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Levee Fixes Falling Short, Experts Warn

Corps Rejects Claim Of Substandard Soil

By [Joby Warrick](#)

Washington Post Staff Writer

Monday, March 6, 2006; Page A01

NEW ORLEANS -- The Army Corps of Engineers seems likely to fulfill a promise by President Bush to rebuild New Orleans's toppled flood walls to their original, pre-Katrina height by June 1, but two teams of independent experts monitoring the \$1.6 billion reconstruction project say large sections of the rebuilt levee system will be substantially weaker than before the hurricane hit.

These experts say the Corps, racing to rebuild 169 miles of levees destroyed or damaged by Katrina, is taking shortcuts to compress what is usually a years-long construction process into a few weeks. They say that weak, substandard materials are being used in some levee walls, citing lab tests as evidence. And they say the Corps is deferring repairs to flood walls that survived Katrina but suffered structural damage that could cause them to topple in a future storm.

The Corps strongly disputes the assertion -- by engineers from a National Science Foundation-funded panel and a Louisiana team appointed to monitor the rebuilding -- that substandard materials are being used in construction. Agency officials maintain that the new levees are rigorously inspected at each step. But they acknowledge that much more work will be needed after June 1, the beginning of hurricane season, and that the finished system still will not be strong enough to withstand a storm the magnitude of Katrina.

"The people of New Orleans need to get back to at least the level of hurricane protection we had before Katrina," Corps spokesman Jim Taylor said. "We were authorized to do that, and do it quickly. It's up to Congress to decide to take it to a higher level."

But Ivor van Heerden, a Louisiana State University engineering professor and leader of a state-appointed team of experts investigating the failure of the levee system during Katrina, charged that "the government is trying to create a sense of security that doesn't exist."

"What we have today," he added, "is a compromised levee system that failed during a fast-moving Category 3 hurricane. Absolutely nowhere are the levees ready to stand up to the same kind of test."

The Corps said several steps that could help the levee system survive a major hurricane will have to wait until next year. For example, systematic testing for weak soils beneath the levees will not be completed until 2007. Two of the most devastating flood wall breaches during Katrina have been blamed in part on weak, peatlike soils beneath the walls' foundations.

In addition, a plan to line the bases of certain critical levees with a protective layer of rock or concrete -- a process known as "armoring" -- is not expected to begin until summer, and then only if Congress provides additional money. Levee armoring significantly lowers the risk that a levee will collapse when it is overtopped by floodwaters.

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Louisiana State University researcher Ezra Boyd examines a crack in a flood wall in Jefferson Parish, west of New Orleans. Scientists say many levees that survived Hurricane Katrina are compromised and may fail in another storm. (By Joby Warrick -- The Washington Post)

A recent report by a prestigious panel of the American Society of Civil Engineers described the lack of armoring in New Orleans's levees as a "fundamental flaw" that demands urgent attention. The same report also faulted the Corps for making predictions about the system's safety before the agency officially determined what caused the levees to fail in the first place.

"Overtopping during Katrina caused catastrophic flooding and destruction of the levees themselves," said David E. Daniel, president of the University of Texas at Dallas and a member of the engineers panel. "It is inevitable that the levees will again be overtopped -- the only question is when."

Katrina breached the region's 350-mile levee system in dozens of places, blasting out huge chunks of concrete flood walls in central New Orleans and obliterating miles of earthen levees south and east of downtown. The breaches put 75 percent of New Orleans under water and transformed Katrina from a destructive but ordinary storm to a monumental disaster that claimed more than 1,300 lives.

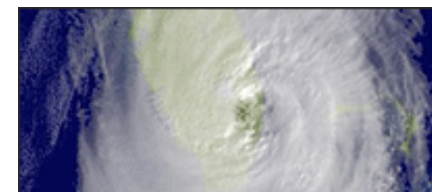
The Bush administration has requested about \$3.1 billion for repairing and strengthening the region's hurricane defenses. In addition to the \$1.6 billion approved by Congress for rapid repairs to broken levees, the administration is seeking additional money for armoring, new floodgates and more pumping stations.

Graphic

[Levee Rebuilding: Ready or Not?](#)

The Army Corps of Engineers is racing to rebuild 41 miles of broken levees and patch up damage along an additional 128 miles before the hurricane season officially starts June 1. But some independent experts are questioning whether New Orleans's hurricane-protection system will be truly ready.

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When all that is completed, New Orleans will have a levee system that is still designed to withstand at most a weak Category 3 hurricane. The Bush administration and many in Congress have resisted calls for building higher levees that would protect against a Category 5 storm, to the frustration of Gulf state governors and congressional delegations.

"Essentially returning to the level of protection we had pre-Katrina will do little to inspire the confidence needed to bring the region back," said Sen. Mary Landrieu (D-La.).

The task of rapidly rebuilding broken levees began within days of the hurricane and is now about halfway complete. At least 500 Corps employees and hundreds of contract laborers are mobilized for the effort; many work 12-hour days in swamps thick with mosquitoes and littered with hurricane debris. All are under pressure to complete what Corps officials describe as the agency's most ambitious undertaking in decades.

"It is the equivalent of building the Panama Canal," Taylor said.

The extraordinary scale and speed of the undertaking are widely admired, even by longtime critics of the agency. Yet experts overseeing the reconstruction worry that problems that helped doom the old levee system are being glossed over.

On a recent afternoon, van Heerden, the Louisiana team leader, pointed to a series of contorted concrete slabs that are part of a nine-foot-high flood wall along Duncan Canal in Jefferson Parish, west of downtown New Orleans. Some sections of the wall leaned a few degrees away from the canal, others tilted inward, and still others visibly sagged or bore large cracks -- evidence, van Heerden said, of shifting or weakened soils underneath.

Soft, almost quicksandlike native soils have been the bane of New Orleans builders for centuries. When Katrina hit, flood walls that were not adequately anchored were sometimes pushed backward along a sliding carpet of saturated soil. In some cases, the concrete fractured and broke. At Duncan Canal and elsewhere, the damage was less visible but still serious, van Heerden said.

"We know there are weak soils here, and they have been further stressed by Katrina," he said. "To me, this says the whole system has been compromised."

Corps officials acknowledge that many surviving levees may have been weakened by the storm, but testing of the entire 350-mile system is not expected for at least another year. Whether the untested levees are safe in the meantime is a subject of intense debate.

Deano Bonano, Jefferson Parish's chief of emergency operations, said he saw no imminent danger in the sagging flood walls along Duncan Canal, noting that "the Corps is telling us the walls are safe." But Chip Cahill, president of the West Jefferson Levee District, worries that the Corps is delaying repairs and upgrades that are needed before the next hurricane strikes. "The Corps has set aside \$170 million for our district, but right now nothing is getting done," Cahill said.

East of the city, concerns are mounting about levees that are being rebuilt from scratch. Normally it takes years to build a proper earthen levee, engineers say,

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Louisiana State University researcher Ezra Boyd examines a crack in a flood wall in Jefferson Parish, west of New Orleans. Scientists say many levees that survived Hurricane Katrina are compromised and may fail in another storm. (By Joby Warrick -- The Washington Post)

Graphic

[Levee Rebuilding: Ready or Not?](#) The Army Corps of Engineers is racing to rebuild 41 miles of broken levees and patch up damage along an additional 128 miles before the hurricane

because the layers of soil need time to compress and settle before new layers are applied on top of them. The Corps has shortened the process to a few weeks.

Because native soils are notoriously soft, the agency is forced to bring in clay by barge. But independent observers contend that some of the materials used in levee construction are still inadequate.

After an unannounced visit last month to a construction site east of New Orleans, members of the National Science Foundation-sponsored oversight team said they observed workers applying highly porous, sandy soils to a levee near Bayou Bienvenue. One team member, engineering professor Robert Bea of the University of California at Berkeley, said he collected samples from the levee wall at several spots for later testing. The tests confirmed his suspicions, Bea said.

"It was the loosest, most erodible material we had seen," said Bea, a onetime Corps employee and a member of the National Academy of Engineering. His analysis was supported by a second engineer present at the time.

In another spot near Bayou Dupre, also east of New Orleans, a ruined levee was being rebuilt on a foundation of weak, porous sands, according to van Heerden, who visited the site recently with a reporter and a Dutch levee expert. Where the levee was to be rebuilt, the soil was white sand the consistency of powdered sugar, intermingled with a copious amount of tiny seashells. "It's the last thing you'd want as a base for a levee," van Heerden said. "The old levee was made of this same material, and it failed."

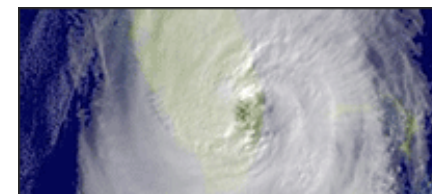
Corps officials rejected the conclusions of the independent experts, particularly Bea's. Taylor, the spokesman, said the soils tested by Bea were not representative of the material used in the levees.

Taylor said that the soils used in levee rebuilding were carefully selected and rigorously tested. And he added that many Corps workers had a personal stake in ensuring that the levees are sound.

"Many of the team members are from New Orleans and lost their homes during Katrina," Taylor said. "Their families will live behind these new levees."

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