

BRITISH DAM SOCIETY 22nd BIENNIAL CONFERENCE –UNIVERSITY OF KEELE Conference Tour – Thursday 12th September 2024

Severn Trent - Tittesworth Reservoir



Figure 1 Tittesworth Reservoir Overflow

Background

Tittesworth Reservoir is situated on the upper reaches of the River Churnet about 3km North East of Leek, Staffordshire. Originally built in 1858 to support the local mill industry, with a capacity of 0.9 million m³.

The dam was 48ft high (Approx. 14.6m), with a puddle clay core, supported by shoulders of compacted clay and shale. In the late 1950's, it was later decided to increase the capacity of the reservoir to support the increasing population and industrial demand for water supplies.

The new dam was completed in 1963. It is sited immediately downstream of the older dam which is incorporated into the upstream shoulder of the current dam. The new dam is an embankment dam with a concrete core.

Problems during construction

The original Victorian reservoir was fully emptied in 1960 to enable the new dam to be constructed immediately downstream of the original dam. It was necessary to trim the downstream embankment of the original dam and remove the original downstream berm. As part of this process a slip formed on the downstream face of the original dam. Later investigations revealed a black organic silt, moisture content 40-80%, in the base of the slip. This was weak enough to account for the slip. Interestingly, there were no obvious weak layers identified within the original boreholes undertaken prior to the slip.



Figure 2 Tittesworth Reservoir Downstream Embankment

Following the slip, the dam design was reviewed and redesigned by Professor A.W. Skempton. There were several improvements incorporated into the revised design for the dam which included:

- i) The shifting of the centre line 30ft. downstream
- ii) The use of a concrete core instead of a rolled-clay core
- iii) A 1 in 2 downstream slope in place of the previous 1 in 1.75.

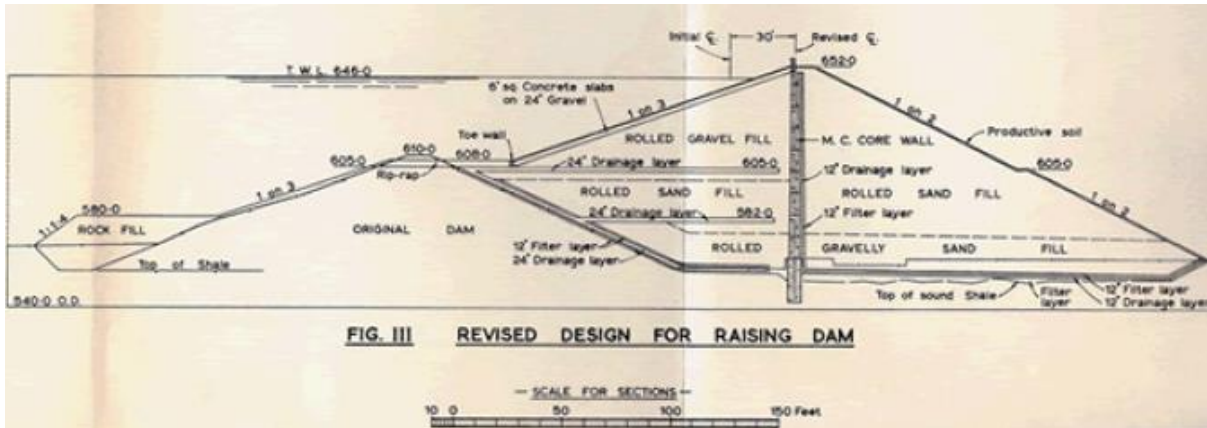


Figure 3 Cross section of the revised dam at Tittesworth reservoir

The revised design also incorporated vibrating wire and hydraulic piezometers which was one of the early adoptions of this technology.

The Reservoir Today

The embankment dam is 390 m long and 24 m high. The reservoir has a capacity of 6.4 million m³ and the dam remains fully compliant with the Reservoirs Act 1975.

At the eastern end of the dam there is a bellmouth spillway and a valve house accessed by a walkway bridge above the spillway.

Immediately downstream of the dam is Tittesworth Water Treatment Works which typically treats 28 Megalitres per day, which supplies the areas of Leek and North Staffordshire, via Ladderedge Service Reservoir (also a statutory reservoir under the Act).



Figure 4 Recreation map for Tittesworth Reservoir

The reservoir is widely used for recreational purposes and is an extremely popular visitor site. There is a visitor centre at the Northern end of the reservoir, which was opened in 1998, a circular walk of the reservoir and it is used by various clubs for fishing and watersports.