

**Association of State Dam Safety Officials**  
**Issue Brief and Recommendation on**  
**Developing a Credentialing Program for a Dam Safety Engineering Specialist**  
**2024**

(Approved by the Board of Directors: 3.14.24)

A longstanding issue, formally and informally discussed since 2001 within ASDSO, is a perceived lack of training and proficiency in the fields required to manage dam engineering, dam safety and related management programs. Consultants, regulators, and owners need to meet a minimum standard of knowledge, coupled with experience in their respective positions. The idea of establishing a credentialing or certification program within ASDSO to address this issue is raised frequently.

The purpose of this paper is to summarize the various certification concepts in practice today by associations, to consider past efforts by ASDSO to define the problem and offer solutions, and to provide a recommendation for the ASDSO leadership to consider in 2024, over the remainder of the 2022-27 Strategic Planning cycle, and potentially beyond.

### Defining Credentialing

It is important to understand what credentialing means. Here are the types:

Licensure -A process through which a governmental agency (or its designated agents) grants recognition to an individual after verifying that he or she has, at a minimum, met eligibility criteria and passed an assessment.

Licensure is mandatory. The goal is to ensure that licensees have the minimal degree of competency necessary to ensure that public health, safety, and welfare are reasonably well-protected.

Certification – A process through which an organization grants recognition to an individual after verifying that he or she has, at a minimum, met eligibility criteria and passed an assessment. Certification is voluntary. The most common goals of a certification program are to protect the public, advance a profession, and identify individuals qualified for a role, or to provide a form of recognition to individuals working in a field.



DEFINITIONS AND BACKGROUND  
INFORMATION FOR THIS PAPER WERE TAKEN  
FROM, 'CONSIDERING CREDENTIALING?  
YOUR GUIDE TO MAKING THE DECISION'  
SEE THIS PUBLICATION FOR MORE  
INFORMATION

Rops, Mickie S., Mickie Rops Consulting, Inc. 2009.  
[www.msrops.com](http://www.msrops.com)

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Certificate Program – A non-degree granting training program consisting of 1) a learning event or series designed to educate or train individuals to achieve specified learning outcomes within a defined scope, and 2) a system designed to ensure individuals receive a certificate only after verification of successful completion of all program requisites include but not limited to an evaluation of learner achievement. There are no ongoing requirements to maintain a certificate unlike a certification. Unlike certification which focuses on verifying current experience and education/training obtained elsewhere and assessing current knowledge and skills, a certificate focuses on educating/training individuals on intended learning outcomes and then evaluating individual attainment of those specific learning outcomes. This is a voluntary program.

As an example, the ASCE/AWRE ‘Diplomate’ term is used to describe their certification program for those with a specialty in water resources engineering. A diplomate is considered a specialist and is certified by the AWRE board for demonstrated knowledge in a specialty.

## Defining the Problem

To protect the public and environment, engineering work on dams must meet a minimum standard of quality and conformance with established best technical practice.

Consulting Engineers: According to state, federal, and private sector professionals working in the dam engineering space, there is a gap in expected competence or relevant experience within the consulting community in areas related to dam investigation, inspection, design, and construction. Individuals and firms are being engaged by dam owners to work on dams with little to no relevant experience, in some cases due to the owners’ cost-saving measures or lack of knowledge and access to firms with experience and know-how. There are documented cases where this lack of experience has caused inadequate design or poor construction leading to dam incidents and failures.

State and Federal Dam Safety Program Engineers: State and federal regulatory program managers typically need a broad range of expertise spanning technical fields including geology, hydrology, hydraulics, structural, and geotechnical engineering. They must also implement federal and state programs guided by dam safety programs laws and regulations, which means they must be experts in communicating with owners, creating and advocating for budgets, resolving permitting issues, and managing legal issues specifically associated with enforcement. With input and advice from technical specialists, they make decisions on what conditions/risks are acceptable and which ones require reservoir restrictions or dam repairs. They run programs including hiring/managing staff and managing finances. Dam safety program engineers must educate and influence senior executives to prioritize dam safety funding and resources when there are other non-dam safety competing needs. These expectations are lofty and are not always met or easy to meet. There are policies, rules, and regulations that define what dam safety programs are to do. However, there is little in the literature about how dam safety program engineers should approach and conduct the work, such as what training, experience, and skills are required?

Owners: Dam owners are responsible and liable for their dam(s). Large companies and federal agencies can employ experienced engineers. Many dam owners are not engineers, do not have any specialization in dam safety or dam engineering, and do not have the knowledge, skills, and experience necessary to

manage a proper owners' dam safety program. There is an ongoing need to educate dam owners about dams and dam ownership.

See more detail about defining the problem in the Attachment 2 below.

## Discussion and Recommendations

One solution to address the lack of relevant experience and expertise that is repeatedly suggested is a credentialing or certification program for those who work within dam engineering. Based on the aforementioned definitions, is the establishment of a credentialing program viable for ASDSO? Are there other solutions to the defined problem?

In many ASDSO discussions about this issue, this type of program has been characterized similarly to the ASCE American Academy of Water Resources Engineers (AAWRE) Diplomate model. In theory, this would be a credential for engineering individuals or companies. States would have to agree to participate and push dam owners to only use those who are credentialed. ASDSO would create and administer the program. Companies or individuals may have a 'credential' that would distinguish them from others when dam owners choose a consultant or contractor. States may be able to tell owners to focus on consultants who are credentialed. ASDSO could provide the list of credentialed professionals. In this scenario, an applicant must fulfill a detailed set of foundational, technical, and professional practice milestones to be credentialed. It is not a continuing education program although some individualized education is included. Another similar option would be a certification program, which is more focused on a series of continuing education goals that all applicants must follow with specific testing.

The following questions have been reviewed and discussed by the ASDSO Board of Directors and within previous meetings and data-gathering sessions (see Background below).

1. Is the target market sharply defined and accessible? **Yes**
2. Does the target market or the industry need and want this certification? **No**
3. Are there powerful stakeholder groups that will support and endorse the program? **Possibly. Large consulting firms with the most dam engineering expertise would gain by endorsing a certification program or credential since the current expertise and monetary resources lie with these firms. Smaller firms or one-person consultants or contractors, with little or no dam engineering expertise and funding resources, would have the most challenge in becoming fully certified. Government agencies may endorse the program but cannot necessarily, legally promote those who are certified in the private sector over those who are not. For government employees, each state or federal entity will have differing rules for accepting or participating in a credentialing program.**
4. Do you have the staff and volunteer resources required to develop and implement the program? **Not currently. This program would need several administrative employees and considerable funding to get underway and run successfully. A full-blown credentialing or certification program would be expensive to operate (minimum estimated annual budget \$500,000).**
5. Can your organization afford a three-to-five-year timeline for the program to break even? **Not within the current budget. The start-up capital to get such a program up-and-running would have to be secured through loans, contracts, or grants.**
6. Is your association the first or an early entry into the certification market in your industry? **Yes and No. Other organizations have discussed it, but none have moved forward. ASDSO has been discussing it for 20 years.**

7. Does your industry have major workforce or professional development needs for assessment and verification of knowledge and skills? **Yes**
8. Is there pressure on the association to make an effort to ensure protection of public health, safety, and welfare? **Not the association itself but ASDSO works to support the industry that is responsible for this protection.**

Pros:

- Increase in the specialized community of educated engineers, program managers and owners.
- Reduction in the likelihood of inadequate work, increasing the safety of dams nationally.

Cons:

- Resource intensive; expensive startup costs for development and implementation.
- No obligation/incentive to participate unless the accreditation was mandatory.
- ASDSO has no ability currently to make such a program mandatory.
- Smaller engineering firms may push back because they may not feel the certification would be worth the lost time and expense; may also be concerned that they will have to pay more to retain certified staff.

After many formal and informal discussions and feedback sessions over several years, the ASDSO Board of Directors recommends the following actions:

- ASDSO will not pursue the establishment of a credential or certification program.
- ASDSO will continue to advocate for comprehensive training programs for the dam engineering profession.
- ASDSO will continue to advocate for accredited college and university programs to include dam safety engineering courses.
- ASDSO will continue to provide training courses to fulfill the objectives of the ASDSO Program of Study and will launch a program to establish topic-specific certificate tracks, using materials currently available through ASDSO's technical training program.
- ASDSO will continue to provide education programs for dam owners and will launch a program to establish a dam owner training certificate track using materials currently available through the ASDSO Dam Owner Academy program.
- ASDSO will continue to build the ASDSO Dam Safety Toolbox web-based product, which is a repository for current guidelines and recommendations related to dam safety. The objective of this effort is to fill the educational gap that is the basis of this issue brief.

## Background

### History and Previous Studies and Recommendations

2021

Report completed from the Technical Knowledge Base Task Force, which recommended the creation of the Dam Toolbox website.

2019

The Advisory Committee was asked to review the issue and submitted a position paper in 2019. The paper did not offer a final opinion or recommendation on the topic but only suggested that it should be studied further. Paper attached below.

A facilitated workshop was held during the West Regional Conference in Colorado to explore opportunities to address the problem issues summarized above and detailed in earlier workshops and soapbox sessions regarding underqualified engineers. The results of the workshop recommended 1) the creation of a technical guide on dam engineering for state dam safety officials, 2) the development of non-technical educational seminars, and 3) update of the Model State Dam Safety Program.

2018:

In December, Greg Paxson submitted a paper on behalf of the Advisory Committee entitled, "Summary of ASDSO Activities related to Design Reviews and the Issue of *Unqualified Engineers*." This paper summarized all of the earlier attempts to study and resolve the problem.

In September, another Soapbox Session was held at the Annual Conference in 2018 entitled, "Towards Common Use of Best Practices." There was valuable survey data and opinions of experts gathered at this event. There seemed to be consensus around creating best practices guidance documents or a website, which led to the concept of the Dam Safety Toolbox website. Paths forward recommended by the organizers of this session were:

- Create industry-wide technical standards/manual/guideline/handbook or "guideline to the guidelines."
- Provide additional education to inexperienced engineers who want to work on dams.
- Create a library or list of vetted references (already underway).
- Develop a certification program for people who want to work on dams and/or a minimum experience requirement (e.g. 5 years).

The summary and survey data are available via ASDSO headquarters.

In October, a journal paper was written describing the work of the task group described below and the Dam Design and Construction Subcommittee.

2016:

A Town Hall style session was held at the ASDSO Annual Conference in Philadelphia to gather concerns and potential solutions, building off the 2015 session. A resulting paper was written to summarize this meeting. It is attached below. Among many ideas to mitigate the problem, the idea of a national

qualification process was listed, as well as the development of more robust training programs for engineers and owners.

2015:

A Town Hall style session was held at the ASDSO Annual Conference. This session included a panel to discuss the work of the Task Force and the Dam Design and Construction Committee and engage the audience in discussion. The session did not result in major conclusions or suggested changes to the process, but clearly indicated significant interest from regulators, owners, and designers in this topic, leading to the 2016 session.

2013

In 2013, the Dam Design and Construction Committee formed a Design Review Process Guidance Subcommittee, led by Jeremy Franz, to evaluate design review processes. A draft paper was prepared but never finalized or submitted to the Board.

2011

In 2011, ASDSO formed a Task Force, chaired by Greg Paxson, to develop guidance related to state reviews of engineering designs. The Task Force included representatives from state and federal programs along with private consulting engineers. The work included interviews of state officials (participation from 40 states) and the development of a best practices paper (Paxson, *Suggested Best Practices for Dam Safety Technical Reviews*, November 2014 – available upon request from ASDSO headquarters), which was not officially adopted by ASDSO. The interview responses included many references to dealing with unqualified engineers and having to “educate,” “walk through the process” or even provide the design engineer with their calculations or design suggestions.

2005:

Later that year, an informal project was completed by a handful of state representatives to gauge interest in developing a certification program for dam safety professionals. The members of the Advisory Committee were surveyed as well as members of the West Region. The group, also, investigated the American Academy of Water Resources Engineers’ Diplomat Program to see if it aligned with the concept being discussed among the ASDSO members. In the end, the group offered the following statement: The conclusion to be drawn from all the information at hand at this time is that there is no need to pursue the concept of certification for dam safety engineers any further. The primary reason being that the concept lacks strong, broad-based support within ASDSO and the dam safety community. The secondary reason is that any new certification specific to dam safety would overlap and perhaps unfavorably compete with the certification for water resource engineers currently provided through ASCE.

Early in 2005, Guy Paul, a state representative, studied the pros and cons of a certification program. He observed that:

- Developing a certification process is a major undertaking and would take several years.
- There is precedent for certification in engineering (environmental) as well as in other professional fields, such as accounting and medicine.
- Certification may provide engineering licensing boards with a solution to a problem they refer to as "splintering", which requires a separate engineering license for every specialty of engineering.

- The National Council of Examiners for Engineering and Surveying (NCEES) endorses certification of the type we are considering as long as it is "post-licensure."
- For ASFPM, certification has been favorably accepted and is growing rapidly.
- To be successful, certification will require broad-based support from all members of ASDSO.
- Good chance of finding support (\$) from federal agencies such as FEMA, ASCE, NRCS, FERC, COE, BOR.
- Significant up-front costs will be required before the system goes "online", then ongoing administrative costs may be supported by fees.
- Full-time administrative support within ASDSO will be required, although it's conceivable that some functions could be contracted out.

## Attachment 1

### ASDSO Advisory Committee (AdCom) Task Group on Credentialing/Certification of Dam Engineers

“Position Paper” related to the above topic

The concept of a certification (or credentialing) program for dam safety professionals has been discussed within ASDSO since the early 2000s; an initial review and research of the issue was done at the request of the ASDSO Board of Directors in 2005 (ref: G. Paul memos to ASDSO Board of Directors). The review concluded, in part, that the concept not be further considered at that time, due to lack of strong, broad-based support within the dam safety community. However, more recent discussions at the Board, work of various ASDSO Task Forces, as well as presentations made at the 2018 Dam Safety Conference (“Towards Common Use of Best Practice” Soapbox) pointed to a potential interest in considering the certification/credentialing concept. Late in 2018, the ASDSO Advisory Committee (AdCom) was tasked with review of the concept and development of a “position paper” on the topic.

The concept of certification for dam safety professionals comes up often in discussions among the dam safety community. It appears that the reason for this discussion is to address concerns regarding inexperienced or unqualified engineers practicing dam engineering, specifically related to observations of the dam safety regulatory programs on the quality of engineering products submitted for review.

The AdCom formed an ad hoc “Task Group” of engineers who have had discussions regarding the concept of certification for dam safety professionals and the development of a “position paper” for ASDSO Board consideration. At this time, this Task Group is not convinced that a certification program alone will solve some of the issues previously identified, recognizes that such an undertaking would be a very involved and ongoing major initiative, and notes that there are several other approaches to address the problem of unqualified engineers, including, but not limited to:

- Owner education with regard to selecting an engineer.
- Improving the state design review process (as has been discussed by a 2011 ASDSO Task Force and the Design and Construction Committee), including informing the dam owner when the engineer does not appear to be qualified as opposed to assisting the unqualified engineer with the design to ultimately satisfy dam safety concerns.
- State programs to require a review of the design engineer qualifications prior to allowing completion of the design.

The opinion of this AdCom Task Group is that a specific “position” cannot be recommended at this time, as there are several unanswered questions related to this concept. To help address this and advance evaluation of the issue, the Task Group recommends:

- Address the following question – “What problem is being solved through a certification or credentialing program?”; it is recommended that polling of ASDSO leadership as well as general membership be conducted to help identify the problem(s); similar polling of USSD and others in the dam safety community should also be considered.
- Further review/evaluation of similar engineering credentialing programs (e.g. ASFPM’s CFM, ASCE’s AAWRE Diplomate, Georgia Safe Dams Program EOR, etc.) to help inform how a dam safety



credentialing/certification program might be structured, administered, and the level of effort and order of magnitude of funding required to create, implement and administer going forward.

- ASDSO should engage USSD moving forward in evaluation and potential development of a program; this Task Group also recommends reaching out to USSD leadership to discuss their progress related to their evaluation of a “Dam Safety Management Certification”.

Once the above items are accomplished, this AdCom Task Group will reconvene to draft more fully a “position paper” on the dam safety credentialing/certification concept. The Task Group will also solicit input on this issue from the entire AdCom membership.

Task Group Members:

Greg Paxson, Chair, AdCom

Terry Arnold

Bill Bingham

Bob Bowers

Jon Keeling

Phil Moreschi

Paul Schweiger

## Attachment 2

### Is It Us against Them? Town Hall Session Notes

ASDSO Annual Conference 2016, Philadelphia, PA

The Design Review Process refers to the steps required to get a dam design from concept to regulatory agency approval. In 2012, an ASDSO Task Force was created to research this issue. More recently, the Dam Design and Construction Committee has been working on guidance for engaging the engineers and regulators early in the design process. At the 2015 ASDSO conference, a “Soapbox” session was devoted to the problems facing both consultants and regulators in the Design Review Process. At the 2016 ASDSO conference a “Town Hall” follow-up session was held to have a *solutions-based discussion* with the audience. The following summarizes notes and ideas from this session.

| Issue  | Description  |
|--|--|
| <b>Issue 1: Inexperienced Engineers</b>                      | 1. Some states prequalify engineers or have other mechanisms in place for assuring the engineers working on dams have sufficient relevant experience. Others say there is nothing they can do; going to the licensing board is not an option. In many cases, the under-qualified engineers often "win the job" by being less expensive. However, in the long run, there may be more cost to the dam owner, through multiple rounds of agency reviews or more expensive (less innovative) solutions. Consulting Engineers: What is your advice to the regulatory agencies and other qualified engineers in preventing this from occurring? Regulatory Agencies: Do you have success stories to share or a procedure in place that helps address this issue? |
| <b>Issue 2: Design by Submittal</b>                          | As a follow up to Issue 1, many regulatory agencies assist the under-qualified engineers with a design through multiple rounds of agency review (i.e. design by submittal), where corrections to analyses may be made and design solutions are sometimes suggested by the regulator. Consulting Engineers and Regulatory Agencies: Please share your experiences with this issue, both good and bad. Do you have any lessons learned?  |
| <b>Issue 3: Design by Regulator</b>                          | Related to Issue 2, in some cases regulators may have preconceived or alternative concepts for a design solution and recommend this to a designer, either qualified or unqualified. Consulting Engineers: How do you deal with regulators that recommend a solution? Have you had situations where you disagreed with the solution? Do you have suggestions for resolving this? Regulatory Agencies: Have you provided specific recommendations for design solutions? If so, how do you resolve disagreement with the designer regarding a solution?   |
| <b>Issue 4: Predesign Meetings</b>                           | 4: The Dam Design and Construction Committee is looking at ways to engage engineers early in the design process to provide guidance, direction and expectations. Consulting Engineers and Regulatory Agencies: What are your experiences with pre-design meetings - in law, rules, practice? Should pre-design meetings be considered the State of Practice or even included in the model Dam Safety Law?  |
| <b>Issue 5: Lack of State Resources for Adequate Reviews</b> | A common story among Regulatory Agencies is the inability to add staff and their significant workload. Also, in some cases, the agency staff may lack experience in a certain aspect of a given design. As a result, they do not always have the time or expertise to perform an adequate design review. Consulting Engineers: What ideas do you have to make an independent review more palatable to both you and the dam owner? Regulatory Agencies: Please share any success stories with regard to contracting for independent reviews.  |

| <b>Solution</b>  | <b>Possible Responsible Party</b> | <b>Comments</b>  |
|--|-----------------------------------|--|
| <b>Update ASDSO brochure on hiring an Engineer</b>                                     | Dam Owner Outreach Committee      | Include cost implications of hiring underqualified engineers caused by multiple rounds of extra review.<br>Add questions for dam owners to ask their state engineer (state engineers can't offer recommendation, but can provide info to carefully worded questions) |
| <b>Add to owner education training courses the topic of hiring qualified engineers</b> | Dam Owner Outreach Committee      | Both webinars and in person, consider webinar targeted towards subject   |
| <b>RFQ/RFP's suggested language for dam owners in hiring an engineer brochure</b>      | Dam Owner Outreach Committee      | # of years' experience required; substitution procedures, request should include carefully worded language that proposal is for approval not just submittal (some legal concerns were voiced).   |
| <b>Develop national qualification process</b>  | AdCom                             | Define qualifications to work on dams anywhere in US   |
| <b>Define qualifications of Engineer of Record in Model Law</b>                        | AdCom                             | Prequalify person, not just firm. Engineer of Record should be company, not person; 10 yrs. recommended; Note there should be lower min qualifications for lower hazards, one size does not fit all situations   |
| <b>Compile Case studies /examples to include in brochure</b>                           | Dam Owner Outreach Committee      | Change names to protect identities, Note Georgia has some good case studies  |
| <b>Provide states example notice of deficiency letters to owner</b>                    |                                   | The letter should be worded to help the owner understand the problems; copy to the engineer. Indiana has a good example.   |
| <b>Provide opportunities to showcase competent firms</b>                               |                                   | Instructors/presenters at dam owner workshops  |
| <b>ASDSO provide outreach and education to licensing boards</b>                        | ASDSO                             | Via Brochure or letter.  |
| <b>Engineer of Record Roundtable</b>   |                                   | Example – Nevada   |
| <b>Legislative advocacy for adequate staffing for states</b>                           | Legislative committee             |  |
| <b>Education to policy makers on importance of strong dam safety programs</b>          | Legislative committee             | Communicate to policy makers shortcomings  |
| <b>Request/Require dam owners to participate in all meetings</b>                       | Dam Construction Committee        | Design<br>Keeps dam owner involved in process, should be required to attend a 30% design review meeting. Do not let attorneys attend meetings.<br>Include as recommendation of Design Review Process white paper.  |

|   |                                       |  |
|---|---------------------------------------|--|
| <b>Guidelines for 3<sup>rd</sup> party independent Review</b>     |                                       | Special Session for next ASDSO conference with State, Federal and consultant perspective |
| <b>Compile case studies on design review problems</b>             | Dam Design and Construction Committee | Lessons learned – included in white paper?   |
| <b>Continued/increased training on design review to engineers</b> | Training Committee                    | Design review committee develop webinar  |