

# SAFETY ANALYSIS FRAMEWORK

DAM FAILURE

DAM FAILS BY LOSS OF STRENGTH

Failure Mode Level

DAM FAILS BY OVERTOPPING

Inadequate durability/  
cracking resistance

Inadequate water-tightness

Inadequate stability  
under applied loads

Inadequate freeboard

Inadequate available  
discharge capacity

Inadequate installed  
discharge capacity

Management,  
Procedural and  
Human Factors

(Response Analysis)

Instantaneous change of state  
(static liquefaction, hydraulic  
fracture, seismic cracking or  
liquefaction)

Structural weakening: AAR,  
internal erosion, crushing,  
gradual strength loss

Through dam seepage control  
failure (filters, drains, pumps)

Seepage around interfaces  
(abutments, foundation, water  
stops)

Loss of support (foundation or  
abutment failure)

Mass movement (external  
stability:- displacement, tilting,  
seismic resistance)

Wind-wave dissipation  
inadequate

Excessive elevation due to  
landslide or U/S dam

Discharge capability not  
maintained

Random functional failure on  
demand

Inadequate reservoir operation  
(rules not followed)

Meteorological inflow > buffer +  
outflow capacity

## FREQUENCY (Hazard Analysis)

