / yd ³	683 lb / yd ³
Water: Rochester Municipal supply	273 lb / yd ³	273 lb / yd ³
Fine Aggregate: Tri-State Dredge 16	1242 lb / yd ³	1266 lb / yd ³
Coarse Aggregate: Haydite- Hydraulic Press Brick Co.	984 lb / yd ³ At approx. 12% moisture	1063 lb / yd ³ At approx. 21% moisture
AEA: Euclid Eucon AE-92	6.3 fl. oz. / yd ³	8.0 oz. / yd ³
WEA: Grace WRDA w/ Hycol	41.1 fl. oz. / yd ³	41.1 oz. / yd ³



Dam Section # 1 passing downtown Pittsburgh on the Monongahela River



PUMPING HAYDITE
Hydraulic Press Brick Company
by Keith McCabe

The most effective method of saturating the Haydite lightweight aggregate, is for the aggregate to be pre-soaked at our production facility in Cleveland for a period of 2-3 weeks prior to shipment. We use a 2" diameter fire hose/sprinkler system. The water flow is maintained constantly and the aggregate pile periodically turned (using a front-end loader) to ensure a more uniform saturation.



Additional Comments: “Our biggest challenge was keeping the aggregate saturated during winter temperatures that averaged below 32°F. If not saturated enough, the SLC plugged in the pump boom. As long as it was saturated, it placed great, smooth as butter. Also, strengths were tremendous! Using Structural Lightweight was a new experience for the entire group on this project. We relied heavily on the knowledgeable people at Haydite. They made all the difference. ” – [Josh Skudlarick, Project Engineer, J.A. Jones](#)

“Realization of the uniqueness of this undertaking hit me when I saw the concrete dam actually floating up the Monongahela River.” – [John Katlen, Sales Engineer, Hydraulic Press Brick Company](#)

“The concrete placements taken individually may have been ordinary. But, what was done with the concrete made the project unique and extraordinary. The lessons learned regarding structural lightweight concrete will be useful in future corps endeavors.” – [Carol Tasillo, PE, Project Engineer, US Army Corps of Engineers](#)



Dam Section #1 moored at Duquesne, PA, for superstructure work. The addition of the superstructure will create an additional 2 feet of draft.

For Additional Information About Structural Lightweight Concrete
Expanded Shale, Clay and Slate Institute

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