Basic Details

Publish Date

16 October 2026

Case ID#

3372

Title

Incorrect gate operation damaged the gate frame causing inoperability

Nation

England

Regulator Reference No.

560

Legal Status

Statutory

Reservoir Type

Non-impounding

Reservoir Capacity

25,000 - 99,999m3

Year of Construction

1990 - 2009

Main Construction Type

Earth fill embankment

Dam Height

5 - 9.99 metres

Dam Flood Category

A

Hazard Class

High-risk reservoir

Reservoir Use

- Flood risk management

Owner Type

Public body

Incident Details

Date & Time of Incident

08 July 2026 - 12:00

Date Incident Closed

08 August 2026

Observations that Caused the Incident to be Declared

- Not provided

Describe the Incident

This site is classed as an impounding flood storage reservoir to prevent downstream flooding during high rainfall. It is mostly dry with a stream running through and only floods the reservoir area in extremely high flows. The outlet is controlled by a hydraulicly operated gate which sits halfway open. This allows a steady flow of water whilst managing downstream flood risk. The gate has stops which rest on a beam, called its 'home position'. this is to prevent the gate closing during a loss of hydraulics or hydraulic creep.

During a planned maintenance event, the operational key switch was moved from auto to manual and the gate was operated to close. However, the gate was still resting on the stops. With the pressure exerted on the stops, they did not move which caused the frame to distort. The frame bowed upwards and the strengthening bars broke away from the locating points on the frame. The Reservoir was empty of the time of the event so there was no uncontrolled release of water caused by the damage to the structure. There is no potential for this to have been the case, and the damage solely effects the ability to drawdown water levels during flood conditions.

The damage was reported immediately to the Supervising Engineer by phone with further details supplied by email later. The undertaker is working with contractors to repair the damage, requesting it to be complete prior to the winter flood season.

The penstock door remains in the 'home position and is resting on it's mechanical stops. This means it will impound flood water in the reservoir as intended, and serve its purpose in terms of flood risk management. It cannot, however, be raised from its home position. In any event where opening of the penstock is required to draw down the reservoir, it cannot currently be operated. There is an Emergency Flood Plan (Onsite Plan) in place for the site, which contains recommendations for pumping to drawdown water levels. This plan would be implemented in the unlikely event of drawdown being required before repairs are complete.

Supporting Photos

Gates resting on their stops



Damage to frame, showing bowing of frame and broken supporting arm joint



Causes and Impacts

Natural Processes which Initiated or Contributed to the Incident

- None

Main Contributing Factors to the Incident Occurring

Dam Factors

- Not provided

External Factors

- Human error

Shortcomings

- Human error
- Process or procedural shortcoming

Root Cause of the Incident

The penstock was incorrectly operated (switched to manual and set to close) when it was already resting on its stops, which caused distortion of the top member of the gate frame.

The damage occurred during planned, routine maintenance by external contractors.

Impacts on the Reservoir

- Failure or damage to valves, gates, penstock

Supporting Photos

No images provided.

Supporting Contributions and Studies

Human Factors which Influenced the Incident

The penstock was incorrectly operated, which caused the incident.

Instrumentation at the Reservoir

Was Instrumentation Effective?

Yes

Assistance by External Parties and Impacts on Downstream Population

None

Summary of Studies or Investigations Undertaken

The cause of the issue was apparent. The repairs involve the following steps:

Recovery

1. Remove the hydraulic cylinder and top of gate with HIAB

2. CARE must be taken with the cylinder as the positional instrument on top is expensive and has a lead time of 26 weeks

3. Contractor to straighten the top of the gate bracing brackets , and twisted side of gate.

4. Return, replace top of gate and hydraulic cylinder with HIAB

The undertaker has also introduced mitigations to minimise the risk of a similar event happening:

Prevention

1. Remove manual button for down , or replace with a key switch

2. Reduce hydraulic pressure if possible

3. Toolbox talk training for the team talking through operational manual

Supporting Photos

No images provided.

Lessons Learnt

Lesson 1

- Human factors
- Mechanical / electrical

Ensure that specific / individual personnel are inducted to site, and familiar with the operation of the structure.

Lesson 2

- Human factors
- Operation and maintenance

Where mechanical operation creates inherent risk of failure, identifying where the risk can be designed out reduces the chance of these errors happening.

Following the ERIC (Eliminate, Reduce, Isolate, Control) principles, this incident could have been avoided (and will be in the future) b:

Eliminating the risk (removing the 'down' button, or replacing with a key switch)

Reducing the impact (reducing hydraulic pressure)

Control (Toolbox talk for all operatives and updating the operational manual)

Lesson 3

Lesson 4

Closing Comments

Supporting Photos

No images provided.

Information provided has been sent from reservoir owners and engineers, and cleansed of personal information by the enforcement authority. We cannot guarantee the accuracy of the data, but if you find an error please contact the relevant enforcement authority.