

POLICY STATEMENT No.R2/1

The Professional Engineer on Dams

Date of issue: 04/08/1995

Guidelines for Evaluation of Applications
in terms of
Section 9C of the Water Act, 1956 (Act 54 of 1956)

E C S A

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SECTION 1

1. Committee's brief

Section 9C of the Water Act, 1956 (Act 54 of 1956), provides that the Minister of Water Affairs shall consult with ECSA in relation to the approval of Professional Engineers for engineering tasks relating to dams. This requirement for consultation arises out of representations from practicing engineers that the engineering profession should be involved in the evaluation of the competence of Professional Engineers on the understanding that the Committee does not accept responsibility for the execution of dam engineering tasks by Professional Engineers.

The brief of the Committee is to evaluate the qualifications and experience of Professional Engineers who have requested approval from the Minister to perform certain engineering tasks in respect of dams, having regard to the requirements for the successful completion of each and every particular task, and to advise the Minister of its recommendation.

SECTION 2

2. Approved Professional Engineers (APE)

The Water Act describes an APE as a Professional Engineer who has been approved by the Minister after consultation with ECSA.

In the evaluation of applications for approval as an APE the Committee accepts that the latter may perform work without supervision, control or guidance by others only within his field of experience and qualification. The APE is precisely that person who has the responsibility to ensure that all relevant engineering aspects of a task relating to a dam are undertaken in a manner appropriate to the specific dam site. For this reason it is necessary that he has a wide experience of, and exposure to,

those aspects which are important to the relevant task. It is a further requirement that he has a sound engineering judgment and the ability to take responsible decisions. At a time when technological development is rapid, it is a requirement that an APE keeps abreast of new developments.

The APE is not necessarily a person who is an expert in all aspects of dam engineering, but rather a Professional Engineer with a broad experience of dams. Since it is required that approval must be obtained for each individual dam engineering task, it is possible by repetition in each case to weigh an applicant's experience against the particular task requirements. Therefore, a professional engineer with limited experience could initially obtain approval for a task with limited requirements, while at that stage he would not obtain approval for a more demanding task.

The importance of the supporting role of other experienced engineers and experts from other disciplines is recognised by the Committee and it is expected of the APE to involve such persons. It must however be emphasized that the assistance of such experts cannot be taken into account by the Committee when considering an application by a person with no or deficient experience.

SECTION 3

3. Task requirements

In the Water Act and the regulations pertaining to dam safety a variety of tasks relating to dams are identified for which approval is required. These tasks include the design of new dams or alterations to existing dams, exercise of quality control during the construction of dams or large maintenance works, as well as the undertaking of dam safety inspections and dam safety studies. Further details in this connection appear on the Dam Safety Office's application form DW 691.

The evaluation of the task requirements takes into account the complexity of the task in relation to aspects such as, wall height, type of wall, the nature of the foundation material, the size and location of catchment area, type of spillway and magnitude of design flood, type of river outlet, the hazard potential of the dam, the age of the structure and any known or expected problems (such as alkali aggregate reaction or soil with dispersive characteristics). The task requirements for the inspection of an existing dam may in fact be higher than the requirements for the design of a new dam and this fact is taken into account in assessing the applicant's appropriate design experience. An applicant's experience with risk analyses is also taken into account when assessing the appropriateness of his design and evaluation experience. This applies in particular when the applicant obtained his experience under the guidance of an APE.

For the purpose of evaluation certain expertise requirements are classified as either desirable or as essential. For example, for the inspection of a large earthfill dam it is an indispensable requirement that the applicant has appropriate design experience of earthfill dams. For the inspection of a medium size dam it would be a desirable requirement that the applicant has experience of systems for monitoring the behavior of dams. However the specific circumstances applicable to each particular dam are considered on their own merits.

SECTION 4

4. Minimum requirements for approval

As indicated above, the requirements for each specific task are considered on merit and the applicant's qualifications and experience are measured against those requirements. In the evaluation of applications the Committee concentrates on four aspects, namely: experience and exposure in respect of the various aspects of importance to the task; the degree to which the applicant has already accepted responsibility for tasks relating to dams; whether he has kept abreast of new developments in the field and the total period of involvement in dam engineering. For each of these aspects the Committee has developed practical guidelines for the evaluation of applications.

The following paragraphs give an indication of the norms which are applied by the Committee:

(a) Experience and exposure in relation to the various aspects relating to dam engineering tasks

Sufficient appropriate experience and exposure in relation to all aspects which are regarded as essential for the task is required. Experience is also required in relation to those aspects which are regarded as desirable, but in certain instances shortcomings in this area may be bridged by way of a conditional approval which requires the involvement of an expert in the relevant field.

(b) Position of responsibility

It is a requirement that an applicant must previously have occupied a position of direct responsibility for decision making concerning those engineering aspects which have been identified as essential.

(c) Keeping abreast of a new developments

The applicant must provide proof that he has continued to keep abreast of new developments in dam engineering through, for example, participation in projects, courses and symposia.

(d) Minimum duration of involvement with dams

The relevant experience required for small dams (wall height lower than 12m) requires a period of from three to five years. For medium size dams (wall height between 12m and 30m) the relevant experience required is from five to seven years and for large dams (wall height 30m and higher) at least seven years relevant experience is required. The norms are applied with discretion particularly with reference to the hazard potential of the relevant dam.

SECTION 5

5. Basis for recognition of experience

The following are particular aspects of importance in relation to the recognition of experience:

- (a) Credit up to a maximum of 15% of the total period of experience required can be allowed for appropriate postgraduate studies or courses, provided that the total credit, inclusive of that in paragraph 5(b) below, does not exceed one year. For this credit to be considered the applicant must submit an exposition of the contents and duration's of the courses. The credit per course will also be limited to between 1 and 3 months depending on appropriateness and duration.
- (b) Experience in a direction closely related to dam engineering may also be brought into account to a maximum of six months.
- (c) Many years of experience with small dams may be taken into account when the applicant wishes to undertake a task in relation to a medium size dam but has limited experience in relation to dams of that size.
- (d) The quality of the experience acquired is often the critical element. Experience acquired in one-man projects carries less weight than experience obtained with projects where there is a variety of experts involved. In addition, excessive duration's indicated for a dam of a particular size are not necessarily fully recognised. Experience obtained as part of feasibility studies carries less weight than actual design and construction experience.
- (e) Experience with structural analyses and the evaluation of the safety of dams as part of dam safety inspections and dam safety investigations can also be taken into account as experience for the relevant types of structures.
- (f) When considering an application for approval the quality of execution by the applicant of previous dam tasks may be taken into account by the Committee
- (g) The Committee may, in its discretion, arrange to interview an applicant.

SECTION 6

6. General suggestions

The Committee's evaluation depends upon the information which the applicant supplies in his application form or which his referee(s) may add. It is, therefore, in the interest of each applicant to complete his application as fully as possible in order to supply all relevant information.

The applicant himself should weigh up his own expertise and experience against the requirements of the task and, if the use of experts is necessary, the applicant should indicate in his application which experts he will call upon to assist in the execution of the task. In the case of a category III dam, the evaluation of an application will be expedited if the names of persons in the professional team are given.