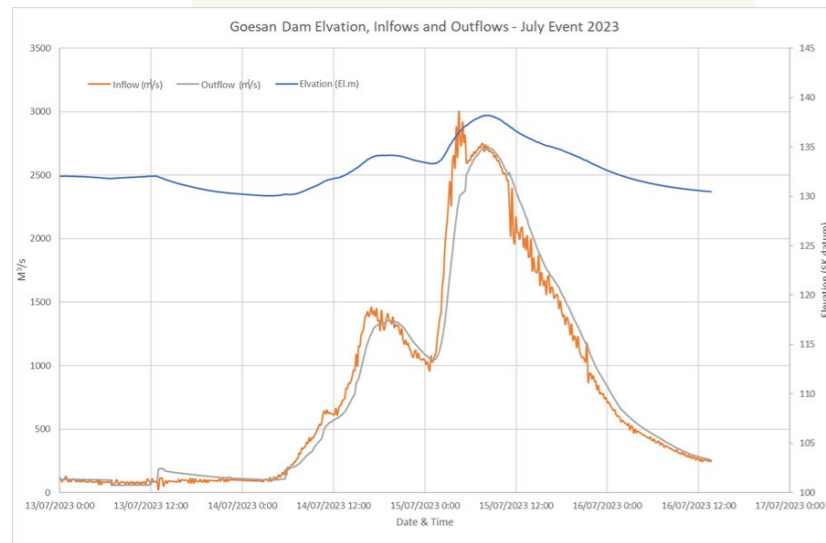


South Korea Infrastructure - July 2023

Goesan Dam is about 15000ML in volume and is in the upper reaches of the Han River catchment that eventually flows through Seoul. It has a catchment area of 671 km². The issue for the dam was that the calculated inflows exceeded the design outflow capacity of the gates by some margin (10.5%), with warnings of potential dam failure conveyed in the media, and picked up internationally as the flood level exceeded the maximum planned. Data provided by Han River Flood Control Office.

In Osang, a levee at the Miho River collapsed allowing rapid inundation of a 685-metre-long road tunnel with 14 fatalities. There was significant criticism of emergency managers with the likely failure identified 1 hour prior to occurrence. A key focus of the police investigation was management and maintenance of the embankment.



Data provided by Han River Flood Control Office.

Resources available

- Rainfall data – unofficial
- Reservoir data - official
- Media coverage

Useful to

- Regulators
- Dam owners
- Engineers
- Disaster & emergency managers
- Boards

Do we have a culture of assuming dams will never fail?

How do we rely on forecasts for gate operations? What scenarios might eventuate and are they within our risk appetite?

How might teams cope in a serious situation? How do we support during, and post event? Do we provide mental health training?

Governance Questions

Are roles and responsibilities during emergencies clear with integrated stakeholder planning?

Do we have any obligations or unmanaged risk with embankments that could fail that are not regulated?

Learnings Checklist

Category	Event	Learning/prevention activity	Question?
Asset management and operational risk	Significant increase in rainfall intensity when dam already discharging about 50% of capacity (data)	Rapid change in situation at dam from emergency to crisis. Gated dams may present greater risk when there is a significant variance between design and operational conditions as the lake level can be influenced by those design assumptions through gate operation settings especially with embedded storms during longer duration events.	How would the asset perform with a large inflow in a short period associated with a convective burst within a larger storm event?
Planning and continuity	Forecast dam failure based on dam inflow assessments and outflow predictions. (Han River Flood District). Early assessment allowed evacuation of 6400 people downstream (BBC)	Clear triggers in an agreed plan for action points mean no decision is required during the event.	Do we have clear evacuation triggers, identified in advance, in a multi agency setting?
Asset management and operational risk	Exceedance of design criteria.	Low risk isn't no risk.	Do we assume dams will never fail? How does this play out in culture, and the application of systems and processes?
Risk and stakeholder	Rapid flooding of Gungpyeong No. 2 road tunnel in Osang. (The Guardian) 14 fatalities. Local authorities advised they complied with their emergency plan which didn't require tunnel closure. (Korea Times). The levee, and tunnel risk were managed by separate entities.	Compliance with a plan doesn't mean safe. Management of risk 'in so far as reasonably practical' means a post event assessment that maybe based on the intent of the plan outcomes – not if followed.	How can we ensure our plan meets the intent of having it in place?
Unmanaged risk	Rapid flooding of Gungpyeong No. 2 road tunnel in Osang. (YONHAP news agency) caused by levee failure. Investigation into those involved in design, construction, and maintenance of levee. Judgement found them liable.	Roles and responsibilities need to be clearly defined, and risk assessed under different design loads. The embankment was effectively a dam during large river flows. Non-regulated structures still require risks to be managed.	Is there a risk to the public safety from infrastructure that may not be regulated?