

Presentation

Dam Inspection

Kevin Shamburg, KLA Environmental Services Inc., Dam Safety Conference, 15 February 2012, Topeka, KS



A professional engineer licensed in Kansas, Nebraska and Oklahoma, Kevin Shamburg said professional engineers have three clients:

owners who pay the engineering fees; Division of Water Resources, the regulatory agency overseeing engineering work; and individuals living downstream of a dam.

He began by defining the term “inspection” — “an inspection is relied upon by others as a guarantee of conformance with a standard” — and the consequences of that term.

The dam inspector, he noted, must be qualified to meet Kansas regulations that require inspectors to be a licensed professional engineer experienced with dam design, construction, and operation.

“Lastly, engineers are required to perform to an industry standard of care. In case of dam safety inspections in Kansas, that’s the dam design and inspection criteria. To protect people downstream from the dams, we shouldn’t overlook other standards of care.”

His engineering firm begins its inspection process by reviewing all available documentation regarding the design of a dam, particularly the dam’s hydraulic and hydrologic capacity. This entails looking at land use changes in the watershed and impacts on the design hydrology and also changes in reservoir and spillway capacities.

Next, a physical inspection is done of the dam, spillway, and other features and changes documented since the dam was designed. “We

evaluate inspection results and summarize findings. This is where we use our engineering experience to identify the consequences of the observations we made.” After organizing all pertinent technical documentation, a comprehensive report is prepared consistent with the standard: K.A.R. 5-40-90. Included in the report are maps, drawings, photographs, and any specific deficiencies.

Shamburg stressed the importance of using a checklist while doing an inspection, saying plenty were available, for example, from the Association of State Dam Safety Officials and other dam regulating authorities. A checklist should record

and document observations that violate the permit or approved plans, modify the permit or approved plans, or threaten the structural dam integrity and safety of the

people or property.

Take color photographs of violations or changes while documenting the condition of dam appurtenances, embankments, and observed deficiencies, he said, and include a plan view sketch showing the location and direction of each photograph.

Of deficiencies Shamburg has observed on Kansas dams, the first is seepage that can range from minimal to a major concern. To identify seepage, he said, use the basic conservation equation: Inflow – outflow = change in storage. “We can apply this throughout the project — whether it be reservoir, outlet channel, stilling basin,” he said. “If no water is coming out of pipe, anticipate any discharge in channel downstream

Dam Safety Inspection Checklist

Complete All Portions of This Section (Pre-Inspection)

Date of Inspection: _____ File Number: _____
Name of Dam: _____
EAP (yes, no) OMAE (yes, no)

Section Inventory - Highlight missing information (Pre-Inspection)

Owner's Name(s): _____
Address: _____
City: _____ State: _____ Zip (+4): _____
Telephone (Home): _____ Telephone (Work): _____
Contact Person: _____ Telephone: _____
Designed By: _____
Constructed By: _____
Year Completed: _____ Plans Available (Yes, No) (location): _____
Purpose of dam: _____

Structure with OMAE (at the site)

Owner/Representative present (Yes, No) Name(s): _____
Double check address, telephone & purpose (check -> 0)
How long have you owned dam - previous manufacturer? _____
EAP/OMAE: up-dated (yes, no) & location: _____
Operate like dam (times per year, accessibility): _____
Mowing (times per year): _____
Flow problems (root cause, erosion, slides): _____
Repair or modification (what & when): _____
Failure/Incident/Breach (time, pool): _____
Downstream hazard status (recent changes): _____

Do you know the in-depth details of the construction of your dam? (If yes - ask next three questions, if no - go to Field Information Section)

Core trench material and location: _____
Volume of fill (earth or rock) in dam: _____
Foundation (earth or rock) of dam: _____

Field Information (while at site)

Field Location (during inspection): _____ Time: _____ (am, pm)

Site Conditions (temp., weather, ground moisture): _____

Inspection Party: _____
Maximum Height: _____ (measured or inventory appears correct)
Normal Pool Surface Area: _____ (measured or inventory appears correct)



from the pipe that water is coming from some place other than conduit. If you see an accumulation of cattails, you can conclude pretty significant seepage that should be identified and communicated to dam owner.”

Take advantage of alignments for inspection, he said. Stand on top of the dam and look down. Another technique is sighting through the pipe. If you see light, you can identify changes in construction or obstructions in the pipe.

“A lot of what we see is spillway erosion damage, after storm events,” Shamburg said. Other typical occurrences are deep rooted vegetation, embankment trails, and animal burrows. “We also see plugged drains, missing parts, and eroded shorelines.”