

Dam Safety

The Corps' risk-informed approach gathers momentum

By Craig Collins

The U.S. Army Corps of Engineers operates more than 600 dams, ranging in age from less than 10 years to more than a century old. Since 2005, the Corps has been developing a new way to determine whether a dam is safe, in terms of the risks it poses to human life and property. Now, experts take into account the complex factors – a dam's purpose, site characteristics, construction methods and materials, for example – that together draw a picture of a dam's safety profile.

This new approach, known as risk-informed decision-making, was launched in 2005, when the first and most basic evaluation of a dam's safety, the Screening for Portfolio Risk Analysis (SPRA), was first conducted to identify serious problems with any of the nation's dams. Today, as the risk-informed approach matures throughout the Corps' Dam Safety Program, the Corps is actively managing dam risks on a national scale by weighing current dam behavior, the probability of a hazardous event, and the potential consequences of dam failure.

The SPRAs, which will be completed on all dams in the Corps' portfolio by the end of 2009, have given the Corps a clear picture of its greatest risks and priorities, and led the Corps into areas of additional study. In some cases, an SPRA has led directly to the performance of remedial work.

The next level of additional evaluation, the Issue Evaluation Study (IES), is a more complex, technical level of risk evaluation that involves computer modeling. "In layman's terms," said Eric Halpin, the Corps' Special Assistant for Dam and Levee Safety, "what that really means is we're able to take a fine-toothed comb to our projects, understand them better, understand the sources of risk, and be able to develop solutions for those sources that are very targeted and very cost-effective."

In several cases, Halpin said, the additional information generated by an IES has been eye-opening: For some dam projects, the risk turned out not to be as great as feared, and for others, the risks were actually higher. "We've been able to adjust our investment strategies," he said, "in the face of that new information."

Examples of risk assessments being amended by more detailed evaluation include the Success Dam on the Tule River near Porterville, Calif. An earthen dam built in 1961, it has been targeted as a risk for failure because of

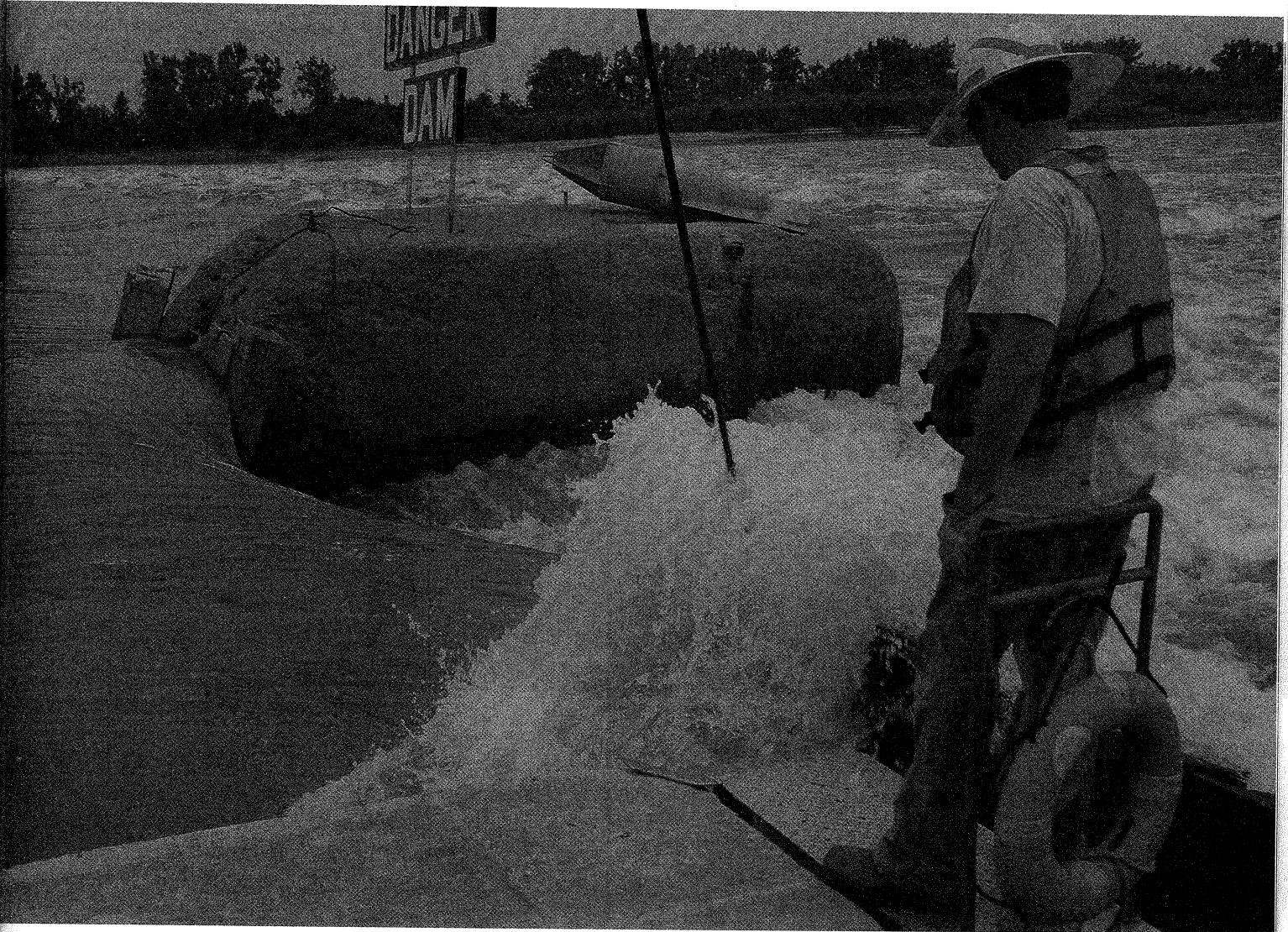
fears it might fail in an earthquake. Success Dam recently underwent an IES that revealed a more complete picture of the potential effects of seismic activity. "We were able to put that seismic threat in a little better context," Halpin said, "and that will mean we will adjust both the priority of the project and the nature of the rehabilitation we can go after."

The ability to change its thinking about the risks posed by a particular project, Halpin said, is a built-in benefit of the risk-informed approach: It allows the Corps to adapt to new information. "We call it spiral or adaptive development of the policies and procedures," he said. "What's important is that you adjust your aim as you learn."

The organizational structure of the Corps' Dam Safety Program has also matured in recent years to meet the goal of having all Corps dams screened by the end of 2009. The Corps established 11 regional Risk Cadres, recruited from individual divisions to receive training in risk analysis; these cadres went straight to work on SPRAs. Last year, two additional cadres were formed to begin testing the new IES process on four dams, in order to enable a quick transition from one level of risk assessment to the next. The Corps has also trained more than 100 staff members in Potential Failure Mode Analysis (PFMA), which is the first step in identifying and implementing measures that will reduce the risk of dam failure until a permanent solution is devised.

Perhaps the most significant organizational change planned for the Dam Safety Program is the establishment of the National Risk Management Center, which will become an operating element of the Institute for Water Resources at Corps Headquarters. "The organization is going to be the permanent centralized home of risk assessment competency in the Corps," Halpin said. "We think it's going to help lead not just the Corps, but also local industry in the area of risk assessment."

Because the Dam Safety Program is structured around a comprehensive system of assessing and prioritizing risk, Halpin said, the recent influx of federal funding, in the form of the American Recovery and Reinvestment Act, has augmented this undertaking. "I think we'll be able to progress through the portfolio from highest risk to lowest risk in a more efficient way now, so individual projects aren't taking as long – but the timetable for



An employee from the Corps of Engineers Louisville District raises the wicket on an old dam at Lock 52 on the Ohio River between Kentucky and Illinois. The Olmsted Locks and Dam project scheduled for completion in the near future will replace this antiquated system.

addressing the entire portfolio remains much the same, because we're already prioritizing projects in our budget." A number of key safety projects, determined by Corps evaluations as "actionable," will be accelerated by the stimulus legislation, including several aging dams that have been determined to pose the greatest risk and a good number of navigation projects that, while typically not a threat to human life, pose risks to safe and efficient navigation of American waterways.

In the summer of 2009, the Corps continued to apply its principles of adaptive development when it launched an overhaul of dam safety regulation that completely incorporates the principles of risk-informed decision-making. "It's been a mammoth effort," said Halpin, "that's going to pay a lot of dividends and essentially set the path forward for the program into the next couple of decades."

The Corps' dam and levee safety programs emphasize the sharing of responsibility for safety among all levels of government and private stakeholders, and as the methods for evaluating, prioritizing, and addressing dam safety issues have become more solidly rooted in the principles of risk, the effort at cooperation has strengthened. This is especially true at the federal level, Halpin said. "Interagency cooperation this past year among the Corps of Engineers, the Bureau of Reclamation, and the Federal Energy Regulatory Commission on dam safety has been as strong and as good as it's ever been, to the point where we will go to international conferences to speak on behalf of each other about what we're doing with our joint federal agency approach," he said. "There is kind of a momentum now, a level of interagency cooperation that the federal government has never really had. And it's a very powerful thing."