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Water and Sanitation
REPUBLIC OF SOUTH AFRICA



CESA — Gauteng Presidential Visit

Presentation on the Safety of Dams in South Africa
Wally Ramokopa Dir: Dam Safety Regulation
Date: 12 May 2022



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MANDATE OF THE DAM SAFETY OFFICE

- Our mandate is in terms of Chapter 12 of the National Water Act, Act 36 of 1998
- Responsible for the registration and classification of all dams in South Africa (*i.e. dams with a safety risk*).
- Ensure that all dams with safety risk are designed, built and altered in accordance with appropriate standards
- Responsible for issuing the following licences:
 - Licence to Construct a new dam
 - Licence to Alter, Repair or Enlarge an existing dam
 - Licence to impound a dam
 - Licence to De-Commission a dam
- Assessment of Dam Safety Evaluation reports by an Approved Professional Person (APP) for Category II & III dams.
- We also conduct Dam Safety Compliance Monitoring Inspections
- **Approval of Approved Professional Person's (APP's) & custodian of the register of APP's**

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OWNERSHIP OF DAMS IN SOUTH AFRICA

- There are currently 5641 registered dams with a safety risk (*Jan 2022 data*)
- 2395 of these dams (*i.e 42%*) are subject to compulsory Dam Safety Evaluation by an **APP** (*i.e. Category II & III ... categorized based on size & hazard potential*).

Sectoral Ownership	No of Dams	Cat 2	Cat 3	Category II & III
Agric Sector	4444	1412	30	1442
Water Boards	121	81	22	103
Local Government	349	225	59	284
Mines/ Bus / Industry	318	205	24	229
Other States depts.	86	47	4	51
DWS	323	123	163	286
	5641			2395



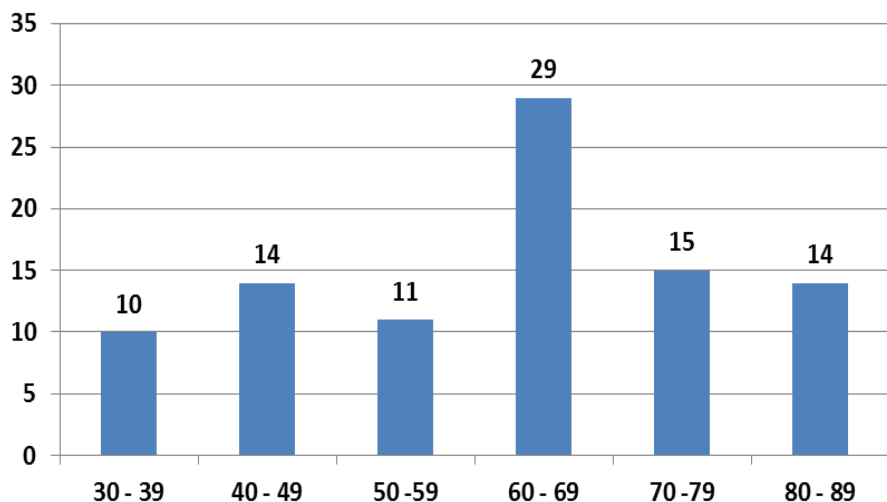
What is an APP ???

- APP is short for Approved Professional Person APP is **not** a Title
- An APP would either be a Professional Technician / Professional Technologist / Professional Engineer approved by the Minister of Water and Sanitation **after** consulting the Engineering Council of South Africa (ECSA) ... (NB: not in consultation with ECSA).
- National Water Act (NWA) also makes provision for the Minister to establish a Register of APP's
- The responsibilities of the APP are defined Section in 119 of NWA . . . this should also be read in conjunction with **Regulations Regarding Safety of Dams** (*promulgated in GN R-139 of 2012*).



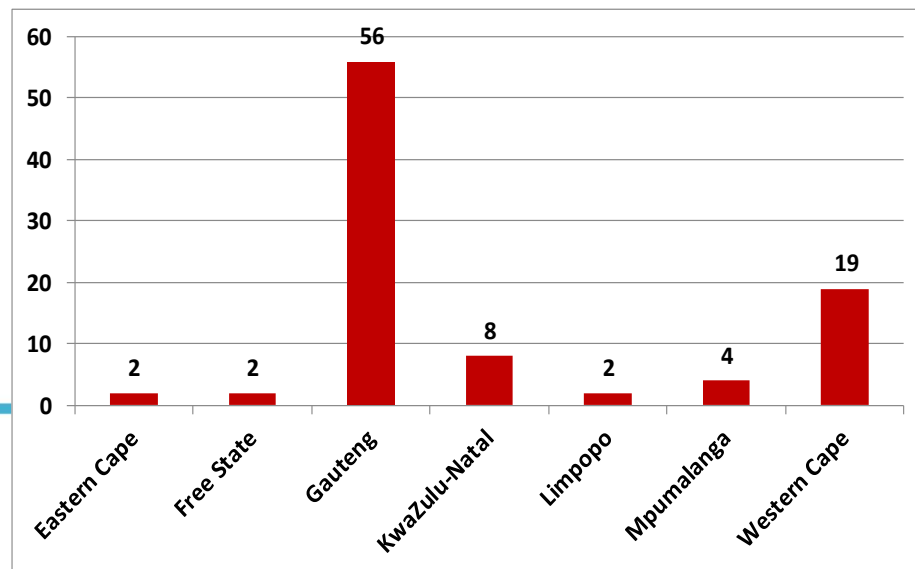
Current Register of APP's

- Total number of “active” APP's on the Register is 93
- 6 APP's employed by DWS ... 87 in private practice with **only 1 black APP**
- 62% > 60 years old



- The majority of APP's are based in Gauteng.

DEMOGRAPHICS		
Africans	6	6%
Whites	87	94%
Males	90	97%
Females (W)	3	3%
Females (A)	0	0%



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Challenges of the current approval process

How the current process works ...

- Dam owners' would appoint an APP or consulting firms for an APP to be assigned a task in a dam
- Firms will either choose a professional person in their employ to apply to the Minister to be approved or to just select from the APP Register.
- Owner's may also choose an APP of their choice from the APP Register
- However, this process makes it difficult for professionals to apply for approval if not being appointed by dam owners or being considered by their firms.
- An APP can only be on the Register once he has completed a task which he was appointed and approved to carry out.
- So, this basically means no one can be on the Register unless the above process of appointment is done.
- Organs of state also find it difficult to appoint APP's through a competitive bidding process as they are mostly forced to appoint those on the Register.
- This is a hurdle for new engineering firms who wants to play in this sector to enter the field.
- It then makes it difficult for state dept's to comply in appointing APP's and carrying out required tasks in their own dams.

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What are we doing about it??

How is DWS planning in addressing the APP issues ?

- DWS is looking at the expansion of the current Register to enable a professional person desiring to be approved as APP to apply to the Minister, without first been approached by a dam owner or being at the mercy of the employer in an engineering firm to apply for approval.
- To change the current process, we will be **formally** consulting ECSA as well as Voluntary Associations (VA's) such as South African National Committee on Large Dams (SANCOLD), South African Institute of Civil Engineering (SAICE) and National Society of Black Engineers (NSBE) and the Water Institute of South Africa (WISA) . . . and if possible with CESA.
- The aim is to finish the consultation process by the end of September 2022.
- DWS to seek further advice from ECSA regarding those professionals who may no longer be **actively** practicing in their chosen disciplines and who may have retired due to age.
- The plan is to conclude this process before March 2023.



Any other challenges . . .

- The steady increase in the participation of APP's in the illegal construction of dams.
- Non-compliance by APP's to licence conditions during the execution of their works.
- Non-compliance by owners of dams.
- The DSO will resume with the publications of the annual Dam Safety Report which will cover the following:
 - The safety status of dams in South Africa.
 - Illegal dams and their impact
 - Approved Professional Persons audit findings
 - Compliance levels by dam's owners *as it could be seen in the recent KZN floods, DSO had to urgently advice the KZN Disaster Management on dams that could potentially fail or were in compromised position so we can evacuate all those on the dangerous flood plains.*



Hydroplus Fuse Gates at Shongweni Dam

Fuse-gates: Ten fuse-gates, 9,75 m wide x 6,5 m high:

- 34 m high concrete gravity dam built in 1927
- 10 Hydroplus fuse-gates were installed in 1995
- 70% of storage lost due to siltation



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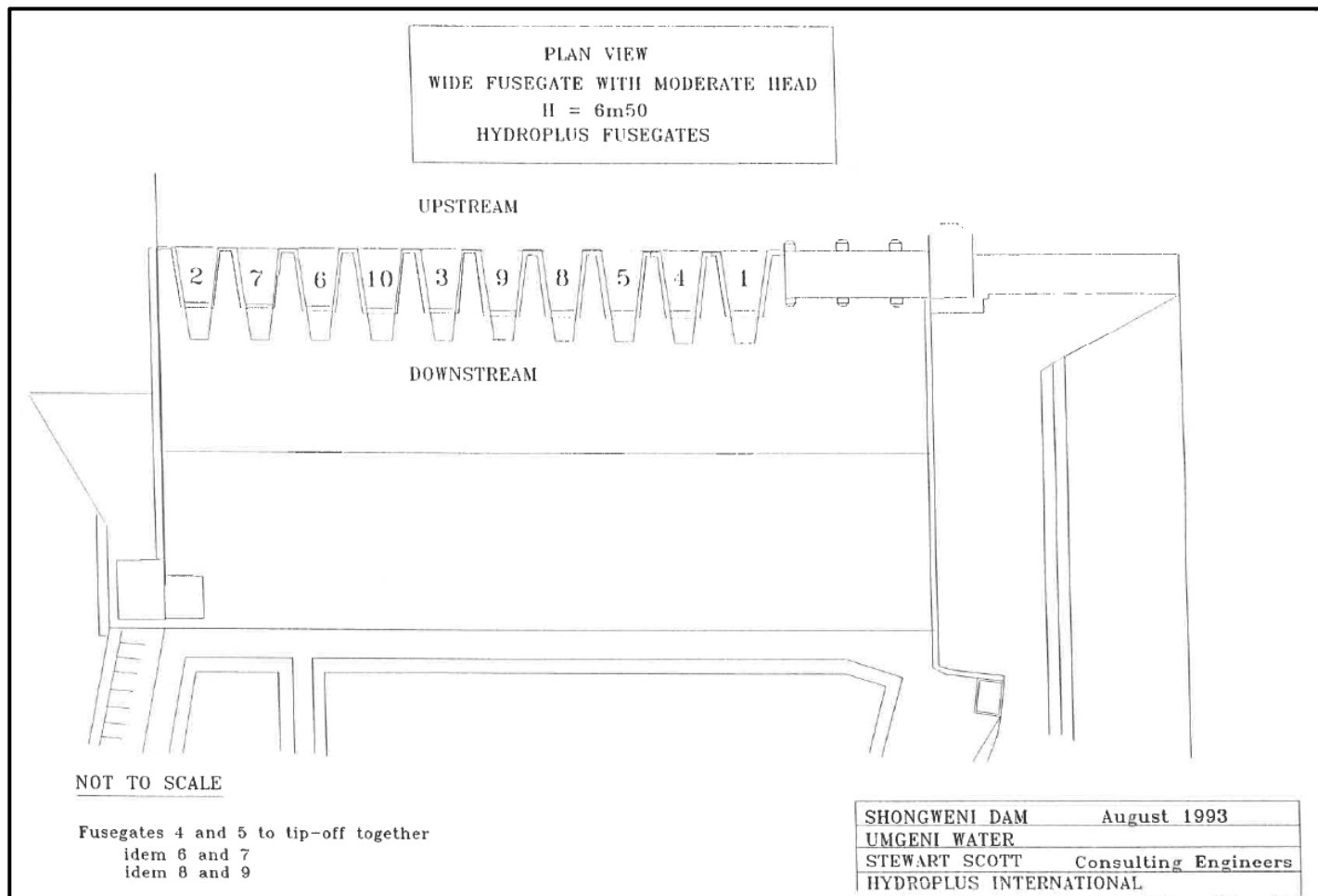
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Hydroplus Fuse Gates at Shongweni Dam

Plan view of fuse-gates with order of tipping:

On the night of 11 Apr 2022, two of the Hydroplus gates have fused.



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Video Dated 12 April 2022



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Shongweni Dam Expected Flood Sizes (... 4th DSE of 2014)

- Gate 1 starts to fuse when the water level is 2,42 m above FSL
- The rest of the other gates fuses at 100 mm intervals

Sequence in Overturning of Fusegates (Unit No)	Overturning Level (RL)	Maximum discharge before Overturning (m ³ /s)	Return Period (years)
1	300,56	1600	240
2	300,66	2000	500
3	300,76	2400	870
4 & 5	300,86	2850	1 600
6 & 7	300,95	3600	4 600
8 & 9	301,00	4350	10 000
10	301,05	5200	> 10 000

Estimated peak flood size since two of the fuse-gates tipped = 2 000 to 2 400 m³/s.



Conclusion . . .

- Though some damage was caused downstream of Shongweni Dam, it could have been worse – the dam slowed down the huge flows along the Mlazi River even though Shongweni Dam has almost silted up.
- Without the collaboration of dam engineers in private sector as well as in government, the planning and execution of such engineered products, would not have been possible as we keep on learning from each other.
- There clearly is a shortage of APP's in South Africa to carry out tasks such as design for the rehabilitation of existing dams, raising of dams, dam safety evaluations of dams and design and quality control of new dams.
- DWS (286), Local Government (281), other states dept (51) & Water Boards (103) do not have enough engineering capacity to carry out most tasks and will require the intervention of private engineering firms – Govt cannot do that alone.
- Transformation in dam engineering is slow, especially in the private sector. Associations such as CESA should be able to play a role in addressing this.
- DWS will be knocking at CESA's doors, in a consultation process of addressing the hurdles keeping new and young future APP's from playing in this field.

THANK YOU

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