



The British Dam Society

EVENING MEETING

Monday 13th January 2025 - 18.00

Overflow and outlet screens

Jeremy Benn



Bwlch Nant yr Arian Reservoir Improvement Works

Matt Coombs



For synopsis and brief presenter biography see overleaf | Admission free | Teas available from 5.30pm

This meeting will be live at the ICE and streamed on the internet. For more details, including enjoying the live stream as part of a group at one of our Regional Hubs around the UK, please visit the meetings page on the BDS website: www.britishdams.org

For more information, please contact the ICE on 020 7665 2147 or email: bds@ice.org.uk

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Synopsis

Overflow and outlet screens.

Overflow/outlet screens are often fitted to reservoirs to prevent human exposure to hazards, to catch large debris, or to prevent fish and mammals being washed downstream.

Whatever its primary purpose, a screen will collect debris and block temporarily. This blockage can lead to an increase in reservoir water level and could alter the stage-discharge relationship of the overflow or outlet. Furthermore, blocked screens will reduce the available freeboard and overflow capacity. Their impact must therefore be considered in reservoir flood studies and the design of outlet structures. This is particularly important for flood storage reservoirs (FSRs) that operate infrequently and rely on maintaining the design stagedischarge relationship to achieve the required flood attenuation.

Case studies are presented concerning two FSRs fitted with self-activating flow-control devices on their outlets that failed to operate as anticipated on first filling. In both cases the unexpected operation was attributed to downstream screens fitted to mitigate perceived hazards. A third case study concerns the impact of a 'fish' screen placed in the overflow spillway of an amenity lake.

This presentation summarises research on the impact of screen size on fish and mammal passage, and on debris movement, in particular the relationship between debris volume and bar spacing. It looks at some alternative screen design and management measures to reduce the impact on reservoir water level and overflow capacity.

Bwlch Nant yr Arian Reservoir Improvement Works

The change requiring formal registration of reservoirs >10,000m³ capacity, implemented within Wales from 2016, led to a large number of reservoirs being reassessed and registered Natural Resources Wales (NRW). This included sites within the forest estate, such as Bwlch Nant Yr Arian, situated about 14km due east of Aberystwyth.

A Section 10 Inspection was undertaken in November 2014 and subsequently October 2017. Completion of measures from the 2014 inspection clarified the capacity of the reservoir was 40,000m³, with no overflow, controllable drawdown facility and with insufficient freeboard. The construction works undertaken in 2020/21 consisted of removal of the existing outlet pipe (a corroding corrugated Armco pipe), installation of a new Reinforced Concrete (RC) spillway with a pedestrian footbridge over the top and an integrated low level drawdown facility, and rip rap along placed the upstream face.

This presentation discusses the particular construction challenges faced, during a project to address safety measures applying to the reservoir, such as the very steep sided valley limiting construction access, the visitor centre remaining open during the works, working limitations due to red kite feeding times, adverse weather experienced, emergency planning and the impact of Covid.

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Presenter's Biographies

Jeremy Benn, JBA | Jeremy is a chartered engineer and reservoir supervising engineer. He is the founder of JBA Consulting and has 40 years' experience of water engineering. He has worked on reservoir and flood risk management projects in the UK, Ireland, Georgia, Azerbaijan, Moçambique, India, Sri Lanka, Australia and New Zealand and has been an expert witness in several landmark cases relating to blockage and scour at engineering structures. He was the co-author of the 2019 CIRIA C786 Culvert, screen and outfall manual and the 2019 Environment Agency Blockage Manual.

Matt Coombs, Binnies | Matt is Dams and Reservoirs Director at Binnies and a reservoir Supervising Engineer. He has over 30yrs experience in the industry and was seconded to NRW for over 5 years from 2015-2021 where he was responsible for reservoir compliance, this was during the enactment of the >10,000m³ requirement for reservoir registration.



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The Regional Hubs allow the live stream of BDS evening meetings in London to be enjoyed as part of a group elsewhere in the UK.

Refreshments are provided from 17:30 in conjunction with watching the live streaming of the evening meeting - anyone is welcome to attend!

We would be grateful if you could register your intention to attend with the relevant Regional Hub host - details below.

BRISTOL HUB | Liz Rivers | liz.rivers@jacobs.com | 07817 166204

Jacobs, The West Wing, 1 Glass Wharf, Bristol BS2 0EL

WARRINGTON HUB | Nathan Freeman | nathan.freeman@uuplc.co.uk |

United Utilities, Lingley Mere, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP

LEEDS HUB | Tom Anderson | tom.anderson@mottmac.com | 07481 071694

Mott Macdonald, 26 Whitehall Road, Leeds, LS12 1BE

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