

Sydney's desalination pipeline

Segmental shaft linings

Case study



Shaft construction fast-tracks desalination project

Whilst the use of precast tunnel linings is becoming more prevalent in Australia, the use of segmental shaft linings is a new concept in this country. Humes was recently involved in the construction of two temporary shafts using the caisson technique, a method that proved extremely successful for the Water Delivery Alliance (WDA) constructing the desalination pipeline in Sydney - the WDA comprises of McConnell Dowell, Bovis Lend Lease, Worley Parsons, KBR, ERM and Sydney Water. The caisson technique involves jacking concrete segments into the ground to form a shaft structure. This approach reduced shaft construction times and provided considerable cost benefits.

With international experience in constructing caisson shafts in tight locations, Alliance partners McConnell Dowell investigated the suitability of this construction method for the desalination pipeline project. Following discussions with Humes regarding the application, economic viability and availability of the system, the WDA decided to proceed with this construction technique. By introducing the use of segmental linings into an urban project with restricted access, significant benefits with the caisson technique were gained including cost efficiencies, reduced plant and personnel numbers for installation, reduced noise pollution, and reduced hazards as operatives were not required to work inside the shaft during excavation.

The WDA sub-contracted Humes to design and supply the proposed shafts. Humes engaged Halcrow to check the segmental linings, design the shaft and all temporary works for the shaft construction process, and provide details for openings in the lining to receive the tunnelling machine being jacked from another shaft. Both of the temporary shafts were designed with a 7.5m internal diameter and measured 12m - 15m deep.

Segmental linings for the construction of shafts in both temporary and permanent conditions provide a viable alternative to the techniques traditionally undertaken in Australia. The adoption of the caisson and underpin methods provides significant benefits, especially in time and cost savings to both the contractor and client. Humes cast these segmental linings in various sizes and they are available throughout Australia.

The Sydney desalination plant and pipeline has been built to deliver up to 250 million litres of water a year, and at full capacity will supply up to 15 percent of Sydney's water needs each year. The plant's power needs are fully offset by renewable energy produced at Capital Wind Farm.

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Project

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Client

Water Delivery Alliance (WDA)

Product supplied

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