Why RCC $aves Money on Dams

The use of roller-compacted concrete (RCC) to build new dams is now more than two decades old in the USA. In that relatively short period of time, RCC dams have replaced conventional concrete gravity dams where site foundation conditions are suitable for a concrete dam. The reason for RCC dam acceptance is economic advantage combined with the enviable long-term safety record of concrete dams. The low cost of RCC dams is due to rapid construction, and lower cement ratios.

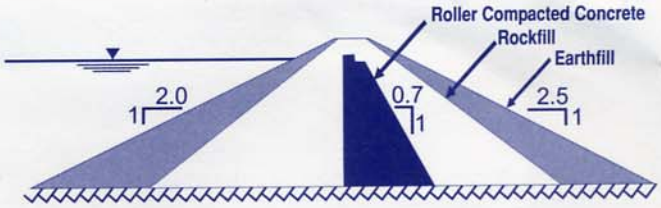
The economic benefit of rapid RCC construction can accrue to the owner in many ways, and is reflected in lower unit prices for items that can be constructed quickly with little risk. If the contractor is on site for a shorter period of time, his mobilization cost, which includes bonds and insurance, field office, laboratory and home office support, is less. In addition to a lower mobilization cost, the owner can save more money on lower interim construction financing, lower construction management and quality control costs. Less construction time has been estimated by some contractors to save 1/3 of a percent per week of total construction costs.

RCC dams must be able to compete economically with other dam types at a given site. The following list of items, which tend to favor RCC dams over embankment types, is presented to aid owners in considering all factors in selecting a dam type that provides the lowest life-cycle cost:

Spillway and Stilling Basin - Spillways have become a major cost factor due to ever-increasing hydraulic requirements. RCC dams can incorporate spillways into the gravity structure at little additional cost where as embankment dams usually require separate, and many times costly, spillways. As the required spillway capacity increases, concrete dams produce a greater advantage over embankment types. In addition, RCC dams can be safely overtopped for floods greater than the spillway design capacity.

Stepped spillways, which are aesthetically pleasing and hydraulically efficient, can be easily incorporated into RCC dams due to the horizontal RCC construction method. The steps dissipate energy step by step leading to a reduced velocity at the toe of the spillway. This then leads to a reduced cost or elimination of an energy dissipating structure, depending on the erosion potential of the downstream rock.

Conduits Through Dam - By referring to the figure which shows the cross-section for three dam types superimposed on each other, it is apparent that the horizontal distance through the RCC dam is considerably less than either the rockfill or earthfill embankment. This means that the length of any conduit through the RCC dam is less than for the earth or rock fill dams and thus, less costly.



Typical Section of Various Types of Dams

Due to rapid construction associated with RCC dams and their inherent erosion resistance, the diversion capacity and upstream cofferdam can be smaller. If initial RCC construction can be planned to coincide with the low-stream-flow season, the diversion capacity can be a seasonal high, which is considerably less than the five or ten-year frequency flood. There are many examples of RCC dams being overtopped during construction with little cleanup required and with minimal lost time.

Other Cost Saving Items - Multi-level intake towers, which are attached to the upstream face of RCC dams compared to a free-standing structure for an embankment dam, represent another cost savings advantage for RCC dams.

Other factors associated with the basic design of an RCC dam that can save money include a slightly lower height for the dam, less foundation excavation of near-surface rock due to a smaller footprint for the structure, less cost for instrumentation, and less maintenance cost.

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