

King Talal Dam is a triumph of complicated engineering

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Highly advanced technology used to overcome unique reservoir building problems during construction of Jordan's new King Talal Dam seems to have been successful, according to seepage monitoring tests around the site.

As the water has been mounting up behind the large earthfill dam providing engineers with their first real tests of the advanced technology used, there has been a race against time for other experts in the area.

American archaeologists have been scouring parts of the future lake bed to record the archaeological history of the area before it is lost under the water.

Anyone setting off one fine Spring day in the near future along the old road to Jarash, perhaps intending to picnic near the Zarqa river bridge, may be surprised to find his way barred by Jordan's first lake.

The waters of the Zarqa forming the reservoir behind King Talal Dam have risen to within a few inches of the bridge and are expected to cover it completely after more rain.

Turning left across the bridge, along the new road to the dam, the visitor is confronted with what is now surely one of Jordan's most spectacular views. The steep slopes of the Zarqa catchment area give the lake a rather fiord-like and picturesque appearance.

The reservoir has been gradually filling up since March 1977 when the diversion tunnel, which had for the last five years carried the river waters around the dam, was closed. Work on the last stages of hydromechanical equipment is almost complete and, as the dam fills, continual monitoring of seepage rates through the complex invisible water barriers is being carried out.

Unique problem

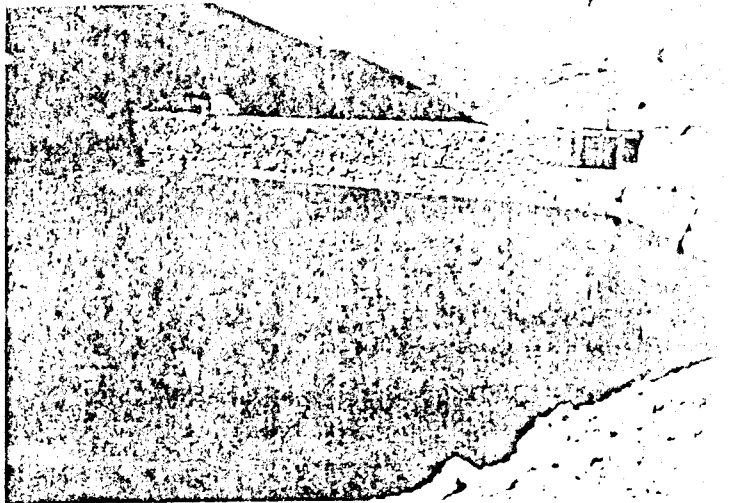
Mr. Toma Nickolovski, chief resident engineer for Energo-projekt, (design and supervising engineers for the dam), described these waterproofing procedures as a unique design problem in the history of dam building.

"The dam will be famous for this problem" he said during a recent site visit by Mr. Fayez Arikat, a senior engineer with the Jordan Valley Authority, at which the Jordan Times was present.

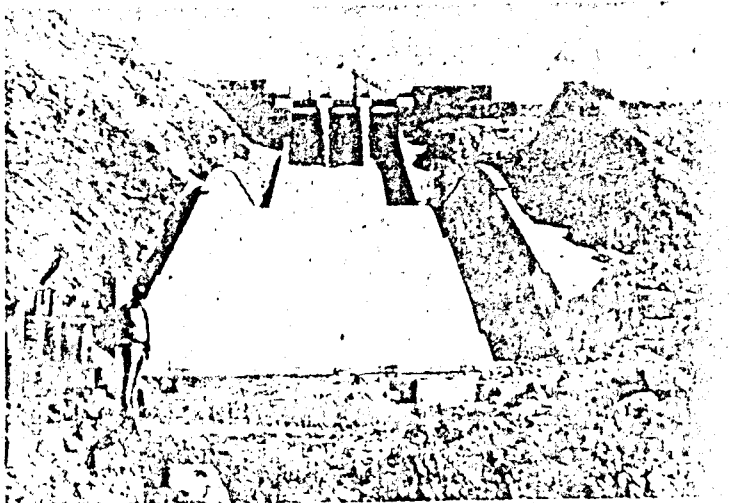
The problem was that the porous nature of the sandstone rock around and below the dam wall required very extensive treatment in order to ensure that water could not seep through and weaken the structure of the dam wall itself. This involved tunnelling for considerable distances both into the dam abutments and beneath the dam wall itself.



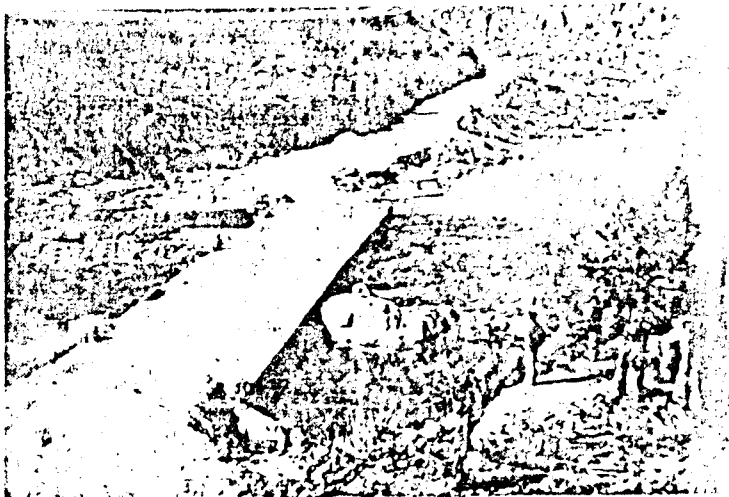
Mr. Fayez Arikat, assistant to the Director of Execution for King Talal Dam at the Jordan Valley Authority, stands on northern shore of lake above the dam.



The reservoir and upper section of the dam wall with the spillway gates on the left.



Looking up the concrete spillway from below the dam.



Tall water of the reservoir at the old Zarqa River bridge on the old Jarash road.

From these galleries vertical drill holes were made at frequent intervals for considerable depth and filled with cement under pressure so as to penetrate and seal the porous rock cavities.

In this way a waterproof barrier has been formed which although invisible to the visitor has been almost a greater undertaking in engineering terms than the dam wall and associated spillway and equipment which are more easily appreciated.

The completed reservoir will hide more than unique engineering techniques as has been discovered by a team of archaeologists who recently surveyed the reservoir basin.

Accompanied by Dr. Khair Yassine of the University of Jordan and Mr. Ali Mousa, Department of Antiquities Inspector at Jarash three archaeologists from the Universities of Michigan and Toronto, U.S.A., have spent one week collecting potsherds from the surface of the reservoir area which is not yet flooded, in an attempt to record evidence of historic and prehistoric habitations before they are lost beneath the rising waters of the lake.

Tombs found

Mr. John Lundquist, Bryant Wood, and Terrie Kerestes have found evidence of a number of areas which were inhabited to varying degrees on the eastern part of the reservoir basin. At least fifteen sites of human occupation from as early as the Neolithic period, 9000 B.C., to the Byzantine, around 400-600 A.D., have been recorded.

These included what was probably a Byzantine fortress but has been bulldozed for the new road, above the present bridge. Near here also they have recorded the remains of the abutments to an Umayyad or Mameluke bridge, below

those of the bridge which was destroyed in the fighting of 1970.

Perhaps the most interesting area of settlement is beneath the present staff housing site, where the archaeologists have discovered tombs on the east side, but unfortunately at water level.

This hill site, rising out of the water at a bend in the lake, is one of its most picturesque features. It is easy to imagine it as a former castle or fortress site.

Needless to say the scenic qualities of the reservoir are side benefits only, although it is hoped in the future that some tourist and recreational use may be made of these.

The main purpose of the dam is to provide water for year-round irrigation to the southern section of the Jordan Valley, by feeding the extension of the East Ghor Canal and a sprinkler irrigation system in the Zarqa triangle.

However as Mr. Zafer Budeiri, vice-president for dams with the Jordan Valley Authority explained, a very significant function of the dam will be to supply water to Amman for domestic use.

Registration of tenderers for the construction of water treatment plants and pipelines to Amman is currently underway. It is expected that this work will be completed by the end of 1980 when Mr. Budeiri said 16 million cubic metres of water will be made available to Amman.

Sixty year life

The maximum life of the dam under present conditions is expected to be around sixty years (allowing for the raising of the dam wall another ten metres after about thirty years) because of the gradual build-up of sediment brought into the reservoir by its various tributaries.

This lifetime would be extended to ninety years if recommended procedures are carried out by the Ministry

of Agriculture to restrict the silting up process. These involve establishing ground cover in the catchment areas, building retaining walls to prevent erosion of the steep slopes where planting is not possible and constructing check dams, at points along the wadi tributaries, to trap the silt.

The Jordan Valley Authority, which is an amalgamation of the previous Jordan River and Tributaries Regional Corporation, the Natural Resources Authority and the Jordan Valley Commission is now planning an even greater reservoir project to control and make maximum use of the waters of the Yarmouk River on the Syrian border.

It was a recommendation in the feasibility study for this project that an archaeological survey team should visit the area that will be inundated to identify and evaluate possible sites of archaeological importance, that led to the survey also of the King Talal reservoir basin.

The archaeological team is now concentrating on the proposed Yarmouk reservoir basin, to be known as Maqarib Dam. As this project is still in the design stages there should be ample time for any significant sites in the area to be evaluated and excavated if necessary.

The team is to submit a report listing recorded sites and recommendations to the Jordan Valley Authority in March, when funding negotiations for the entire project are to take place.