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Meeting report: BDS conference in Belfast September 2014

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The 18th biennial conference of the British Dam Society (BDS) took place at Queen's University, Belfast, with tours to several reservoirs. The conference banquet and Binnie lecture took place in Titanic Belfast. A pre-conference tour to Lagan weir was held, and this is reported upon separately. The Accompanying Persons programme also ran in parallel throughout the conference.

The British Dam Society (BDS) conference in Belfast, September 2014, was formally opened on Thursday morning by the BDS chairman Ian Hope who introduced the theme of the conference 'Maintaining the safety of our dams and reservoirs' (Figure 1). He remarked upon the record number of delegates and particularly welcomed the younger members that were present. We were then welcomed by Professor Trevor Whittaker, Head of Space at Queen's Univeristy Belfast (QUB). Geoff French, President of the Institution of Civil Engineers, then addressed the delegates before the commencement of session 1.

Session 1, 'Legislation and environmental challenges', started promptly under the chairmanship of Ian Hope, with Ian Merrill as technical reporter. Roger Lewis presented a summary of the recent changes to the Reservoirs Act 1975 (1975), which came into force in July 2013 in line with schedule 4 of the Floods and Water Management Act 2010 (2010). Huw Thomas followed on with a presentation describing the main legislative changes which will be brought about by the scheduled implementation of the Reservoirs (Scotland) Act 2011 (2011), and are due to commence in 2015. The final presentation of the legislative trilogy came from David Porter, who explained Northern Ireland's journey towards 'The Reservoirs Bill', which reached the final stage in June 2015. David McKillen's paper examined the significant environmental challenges which had to be overcome in order to obtain full planning permission to raise the top water level of Lough Mourne, County Donegal, for water supply development. The final paper of the session was Tom Wanner's summary of the Chingford pond restoration, a project which overcame a series of ecological and historical constraints in order to reinstate the historic top water level.

After a coffee break in Whitla Hall, where there was opportunity to visit the various trade stands, session 2, 'Geotechnical issues of dam construction and maintenance', commenced under the chairmanship of Richard Robson with Sally Russell as the technical reporter.

The first paper was by P Rigby, A Thompson and D Jones and was a description of the nearly perfect nineteenth-century embankment dam. The paper provided a timeline of the development of the embankment dam and described how United Utilities owns 170 embankment dams and as a result has undertaken a number of seepage Toolbox workshops to identify the main risk to their dams from internal erosion. The second paper of the session was by D Bruggemann and O Francis, who described the remedial grouting works at Shon Sheffery dam in Wales. They described how they utilised a magnetometric resistivity (willowstick) technique to target the grouting solution which was required to resolve a historical leakage issue into the spillway chute. This was followed by Simon Pryce and Anthea Peters who presented a paper on the Bransholme lagoon scheme, which involved increasing the volume of the lagoon by raising the reservoir embankments. They described the issues encountered with the piled solution, how these were identified during testing and summarised the lessons learnt on the scheme. The session ended with a paper written by P Harvey describing the Didachara dam project and the issues related to the design of the concrete dam; in particular the challenges of the geology of the area and the topography of the site.

A splendid buffet lunch in Whitla Hall was followed by session 3, 'Mechanical components of dams'. The chairman was Newman Booth and the technical reporter Viktor Pavlov. Karol McCusker commenced with a paper describing the design and installation practicalities and challenges presented by the refurbishment of the Portora sluice structure.

This was followed by Russ Digby's paper on the subject of replacing vertical lift bow string-girder type roller gates in the absence of any existing stop-log system.

David Windsor and Matt Coombs then presented a paper on the modification of the draw-off culvert inlet structure at Rudyard reservoir to improve the inlet control and operation of the scour valves.

Figure 1. Main lecture theatre

The final paper in this session was given by Jon Walker and Marika Tietavainen who described two case studies of slip-lining of bottom draw-off conduits. The authors shared their practical experiences and suggested ten 'golden rules' to be adopted by the designer and contractor when carrying out similar works.

After the coffee break, Craig Goff chaired session 4, 'Risk analysis and reduction measures' with Alex Topple as the technical reporter. Alan Warren and Andy Hughes commenced with a short overview of the update to the new Guide to the Reservoirs Act, and an update on current research (Figure 2).

Figure 2. Dr Hughes with a riveting question

This was followed by a paper on a practical application of UK guidelines for the public acceptability of the risk of dam failure by Keith Gardiner. This generated discussions on the public's perception of risk. Robert Mann then gave a paper on setting standards for drawdown capability at Scottish Waters reservoirs. The paper reviewed current standards and developed a standard to adopt for draw-down rates to meet maintenance, precautionary and possible emergency requirements. The final paper in this session was given by Alan Brown – a change to the original agenda. Alan described the works to rehabilitate an 800-year-old masonry dam, which was not without its surprises as the site was once used for a tank training ground, which led to the discovery of a dummy anti-tank mine, and the sudden self-ignition of an old WWII phosphorus grenade 0·5 m from a public footpath.

At 17:20 prompt, we were taken by coach to Titanic Belfast for the Geoffrey Binnie Lecture given by Alan Cooper. Alan gave us a varied and interesting lecture on the heritage of dams in Northern Ireland, which is reported separately in the previous issue of *Dams and Reservoirs* (Cooper, 2014). Dinner followed in the Titanic Suite (Figure 3).

The dinner proved an excellent opportunity for socialising and networking and Ian Hope, the chairman of the BDS, gave an after-dinner speech assisted by Jo Hope both suitably attired in safety helmets (Figure 4). The entertainment was provided by a stand-up comedian, whose one-liners seemed to be plucked from a very deep reservoir of material; all within the act no doubt.

Figure 3. Dinner at the Titanic Belfast

Session 5, 'Design and construction case studies', started at 8:30 on Friday morning and was chaired by David Porter with Kieran Brazier as the technical reporter. The session commenced with a presentation by John Ackers and Simon Pryce on the design and construction of an enlargement scheme for Black Esk reservoir which is located in the Dumfries and Galloway region of the Scottish Borders. This was followed by Peter Brinded and Rob Gilbert, who shared the challenges of low-impact flood storage design on Eller Beck Flood storage reservoir, which is part of the proposed Skipton flood alleviation scheme in North Yorkshire. Richard Terrell then gave a presentation on labyrinth overflow and replacement of masonry spillway at Shon Sheffrey reservoir in South Wales.

Figure 4. Ian and Jo Hope with suitable personal protective equipment

The final presentation of the session was made by Sally Russell and David Rebello who discussed the issues faced when discontinuing an impounding reservoir, including the environmental, hydraulic, and construction sequencing constraints and the strategies used to overcome these challenges.

At 10:15 prompt we arrived at the coaches for the four organised tours. These tours are reported upon separately, but as a taster, Figure 5 shows outlet plume at Ben Crom, the upper reservoir in the series at Silent Valley in the Mourne Mountains. The dam is 213 m long and 34 high above river bed with a total concrete volume of 93 000 m^3.

The meal on Friday evening in Whitla Hall was of excellent quality, and was followed by the Andy Hughes quiz. Perhaps the most memorable part of the evening was the excellent response by the team headed by Richard Robson to the request for ideas on future research projects. This was entitled 'A study of access chamber diameters in the light of panel engineers' expanding waistlines'. It must be reported that Dr Hughes took this as a personal insult and was not overly impressed.

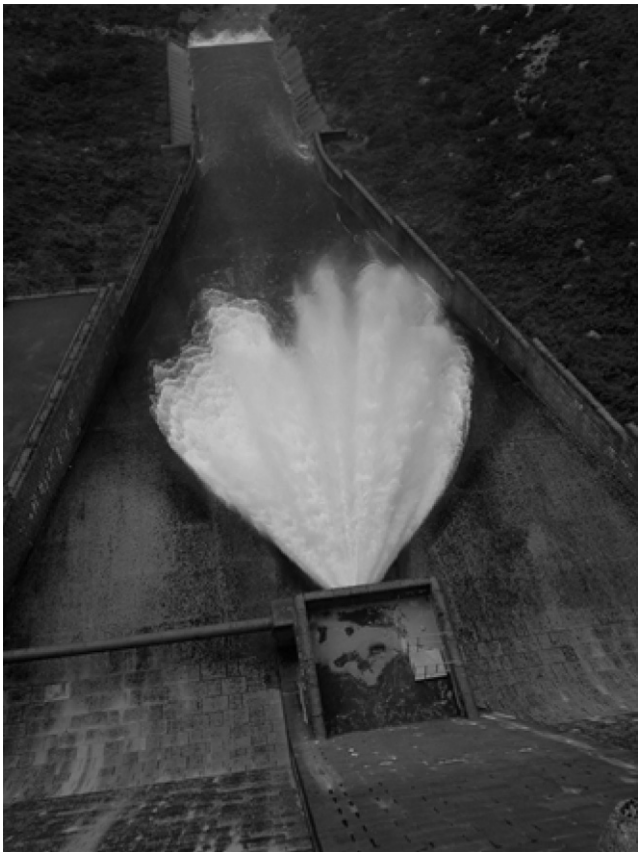

Figure 5. Ben Crom

Many delegates migrated to the 'Bot' across the road to finish the evening of intellectual stimulation to the accompaniment of an Irish band.

Saturday morning was approached in an appropriately alert fashion, and session 6 was chaired by Tracey Williamson with Rachel Davies as the technical reporter. Andy Hughes commenced with a paper describing how monitoring and surveillance programmes of dams are changing, which included a series of case histories being described. This was followed by a paper by J Gosden, which discussed concerns that have been raised during recent Reservoir Act inspections. These concerns are namely that the reservoirs may not have the ability to accommodate overtopping flows during extreme flood events without significant risk of failure. Andy Hughes then presented a second paper in this session, which focussed on the 2013 incident at Rhymney Bridge reservoir in South Wales. It described how the incident was managed, why it had occurred and the emergency repairs that were undertaken. It concluded with a description of the permanent repairs that will be constructed in the future. Session 6 concluded with a paper by A Ross, which highlighted the risks associated with accessing reservoirs in severe winter weather. Options for safe access were described, including the use of all-terrain vehicles, with comparisons given and reasons outlined for the choice of vehicle in specific circumstances.

A coffee break followed in Whitla Hall, and the final session 7 commenced with Andy Hughes as chairman and Ben Jones as the technical reporter. The session started off with an example of emergency planning for mining waste facilities in England, given by Tim Hill, who explained how the breach of tailings dams, with varying quantities of material inside, could be modelled. (This paper had been rescheduled from session 4.)

John Chesterton then presented a paper on an investigation into the safety of Tittesworth reservoir, where a 'pre-inspection' of the reservoir by the ARP engineer, before the scheduled section 10 inspection, allowed time for a review which discovered a discrepancy in the record drawings. This discrepancy affected the rating curve of the spillway, and the discovery of this led to modelling and flood studies to reassess the flood rise and the strength of the wave wall.

The third paper detailed improvements to operational safety at Spelga Dam in Northern Ireland. Jon Bradshaw explained how some exercises with the fire brigade had highlighted the need for the excavation of a walk-in tunnel to allow inspection access into the dam, because of the difficulty of winching out someone if they were incapacitated. This led to an interesting discussion on whether supervising engineers should have abseiling skills.

The session was concluded by Gareth Briggs with a paper on the refurbishment of towers and scour pipework at the Woodburn reservoirs, above Carrickfergus in Northern Ireland. He drew particular attention to the benefits of site-specific scour management plans.

To wrap things up Ian Hope then closed the conference, thanking our hosts, the QUB, for their excellent hospitality, Barbara Sharp and the organising committee, and Alan Cooper OBE.

The delegates then retired to the refectory for a buffet lunch, where praise for the organisation of the conference, the variety of papers and the social events was unanimous.

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