

A proud history of dam safety



Trisa Hugo

Continuous work by the Department of Water Affairs (DWA's) Dam Safety Office is required to ensure that South Africa maintains its imposing dam safety record.
Article by Lani van Vuuren.

The first significant storage dams in South Africa were already constructed during the second half of the nineteenth century, but it was not until 1987 that the country passed its first dam safety legislation. Nevertheless, the country's dam safety record compares favourably with that of developed countries. Loss of life during dam failures has been relatively low through the decades, and in the last 25 years not a single Category II or III (high risk) dam for which there had been a licence to construct has failed in South Africa.

Last year one incident was reported, namely Hogsett Dam, a 15 m high, 125 200 m³ capacity earthen dam near Dordrecht, in the Eastern Cape, which failed in February after heavy rain. Originally constructed in 1932 the dam was never registered or inspected and thus missed out on the benefits of dam safety legislation.

"The objective of dam safety legislation is to improve the safety of new and existing dams with a safety risk so as to reduce the potential for harm to the public, damage to property or to resource quality," explains Jan Nortje, Chief Engineer of the DWA Dam Safety Office. Dam owners are wholly responsible for ensuring the safety of their dams, with the Dam Safety Office responsible for administering and monitoring

compliance with legislation. "We are fortunate that so few medium or large dams have failed in South Africa to date. However, we cannot rest on our laurels. Dam safety depends on regular monitoring and maintenance, and dam safety evaluations, including inspections, need to be undertaken constantly."

Particular attention is paid to the safety of dams with a high hazard potential, and the upgrading and monitoring of existing Category II and III dams remains a priority. Of the 1 926 category II and III dams registered with the Dam Safety Office, 1 422 have been inspected at least once. As an owner of many of these dams, DWA itself has also started with a comprehensive rehabilitation programme to improve the safety of its dams.

Some concern has been expressed over the safety of municipal dams, many of which are in excess of 50 years old. “There are so many other pressing priorities at municipal level, such as the provision of basic services, that the safety issues of dams are often neglected,” reports Nortje. “In many municipalities there is also a lack of technical capacity to appreciate and address the shortcomings in structural safety and day-to-day operation and maintenance of municipal dams.”

Unfortunately, the Dam Safety Office has limited technical capacity, consisting of only two engineers and one technician, and there are limits to the technical assistance the office can provide local authorities. Municipalities – as other dam owners – must procure technical expertise from the private sector to conduct regular compulsory dam safety evaluations of their dams, and carry out any recommendations stemming from these evaluations. The Dam Safety Office has recently focused on better communications with municipalities regarding the requirements of dam safety legislation.

The 1987 Dam Safety Regulations, originally drawn up under the Water Act of 1956, have now been revised to bring them in line with the current

National Water Act of 1998. The biggest change has been that in addition to protecting human lives and property against unsafe conditions at dams, the draft new Regulations have been expanded to also protect water resources by assigning a high priority to e.g. pollution control dams, which have an impact on groundwater and surface water resources. These dams occur mostly in the mining, industrial and municipal sectors.

“The draft new Regulations will also streamline the process of approval of professional persons for dam safety tasks in terms of the Regulations by providing for a Register of Approved Professional Persons, to be compiled in consultation with the Engineering Council of South Africa,” explains Nortje. “The old Regulations required that a person had to apply for approval every time he/she undertook a dam safety task, for example, new approval had to be sought even if the same person was requested to perform a second five-yearly dam safety inspection.”

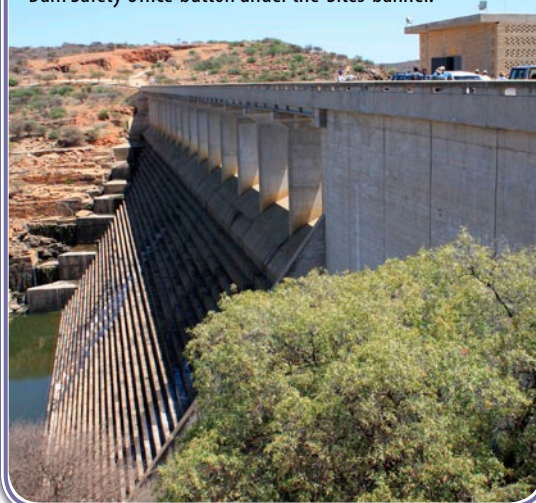
Under the draft new Regulations a person on the Register will be allowed to perform dam safety tasks as specified in the Register without having to re-apply. This is expected to greatly reduce the administrative burden on the Dam Safety Office.

In addition, the new draft Regulations will provide for a self-sustaining inspection programme by requiring that Category II and III dams must be inspected by an approved professional person every five years. This will relieve the Dam Safety Office from the administrative burden of having to send instructions every five years. “This will mean that scarce human resources can now be focused on other important tasks, such as monitoring that inspections are done and that the recommendations to upgrade the safety of dams are implemented,” notes Nortje.

When dam failures do occur in South Africa, they usually involve small, farm dams. Around 74% of the dams currently registered with DWA's Dam Safety Office are less

WHEN DOES A DAM CARRY A SAFETY RISK?

A dam is defined in legislation as any structure capable of diverting or storing water. So a storage reservoir for municipal water supply is a dam, and so is a tailings dump at a mine or power station that may or could contain water as well as a refuse dump that contains water. At present any dam with a storage capacity in excess of 50 000 m³ and a vertical height higher than 5 m is considered as having a safety risk. Every dam with a safety risk must be classified as a Category I, II, or III dam (with I being relatively low risk and III being relatively high risk). This is done on the basis of the dam's size and its hazard potential rating. In South Africa, about 56% of dams are classified as Category I. No person who intends to construct a new dam with a safety risk, or enlarge, alter or repair an existing dam with a safety risk, may begin construction work before he or she is in possession of a dam license to do so, which is issued by the Department of Water Affairs. For more information Visit: www.dwa.gov.za and click on the 'Dam Safety Office' button under the 'Sites' banner.



than 12 m high, with 86% having a storage capacity of less than a million m³. “In the old regulations, requirements for small Category I dams were very superficial, making them almost meaningless,” notes Nortje. “More pertinent information is now required by the new regulations for the various actions (when applying to construct a new dam or when inspecting an existing dam). This should help improve the safety of Category I dams.”

At the time of writing the draft new Regulations were awaiting final Ministerial approval. □

Distribution of registered dams according to size class

Size class	Number	%
Small (5 m-12 m)	3 465	74%
Medium (12 m-30 m)	1 061	22%
Large (30 m and higher)	183	4%
Total	4 709	100

Source: DWA

Category classification of existing dams

Category classification	Number of dams	%
Category 1	2 456	56%
Category 2	1 622	37%
Category 3	288	7%
Total	4 366	100

Source: DWA