

# **The embankment dam**

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# The Geoffrey Binnie Lecture

P. A. BACK, Sir Alexander Gibb and Partners

Before I turn to the topic of my lecture it would be appropriate to say a few words about the man whose name we especially remember today - Geoffrey Binnie.

I consider it a great privilege to be invited to give this - the first Geoffrey Binnie Lecture and to recall briefly just a few aspects of his distinguished career and the considerable contribution he made both as an individual and also through his illustrious firm to the craft of dam building - and indeed to the profession of Civil Engineering.

Geoffrey Binnie was born in 1908 and died in 1989. He came from a long line of distinguished engineers - both his father and grandfather being eminent in the profession and who together founded the firm of Binnie & Partners in 1902. Geoffrey was at Charterhouse and then Trinity College Cambridge. He was born partially deaf and the need to overcome this disability which might have adversely affected his career perhaps gave him that extra determination to succeed. He proved himself a most able young engineer and after varied experience in Switzerland and Hong Kong and the U.K. he was appointed a Partner in his firm in 1939.

On the outbreak of war he volunteered for the Royal Engineers and served in North Africa and the Middle East from 1940 - 1945. At the end of the war he returned to the U.K. to find his firm reduced to no more than a handful of staff. From that low point Geoffrey was at the forefront of the reconstruction of his firm which under his leadership went from strength to strength and was to achieve an international reputation for excellence in the field of dam engineering.

Two projects in particular stand out:

- The Dokan Dam in Iraq and Mangla Dam in Pakistan

The Dokan Dam marked a watershed in the development of new computational methods for the analysis of arch dams.

Mangla Dam was at the time (1957) the single largest project undertaken by a consulting engineer. An organisation was set up with Binnie & Partners as Project Consultants and with Geoffrey Binnie as Project Partner. This is not the place to go into any detail on the Mangla project, but it is worthy of note that

the project was carried through to a most successful conclusion and much of the credit for this was undoubtedly due to Geoffrey Binnie and the wise and firm, but always courteous leadership that he provided.

Today we honour his memory and the traditions of engineering excellence which marked his work.

I have chosen as a title for my lecture:

## THE ULTIMATE DAM

No doubt this title will be considered the ultimate in cheek.

How can there be such a thing as the ultimate dam? Surely every dam is a once-off structure designed to meet the very specific needs of a particular site.

Very true - but perhaps only half true.

We all know, I am sure, that we each bring to the design of a dam our own particular preconceptions - our own idiosyncrasies - our own foibles and prejudices. We say that we always consider all options - but find strange to say that every project we are involved in tends to have a certain type of dam. And if another designer were involved it would almost certainly be a different type of dam.

I say that we delude ourselves if we believe that any one of us is truly impartial.

Terzagi, Cassagrande, Penman - Embankment dams  
Andre coyne, Serafim - Arch dams  
Barry Cooke - Rockfill dams with upstream concrete face  
Schreder, Dunston, Hollingsworth - Roller compacted concrete

I certainly have to confess my own partiality!

I have been known to wax lyrical about the sublime beauty of a thin arch dam compared with the splodge of an embankment dam. Now there's prejudice for you.

To parody the words of Dryden in Absalom & Achitophel: