COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

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ANNUAL CONFERENCE OF INSTITUTION OF ENGINEERS,

NEWCASTLE, FEBRUARY, 1958/64

by

D. E. Gardner

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INTRODUCTION

The headquarters of the Conference was located at the Newcastle City Hall, where rooms had been made available for organising and secretarial work. Papers were read at the Newcastle Technical College, in lecture rooms which are eminently suitable for the purpose.

ENGINEERING GEOLOGY

No papers dealt specifically with engineering geology. The following included various aspects of engineering geology.

Papers on design and construction of Glenbawn Dam.
Visit to Glenbawn Dam.
Visit to Grahamstown Water Storage project.
Visit to Tomago Sand Beds Water Scheme.

The following papers had few if any applications of engineering geology, although it is very probable that problems of engineering geology would enter into some phases of the projects concerned:

River control works in the Hunter Valley.
Flood mitigation in the lower Hunter River.
Hydrology research.
Structure foundation interaction.

COMMENTS

Engineering geology enters in varying degree into several of the projects discussed at the Conference, in particular into those dealing with water supply and conservation. The problems involved in choosing suitable sites for similar projects in other areas would initially be largely geological ones. The paper on Structure Foundation Interaction was concerned with the design of the structure. An investigation of foundation material at the site essentially engineering geology, may be regarded as complementary to the work discussed in the paper.

It is suggested that the Bureau could usefully be represented at each Annual Conference of the Institution of Engineers, particularly if a paper on engineering geology could be presented. By this means the Geological Section could keep in touch with some applications of engineering geology, and with the engineers concerned.

GLENBAWN DAM

Glenbawn Dam is a major earth- and rock-filled dam on the Hunter River. The country rock at the dam site consists of sediments and interbedded clastic volcanic rocks of Carboniferous age. Bands of propylitized tuff beneath the dam wall are weathered and decomposed to considerable depths. They caused difficulties in design of the dam, in preparing foundations, and in excavating a diversion tunnel and an outlet for the dam.

In driving the diversion tunnel an excessive amount of overbreak was attributed to numerous close joints in several directions. (It may be remarked that similar trouble in major excavations in the Snowy Mountains area was minimized by studying joint patterns before starting the work).

The large quantities of fill needed for the dam (10,000,000 cu. yd.) were provided in part from soil and alluvium and in part by quarrying solid rock. Soil testing and classification was done in a field laboratory and the field work was controlled by an engineer trained in soil-testing techniques. It may be assumed that the presence of the alluvial deposits in the vicinity was indicated on a detailed geological map compiled in the early stages of the investigation of the dam site.

Some trouble arose in the early stages of construction in obtaining satisfactory supplies of rock fill. This was overcome by opening a quarry in limestone above the dam site. The opening sentences in the concluding section of the paper on the dam site emphasise the importance of detailed geological investigation of the site: "Experience in the design of Glenbawn Dam emphasised in a practical manner the importance of investigations. With the opening of foundations, quarries, earth-borrow areas and tunnel lines, new and unexpected problems were revealed even after it was thought that designs were complete".

The following papers distributed at the Conference have been placed in the Bureau library:-

WILSON, N.A. and SCOTT, H.S., 1957 - The design of Glenbawn Dam. Jour.Inst. Eng.Austr.Dec.1957. (Reprint).

WATER CONSERVATION AND IRRIGATION COMMISSION, 1958: Glenbawn Dam. (Paper prepared for Conference).

STAFFORD, C.T., and WEATHERBURN, D.C., 1958 - Glenbawn Dam. Construction. (Paper prepared for Conference).

GRAHAMSTOWN WATER STORAGE RESERVOIR

A reservoir of 12 sq. miles and average depth 20 feet is being provided 10 miles north-north-west of Newcastle by constructing a series of earth-filled dams between low hills at the outlet of a natural shallow basin or depression. The unusual feature of this scheme is the "impounding" of a large volume of water in an area of subdued topography. The water impounded will come partly from the catchment of the basin, approximately 30 sq. miles, and partly by diverting and pumping some of the flow of the Williams River.

The terrain is sandy, but clay occurs at shallow depths from the right abutment across to the left abutment, which is situated in sand-hills. Sealing will be by means of clay, which will also be placed as an inclined blanket on the sand-hills. Leakage will probably take place below the sand-hills, but the water will flow into the Tomago sand beds, which are already yielding water to a series of pumping stations.

The following papers, distributed at the Conference have been placed in the Bureau library:-

HUNTER DISTRICT WATER BOARD, 1958 - Inspection, Grahamstown and Tomago. (Paper prepared for Conference).

HUNTER DISTRICT WATER BOARD, 1957 - Water is wealth. (Brochure issued by Water Board).

WATER SUPPLY FROM TOMAGO SAND BEDS.

The Tomago sand beds consist of aeolian and littoral quartz-sands, Recent in age. They form a belt 1½ to 3 miles wide that extends over a length of 15 miles parallel to the coast and approximately 3 miles inland between Port Stephens and Hunter River. The sands average about 60 feet in thickness and rest on impervious estuarine muds and clays of Pleistocene age. Fresh water is being pumped from the sand beds at 20 pumping stations, each of which is estimated to have a normal daily capacity of 1 million gallons. Details of the scheme are given in publications by the Hunter District Water Board that were issued at the Conference. The publications have been placed in the Bureau library.

HUNTER DISTRICT WATER BOARD, 1958 - Inspection, Grahamstown and Tomago. (Paper prepared for Conference).

HUNTER DISTRICT WATER BOARD, 1957 - Water is wealth. (Brochure issued by the Water Board).

OTHER PAPERS

Other publications issued at the Conference which are of incidental interest for engineering geology have been placed in the Bureau library. They are:-

HERZOY, A., 1958 - Hydrology research in the Hunter Valley. (Paper prepared for Conference, with bibliography).

DAVIS, E.H., and DOUGLAS, D.S., 1958 - The interaction between simple steel structures and their foundations in relation to the plastic method of design. (Paper prepared for Conference)