

# Destination Pakistan

## BWB Volunteers Aid Earthquake Reconstruction

Richard L Rogers

Ask Bob Culbert PEng and Saqib Khan PEng why they dropped everything at virtually a moment's notice last April to spend three weeks working with World Vision in earthquake-devastated northwestern Pakistan, and both say it was their way of giving back.

Culbert, a civil engineer by training with a long and well-travelled career in business and project management, says he was thankful for "the years of really good, very rewarding experiences I've had in Nigeria, Indonesia, Nepal and many other places" while Khan, who grew up and received his civil engineering undergraduate degree in Pakistan before moving to Canada in 1999, says his home country "has given me a lot of things ... and, in my mind, it was an opportunity to go and give back."

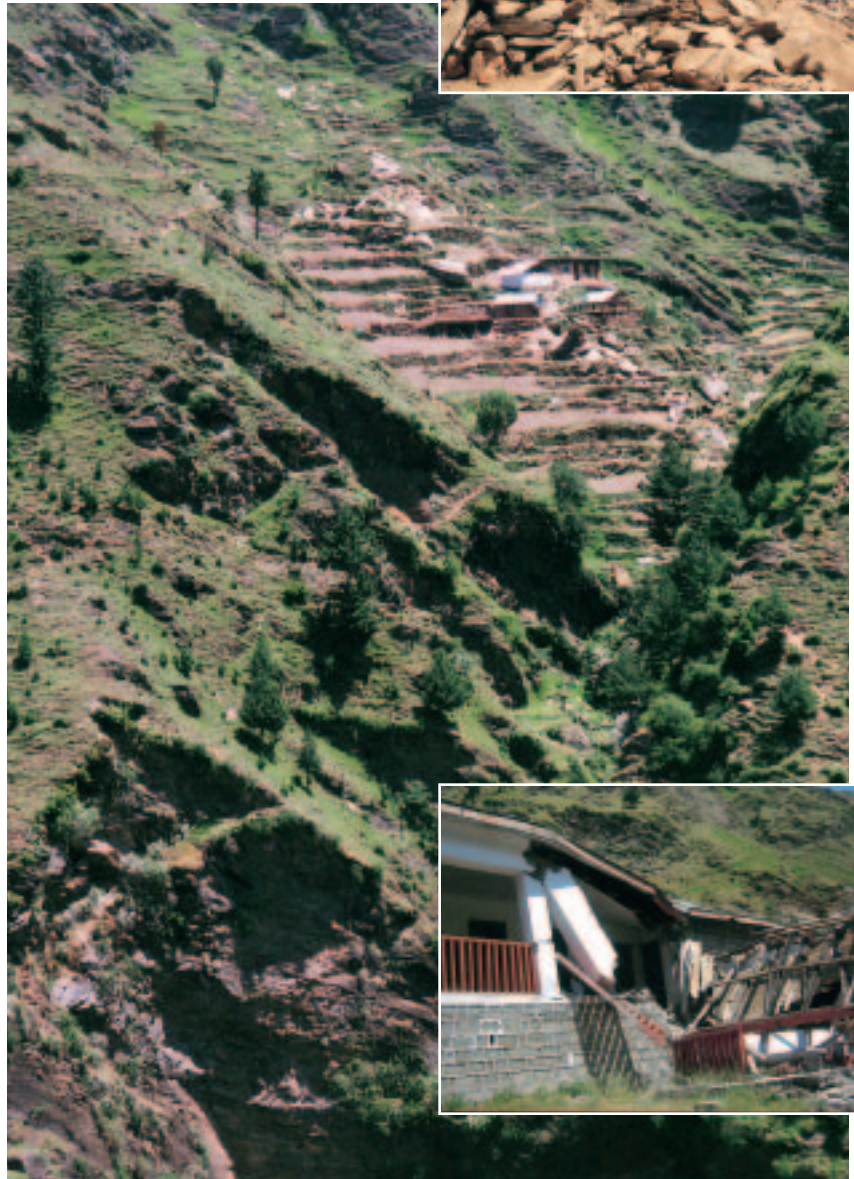
Among the flood of tragic images in the aftermath of the deadly temblor — the strongest witnessed by Pakistan in over a century — few were more heart-rending than those of frantic rescuers desperately scabbling through piles of rubble marking the sites of village schools. Thousands of children throughout the region had just begun their school day when the quake struck, and few survived the crushing collapse of the mostly stone masonry buildings.

### Call for Engineering Help

Within days of the October 8, 2005 tragedy, aid began flooding into the region. Dozens of non-government organizations such as World Vision worked with the Pakistani government to keep people alive, bringing in food, medicine, clothing and temporary shelter to help survivors make it through the harsh mountain winter.

According to official estimates released by the end of 2005, the earthquake and the landslides it unleashed killed over 73,000 people, injured over

*Main image: Primary school reconstruction site in the Upper Siran River Valley in Pakistan's North West Frontier Province. Insets: Damage and destruction wrought by the October 2005 earthquake. (Photos: Bob Culbert PEng, Saqib Khan PEng)*





120,000, left over 3 million homeless, and wiped out hundreds of towns and villages. The destruction of most hospitals, schools, government buildings and communication channels in affected areas amplified the devastating effects of the crisis.

By early spring 2006, relief efforts began to shift to rebuilding. WV emailed Neil Griggs, founder and president of Vancouver-based Builders Without Borders, asking for help from engineers with knowledge of and experience in seismic issues, and locally-appropriate earthquake resistant construction techniques, to advise on school reconstruction. That led to Culbert and Khan.

"I've known Neil for a long time," says Culbert, "and back around 2000, when he started BWB, he talked to me and knew I had a lot of international experience, particularly in developing countries. I encouraged and helped him out as much as I could and said 'if ever the need arises, let me know.'"

That need did arise in 2001 and Culbert travelled to Gujarat, western India, to help with its post-earthquake reconstruction. With that experience, he was one of the first engineers Griggs turned to when the WV request came in.

Khan, who completed his master's degree in structural engineering at UBC in 2001, came to the project a little more indirectly. "Svetlana Brzev [PEng PhD] is a BCIT instructor with a seismic background; I met her in 2001," he recalls. "BWB originally approached her but she had other commitments. Knowing that I have a bit of seismic knowledge and come from Pakistan, she asked if I would be interested."

Both men's immediate reaction to the BWB request was positive — particularly Khan's, since during a visit home in December he had wanted to help but lack of time and resources barred the way — but there were a few complications.

Culbert works in gold exploration with a number of public companies. At the time of his Gujarat trip in 2001 gold prices were low, mining and exploration had almost ground to a halt, and he had some time on his hands.

"This time, I was really pressed and it was quite a struggle because I have responsibilities here in two or three different companies," he says. His solution was to take a three-week vacation. "Everybody takes holidays, so why can't I? If I want to go and do this instead of lying on a beach, I don't see any real difference. I'm away and that's that."

Khan, on the other hand, was starting a new job with Associated Engineering on April 1 and wasn't sure of the reaction if he asked for three weeks off right away.

He needn't have worried. Don Kennedy PEng, manager of AE's bridge engineering group and Khan's new boss, says "Saqib wanted to go, and it really wasn't that difficult ... it was such a good opportunity and one you can hardly say no to."

**L to r: World Vision engineer in front of collapsed school in Manda Gucha; Saqib Khan PEng (red shirt) with assessment team; village elders near Basu; Bob Culbert PEng (right) with World Vision engineer in the upper Siran River Valley; Saqib Khan PEng (far right) inspecting a damaged primary school at Panjul village. (Photos: Bob Culbert PEng, Saqib Khan PEng)**

### Focusing the Scope of Work

Culbert notes that the 2001 Indian project was somewhat similar to that in Pakistan; in Gujarat he was helping to rebuild local medical clinics and child care centres. In Pakistan, however, there were two main differences: time and terrain.

While in India, Culbert spent three months working on a largely flat coastal plain where reconstruction sites were easily accessible. In Pakistan, all they had was three weeks, and most of the sites were in steep Himalayan mountain terrain several hours from the base in the town of Mansehra about 200 km north of the capital, Islamabad.

Culbert says a good analogy might be travelling east from the "slightly rolling" country around Popkum (15 km east of Chilliwack) into the mountains along the Hope-Princeton Highway, "but imagine there's no Hope-Princeton, just an extremely narrow track that could take two hours to travel 40 km."

The original WV request stated that help was needed for "assessments of school buildings that we may decide to reconstruct, including cost estimates for reconstruction up to minimum government standard (still not issued) as well as WV standard (should it be higher than the government standard). The WV standard does not exist yet — it would need to be created by the engineer."

In addition, WV wanted assessments and costings for repairs to water, sanitation and irrigation systems as well as roads. Although the request was for investigations of a limited number of schools — 50 to 80 out of the 8,000 damaged or destroyed the region — and was confined to a specific area, it was still a tall order.

"When we looked at what they were asking for," says Khan, "it was very clear that this assignment could go on for months." Therefore the first order of business upon their arrival on April 21 was narrowing the terms of reference.

"We had to come up with something that we could realistically tackle in that period of time," says Culbert. "What we tried to do in the report [to World Vision] is guide things along towards where we think they should go."

### Satisfying Results

During the three weeks Culbert and Khan were in Pakistan, they were able to spend only five days actually in the field.



Fortunately, Khan had been to the area before and was familiar with local construction methods, commonly “very brittle, unreinforced stone masonry.” This, combined with their field inspections, allowed them to recommend specific guidelines for the reconstruction effort.

Their key recommendation in their final report to World Vision was to use confined masonry construction, which Culbert says is “fairly well accepted and known in places like this,” to replace heavily damaged or destroyed schools. “It involves a slab and then columns and beams infilled with masonry like bricks, concrete blocks or stone, and some sort of roof truss,” he says.

They also recommended the roofs themselves be galvanized iron, primarily because it’s easier than concrete tiles to transport to the isolated and difficult-to-access sites. In addition, they urged a geotechnical inspection of each school site before reconstruction, and relocation if faults or other geological dangers are identified.

Both Culbert and Khan are satisfied with the results of their trip. “I would say we achieved a lot in the time we had,” says Culbert. “We tried to work on the most important things and I’m very happy with what we accomplished.”

Khan believes the trip will return much larger dividends than rebuilding of a few schools, pointing out that “the biggest reason such catastrophes happen is because we tend to overlook the basics.”

Even though some of the region’s schools survived the quake either intact or with only slight damage, their construction still makes them prone to collapse. Both hope the country will put resources into a program to eventually replace every school with structures more likely to survive any future earthquake.

### Making a Difference

Culbert and Khan believe there is plenty of engineering and construction expertise within Pakistan to get the job done. Although they are more than willing to provide further advice, they believe it is important that reconstruction remain in the hands of local people to ensure it is culturally and architecturally appropriate, and engenders pride of ownership.

“It seems to me that this quake has jolted local authorities out of their slumber, so to speak,” says Khan. He points out that the country’s Earthquake Rehabilitation and Reconstruction Agency has undertaken to carry out spot inspections of the reconstruction, something previously unheard of.

Khan adds that, during discussions with engineers from the National Engineering Services of Pakistan, “they came across as being really determined to build something that wouldn’t wreak such havoc with human life.”

Both men are open to similar trips if the need arises in the future, something that doesn’t surprise AE’s Kennedy, who believes they are no different from most engineers.

“Engineering and civil engineering is about making lives better, and a lot of people go into it for that reason. So when an opportunity comes along for either yourself or somebody who works with you to tangibly make a difference, it’s something that most would jump at.” ■

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