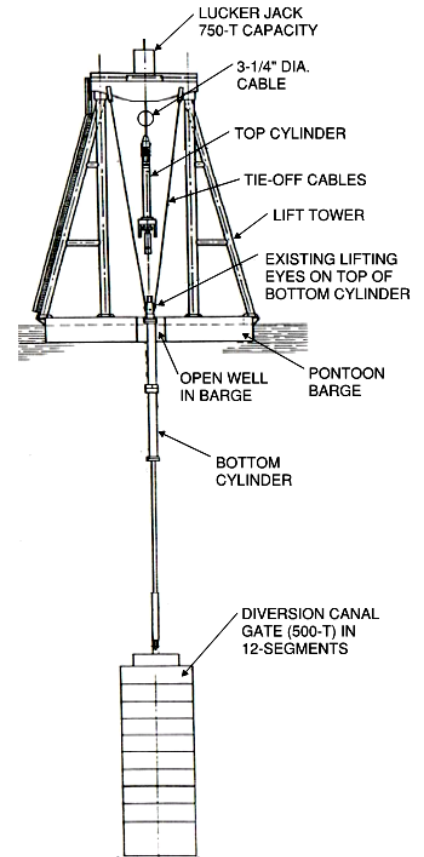


ITAPÚA DAM - PARANA RIVER, BRAZIL/PARAGUAY



Completed Itapúa Dam in Operation



Salvage Barge for Diversion Canal Gates

PROJECT INFORMATION

Year of Completion: 1984
 Construction Cost: \$19.6 Billion
 Client: UNICON
 Owner: Itapúa Binacional
 Contractor: Riedel International

The Itapúa Dam, across the Parana River on Brazil's southern border with Paraguay, is the largest dam in the world. It has two times the generating capacity of the largest dam in the U.S., the Grand Coulee Dam. Riedel International was awarded three critical contracts for this dam: 1) dredging for the clay-cores of the upstream and downstream temporary cofferdams, 2) dewatering of the main dam site between the cofferdams, and 3) salvage of the 12 diversion canal gates following the diversion of the Parana. As the Chief-Engineer of Riedel, Robert Bittner designed the specialty equipment for all three of these critical tasks, and provided on-site supervision of the final gate salvage operation.

In order to dewater the Itapúa Dam site, four rock dikes (two upstream and two downstream of the main dam site) up to 60 m high were constructed from both sides of the river toward the center. As the rock dikes approached each other

in the mid-channel, the entire river was diverted through a 1-km wide by 100 m deep diversion canal by blasting two temporary concrete arch dams. With the river flow diverted, the rock dikes closed the river in the main channel. The Riedel dredge was then positioned between each pair of dikes, and a specialty jet/suction dredge was used to clean off the bed-rock subgrade along the entire alignment of both the upstream and downstream temporary rock cofferdams in water depths exceeding 50 meters. After completing the dredging-clean-off operation, a clay core was end-dumped between each pair of dikes; each cofferdam was then completed to a height of 60 m. Following the diversion, the dredging equipment was re-configured and re-positioned between the upstream and downstream cofferdams where it dewatered the entire dam site.

Following the completion of the dam site dewatering, construction of the main dam commenced while the Parana flowed through the diversion canal. When the main dam was completed, 12 diversion canal gates weighing 500-T each shut-off the river flow and filled the reservoir behind the dam to a depth of 122m. The same equipment was re-positioned and re-configured for the final tasks of salvaging the diversion canal gates for re-use in the main dam for regulating flow into the main generating turbines.

SERVICES PERFORMED

Design, Construction, and Operation of All Equipment for:

- ◆ Dredging and clean-off to bedrock between upstream and downstream temporary rock cofferdams for placement of 60m deep clay core
- ◆ Dewatering of main dam site
- ◆ Salvage of 12 - 500T Diversion canal gates from 110m deep reservoir



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