


Water Directorate Dam Safety Risk Management Workshop

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Bathurst Regional Council
Chifley Dam
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A stylized silhouette of a mountain range in shades of teal, located in the bottom right corner of the slide.





Outlet works



The main embankment



The auxiliary spillway



1998 Flood

- ◆ Peaked at 2.74m (9') above spillway (<1.4m to overtopping)
- ◆ Flow reached 0.7ML/s
- ◆ 235mm below auxiliary spillway
- ◆ Largest Bathurst flood since records started in 1909 (1.7ML/s)

Major safety concerns

- ◆ Dam only able to pass 36% of PMF
- ◆ NSW DSC required ability to withstand & pass 100% PMF
- ◆ Single auxiliary spillway would cause large wave through Bathurst
- ◆ Outlet works flood – scour unusable
- ◆ Side channel spillway almost choked
- ◆ All water released from base of dam

Upgrading & Raising

- ◆ Dam strengthened with 47 permanent ground anchors
- ◆ Dam raised by 5.35m, 6 fuse plug embankments installed, auxiliary spillway extended & deepened, outlet works replaced
- ◆ Parapet wall installed along crest
- ◆ Monitoring points installed (1", 1mm)

Ground anchors

- ◆ Geotechnical investigations revealed three rock strata below concrete spillway
- ◆ Issue was movement of spillway or strata due to increased load from extra water
- ◆ 47 ground anchors required
- ◆ Each drilled 30° to horizontal
- ◆ Average length 33m
- ◆ Anchors comprised 38 or 48 strands cable
- ◆ Tensioned to 500T or 700T
- ◆ Locked off & sealed
- ◆ 61km steel cable used

Post tensioning base camp



Ground anchor cable ready





Post tensioning underway



Foundation preparation



Extensive diving works

- ◆ In late May 2000 the construction site was covered in snow
- ◆ Divers were working up to 13m deep in very poor visibility & very cold water temperatures
- ◆ After each dive, 40 minutes of decompression chamber required due to elevation of the site (705m AHD)

Portable decompression chamber



Another day at the office



Trunnion arm



Water everywhere



First stage of spillway raising



Auxiliary spillway bays 1-3



6 Fuse Plugs

- ◆ Bays 1 to 3 have ogee crest
- ◆ Bays 4 to 6 lower storage to <50%
- ◆ AEPS
 - 1 in 200
 - 1 in 520
 - 1 in 1,100
 - 1 in 2,400
 - 1 in 9,700
 - 1 in 30,000





Major components complete August 2001





Statistics

- ◆ Storage increased: 16GL to 30.8GL
- ◆ Now one sixteenth capacity of Sydney Harbour
- ◆ Spillway raised 5.35m, 29.7m longer
- ◆ 208,000m³ of fill material
- ◆ 3,200m³ concrete
- ◆ 2,000 bags cement grout – anchors & sealing outlet conduit leaks

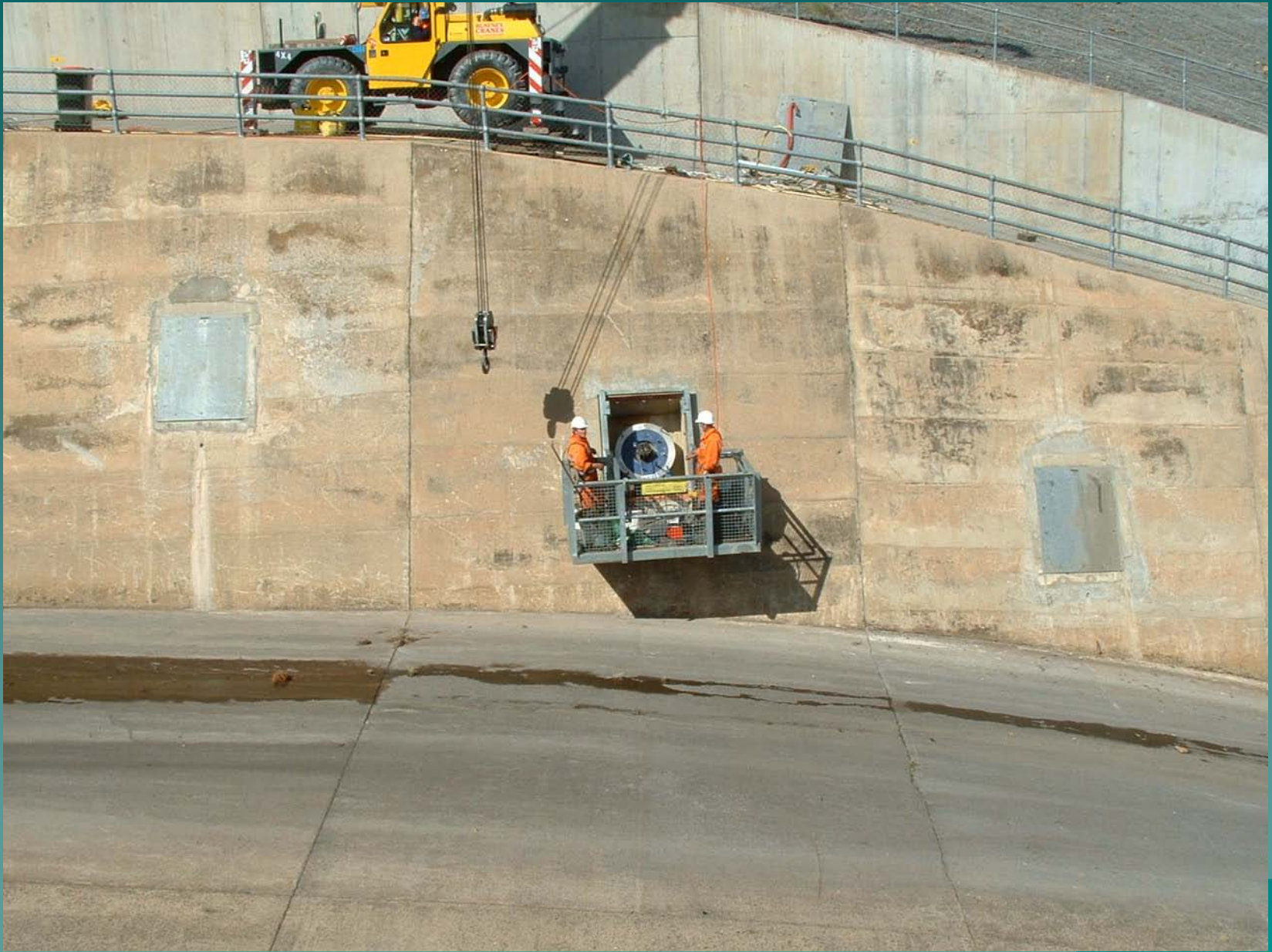
Statistics continued

- ◆ Dam can now cope with PMF
- ◆ Outlet lengthened by 22m to 140m
- ◆ All outlet pipework renewed
- ◆ Auxiliary spillway
 - Six fuse plugs for 1 in 200 to 1 in 30,000 AEP
 - 240,000m³ material excavated
 - Widened by 50m, now 172m
- ◆ Catchment 960km², perimeter 28km
- ◆ Project cost \$30M (BCC & State Government 50% each)
- ◆ Constructed by Barclay Mowlem

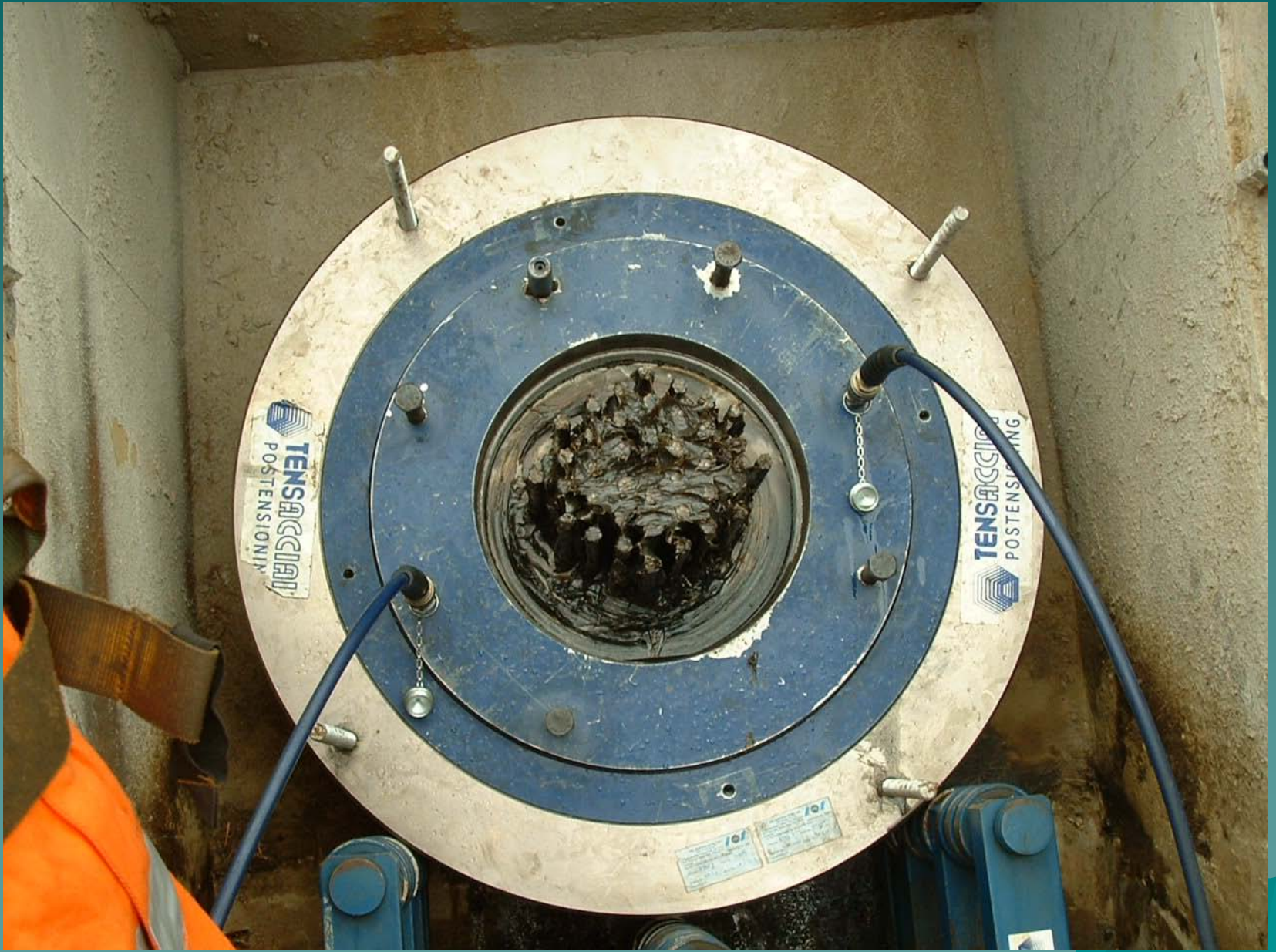
Tuesday 8 November 2005













Dam Safety

- ◆ DSEP draft completed
- ◆ PMF > 9ML/s
- ◆ PMF + Dambreak > 25ML/s
- ◆ PAR 1,625 (650 houses)
- ◆ Travel time 65 minutes
- ◆ Major flood in Bathurst is 5.7m & PMF + dambreak = 11.4m!
- ◆ Consequence categories High A

Any questions?