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PROPERTY REPORT

El Salvador Is Lesson in How Not to Rebuild

By **ALEX FRANGOS**
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LA CRUZADILLA DE SAN JUAN, El Salvador -- Four years ago, a pair of powerful earthquakes crumbled whole villages of small brick homes in this lush river valley. Millions of dollars in U.S.-government aid poured in to handle the initial crisis, followed by many more millions to help rebuild.

The result is more than 25,000 homes, 53 schools and dozens of clinics and other facilities. But in some cases, the design and construction of the buildings are flawed, making them potentially dangerous in the event of another disaster in this earthquake-prone region.

In some homes, the ceilings are improperly attached to the walls. In others, concrete blocks are too small and the reinforcing metal rods used to add strength are too thin.

A new U.S.-funded grammar school in the town of Jiquilisco has dead-end corridors that are 120 feet from the only exit, 100 feet farther than building codes in the U.S. allow. A classroom at the end of the corridor has exposed wiring that leads to an outlet.

In many new homes, a narrow column of concrete blocks holds up part of a roof. "I could run into this like a football player and I'd crack it," says David Rivard, president of Steel Reinforcing Inc., a Burlingame, Calif., contracting business.




Lynn Underwood
Flaws in U.S.-funded buildings in El Salvador include unsafe guardrails.

Mr. Rivard is part of a small group of volunteer building experts who traveled to El Salvador two weeks ago to inspect the construction paid for with U.S. aid money. The building experts, some of whom had already seen the substandard construction in the country, are part of an ad hoc group called Casa Corps, whose goal is to improve the quality of construction in developing countries.

"Our buildings reflect who we are as a society," says

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WAVE OF DESTRUCTION



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See [complete coverage](#)² of the earthquake and tsunami in South Asia.

Stephen Forneris, an architect from New York who organized the trip. "What do these poorly constructed buildings say about us?" The experts want the U.S. to impose stronger building standards for the hundreds of millions of dollars it will spend on reconstruction around the world, including the parts of Asia ravaged by the tsunami. Their hope is that the U.S. can set an example for local builders to follow.

The rebuilding needs in Southeast Asia dwarf El Salvador's. The United Nations estimates that at least two million people were made homeless by the tsunami. While touring damage in Sri Lanka, U.S. Senate Majority Leader Bill Frist said 150,000 homes would need to be built there in the next year and a half.

But comparisons can't minimize the pervasive damage wrought by natural forces in El Salvador. On Jan. 13, 2001, a 7.6-magnitude earthquake struck off the coast. Exactly one month later, a second quake, magnitude 6.6, hit 20 miles east of the capital, San Salvador. In a country of 6.6 million people with an area smaller than Massachusetts, the quakes killed 1,159 people and caused \$1.7 billion in damage. Around 167,000 houses were destroyed, along with 1,200 schools.

Tucked between a mountain range of towering volcanoes and the same giant fault system that runs north to California, El Salvador is one of the most seismically active countries in the world. Temblors have devastated the nation repeatedly, including ones in 1968, 1986 and the pair in 2001. Hurricanes and floods are common.

After the earthquakes, the U.S. led the way with immediate aid. But the bulk of the U.S.'s commitment, \$109 million, went to long-term reconstruction. Now, four years later, almost all of the projects have been completed, but not without problems. Simply fashioned metal "seismic" hooks that would keep the rebar in place during a quake are missing. One of the visiting experts, David E. Saunders, manager of building and fire safety in Yakima County, Wash., says the U.S.-funded houses could collapse in an earthquake.



Alex Frangos

U.S. building expert David E. Saunders inspects construction.

"The main problem is the ceiling won't be attached to the walls properly," he says. "We probably wouldn't pass [such a] house in the U.S."

Casa Corps is named after a little-known law passed by Congress in 2002 called the Code and Safety for the Americas Act, or Casa, which encourages the teaching of U.S. building codes in El Salvador and Ecuador. The impetus to pass the law came from people like Messrs. Rivard and Forneris, who were in El Salvador during one of the 2001 quakes, and from groups that benefit from building-code improvements including the International Code Council and the National Fire Protection Association. Congress never authorized any funding for it, so the legislation turned out to be largely symbolic.

The recent trip was inspired by earlier visits to El Salvador by the two Americans, who had seen the shoddy construction, including at the International Airport, which was rebuilt with U.S. funds. While many work in the building industry, they could not directly benefit from any improvements in building codes overseas. The group made a similar trip to Ecuador in 2003.

The U.S.-funded buildings inspected by the American experts were designed by Salvadoran

builders and approved by the U.S. Army Corps of Engineers, while charities or state-owned development foundations hired local contractors to do the work.

U.S. government officials say the new buildings meet Salvadoran codes for earthquake resistance and are far better than what was there before. Speaking of the approximate cost to build one house, Mark Silverman, mission director for the U.S. Agency for International Development in El Salvador, says, "At \$3,500 a pop, there's only so much you can do." But he says USAID, which is leading the U.S. rebuilding effort in Asia, did enough to ensure the buildings were safe. It hired the U.S. Geological Survey to create risk maps that identify safe areas to build. The U.S. Army Corps of Engineers reviewed plans for every project. A team of 13 Salvadoran engineers and architects supervised the projects and in some instances shut them down for improper construction practices.

Despite USAID's best efforts, however, Mr. Forneris says there were systemic problems. He cites USAID's own guidelines to contractors, which specify concrete blocks and metal rebar that the inspectors deem too weak for an earthquake-prone region. Regarding the Salvadoran codes, which USAID adheres to, he says they're out of date and inconsistently applied.

Casa Corps will submit its El Salvador findings in a report to USAID and Democratic Rep. Tom Lantos of California, ranking member of the House International Affairs Committee. Mr. Lantos, who sent a staffer on the trip with the building experts, intends to introduce legislation on the subject, possibly requiring USAID to create a set of sample building plans that adhere to stringent building codes.

"While the U.S. government has done a good job raising the quality of reconstruction ... much more can be done," Mr. Lantos says. "We must ensure that U.S.-financed reconstruction meets basic safety requirements and is better able to withstand the forces of nature."

The Salvadorans now living in U.S.-built homes are grateful for the help. At the housing project the inspectors checked out, Alfredo Valle, 25 years old, just moved his family into a tiny three-room house with backyard latrine. "It's magnificent," says the seed-store clerk. "Without this we'd have nowhere to live." His old brick house was flattened in the earthquakes.

At the school where the hallway was too long, Adolf Zubia, fire chief of Las Cruces, N.M., noticed that large potted plants had been placed opposite classroom doors, narrowing the already compromised escape route. Army engineers who accompanied the inspectors quickly told a custodian to move the plants.

There are other problems. Blue metal stairwell guardrails are too low, and the spacing between the rails on the second-floor balcony is too wide. "A kindergarten kid could get his arm or even his head through the rails and hang himself," says John C. Parker, chief building official in Middletown, Conn. "Reviewing the plans could have solved most of these problems," he says. The school opened for classes on Monday.

A senior USAID official confirms that the design of the two-story building was approved by the Army engineers. The project manager says the height of the handrails will be fixed but paid for by the school's parent-teacher association because there isn't any U.S. money left.

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