

## **Reliability of flood detention reservoirs in providing the intended standard of flood Protection**

S Mergen, Jacobs UK Limited  
A Courtnadge, Jacobs UK Limited  
A J Brown, Jacobs UK Limited

---

**ABSTRACT:** There are now around 200 large flood detention reservoirs (FDR) in the UK, typically designed to attenuate floods and thus prevent flooding downstream for events up to the 1 in 100 chance per year, sometimes but not always with provision for climate change. There is some evidence that these structures do not always provide the intended standard of protection and this paper will explore issue arising, including:

- Case history evidence of design storage expressed as mm of rainfall runoff which can be accommodated, and pass forward flow (attenuated outflow)
- Reasons why the intended standard of protection may not always be achieved
- Present case examples of a number of FDR which are to be discontinued, as the annual costs outweigh the benefits of flood attenuation
- Potential impacts of climate change

The paper will conclude with some suggested simple sensitivity tests to test the reliability of a flood detention reservoir in attenuating floods, including the impact of climate change.

## **Practical experience of installing slurry walls**

D Scopes, Senior Engineer, Atkins

---

Although the Horncastle project was a new build embankment, the cut-off, in the form of a slurry wall, was installed once the embankment construction was complete, and as such the installation process was practically the same as a slurry wall being installed as a part of a dam repair and rehabilitation works, and the experience is directly transferable.

This paper is based on my experience based full time on site, working for the main contractor, supervising the installation of a sub-contractor design to a performance specification. This paper will take the reader through every stage of the installation process from setup and logistics, to daily operations, what the process is actually like on the ground, and the H&S and environmental considerations.

For each stage I will discuss the challenges faced, and the lessons learnt, to allow other designers, and supervisors an insight into what to consider, and what to be aware of when planning, or supervising, a slurry wall installation operation.

# Design details for flood detention reservoirs

A J Brown, Jacobs  
A Courtnadge, Jacobs  
J Gosden, Jacobs

---

**ABSTRACT:** There are currently around four new flood detention reservoirs built each year in UK, which although only being modest structures with median height of 4m and reservoir capacity of 300,000m<sup>3</sup> pose a significant risk to the community as they are located immediately upstream of the community they are protecting. These communities range from around five to several thousand households.

The cost and therefore viability of these structures can vary depending on the number of defensive features built into the design, which raises interesting conflicting issues of public safety contrasted to vulnerability to property inundation in operational (say, 1 in 100 chance) floods.

The authors have designed and supervised over 30 new flood detention reservoirs in the UK in the last 20 years, together with inspections of a similar number designed by others. This paper describes the emerging issues regarding risk of failure of these dams under flood loading. Examples of measures to manage risk are described, with discussion of when selection of the options to increase resilience against a particular failure mode should be mandatory, and when it may be more appropriate to consider it on a case by case risk-based approach. The paper will also discuss more strategic issues of design standards for design of spillways at flood detention reservoirs, comparing the hazard introduced by construction of the reservoirs with the annual benefits of flood risk reduction.