Dams and reservoirs - Transforming energy

Dam engineering features

Overview

Use the glossary of dam terms in conjunction with the model dam building video and enjoy watching our graduate engineers build and explain the science behind the construction and failure modes of dam-building.

Scan this QR code to find out more!

Glossary of dam terms

Crest	Top of the dam wall
Core	Impermeable fill barrier that makes up the balance of an embankment dam
Filter	Semi-permeable zone designed to prevent loss of soil and protect the core
Shoulder fill	Used to provide structural stability to the dam; should have high permeability
Abutment	Side of the valley wall which dam is constructed against. These can be stabilised and modified to provide more stability to the dam. Right and left abutments are as observed when looking downstream
Toe	Junction point of the downstream face of the dam and the natural ground
Grout curtain or blanket	Technique used to create a barrier into the foundation to avoid seepage or possible failure points with the foundation
Spillway	Used to control the release of water from the dam downstream
Riprap	Protection on the up and downstream face of the dam. Riprap offers wave protection, particularly on the up stream face
Free board	The height remaining between the top of the reservoir and the crest
Phreatic line	The top flow line of a saturated surface of the seepage from the reservoir through the dam

Island Bend Dam

Managing safety controls

To manage this risk there is a stringent dam safety program that involves the constant surveillance and ongoing assessment of the dams. Each dam undergoes a risk assessment and safety review. A large part of this process is identifying the failure modes for each dam. Typically, failure modes can fall into four main categories.

Did you know?

Dam failure is defined as the uncontrolled release of water from the reservoir.

Four main categories of failure modes

Overtopping	When inflows fill the reservoir faster than spillway, generation or other measures can lower the water level this can exceed the maximum design level and overtop the dam structure. Overtopping can lead to erosion and instability of the dam structure, causing a failure
Foundation defects	Structural instability can occur through setting in the foundations, instability in the valley slopes, excessive uplift pressures and seepage through the foundation
Piping and seepage failures	Water can find a defect or weak point and form a pathway through the dam or foundation, which can cause movement of material and internal erosion. Trees, animal burrows, conduits and cracks can contribute to these failures
Conduit and valve failures	Issues in the operation or effectiveness of valves and conduits can lead to failure. Defects in conduits can create an erosion point and inlet for piping to occur

Still want more?

There is also a hands-on activity sheet available to consolidate what you have learned in the dam building video


Geehi Dam