Pakistan Earthquake Reconstruction and Recovery Program

Year 3
Top: Government Girls’ Middle School Noman Pura. On one of the project’s first visits to this school students were studying in the open air on the same spot their school had collapsed in the earthquake and the rubble had been removed.

Middle: Now, on the same spot as the Above photo, is the new GGMS Noman Pura.

Bottom: Government Girl’s Middle School Besuti at the school’s handover day.

Cover Photo:
Government Boys’ Primary School Pehl: handed over to the Department of Education, September 2009

CDM (‘Camp Dresser and McKee Inc.’) is an American employee owned engineering and construction firm, established in 1947 and headquartered in Cambridge Massachusetts, USA; with more than 4500 employees and a network of 113 offices worldwide. The company offers diverse environmental, engineering and construction related services in a range of sectors to public and private clients. CDM delivers projects renowned for quality and innovation including major construction and design/build program.
At 8:52 AM on October 8, 2005 residents of northern Pakistan were shaken by a 7.6 magnitude earthquake that would claim more than 74,000 lives, level 272,000 buildings including 585 health care facilities and 15,000 educational buildings and leave some 3.5 million people homeless. Other lifelines such as water supplies, power lines and bridges were also disrupted. Described at the time by the UN as the 'most debilitating natural disaster the country has ever known', the destruction reached out over 30,000 sq. km.

The earthquake zone is located in the mountainous region, a landscape that is both beautiful and harsh. It includes parts of Pakistan's Northwest Frontier Province (NWFP) and Azad Jammu Kashmir (AJK) and represents a rich mosaic of cultures, languages, religions and ethnicities. On behalf of the U.S. Agency for International Development (USAID), CDM is delivering the Pakistan Earthquake Reconstruction and Recovery Program to re-construct schools and health facilities in two affected districts; Bagh in AJK and Mansehra in NWFP. This 5 year, $120 million program is part of the $1.5 billion in aid that the U.S. government is providing to Pakistan to improve economic growth, education, health and governance to assist with earthquake reconstruction.

As USAID's implementing partner for this program, CDM prepares site assessments, facilitates community participation and capacity building, develops building designs, selects and supervises local contractors to construct facilities, provides quality control and supports reconstruction-related events. All buildings are designed to meet internationally recognized earthquake resistant standards and provide access for the disabled. USAID and CDM are working closely with Pakistan's Earthquake Reconstruction and Rehabilitation Program Authority (ERRA) to rebuild communities, strengthen economic well-being and to 'build back better'.

Now by the end of January 2010, we are pleased to report that significant progress has been made.

- 72 buildings have been designed.
- 12 buildings have been completed and handed over
- 39 are under construction. [29 schools, 10 Basic Health Units (BHUs)]
- 20 schools and 1 hospital are awaiting approval to proceed with construction.
- 3 Rural Health Centers are in design.
- In all 75 locations there is wide community participation, public knowledge as well as enthusiastic support for both construction and to continue in future to maintain the facilities and improve the quality of health and education.

Program Team
- 210 CDM Pakistani staff members
- 4 Pakistani Architect/Engineering firms
- 11 Pakistani construction subcontractors
- With a workforce of 6,000 in 51 sites
- Over 230 Pakistani suppliers

Program Beneficiaries:
The project directly benefits over 1,000,000 people. Health facility catchment areas have a total population of 300,000. Enrolment at the schools is 16,000 students from 556 villages with a population of 783,000.

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Completed Buildings

Top:  
Government Boys’ Middle School Chaknari
When the project arrived, all the materials from the collapsed school had already been removed from the site. Now students and teachers enjoy their new school.

Above Left:  
Basic Health Unit Raikot, CDM handing-over the completed BHU to the Department of Health

Above right:  
Basic Health Unit Harighel. BHU staff and Health Management Committee members outside the newly completed facility.

Left:  
Basic Health Unit Halan Shamali. Community members attended to see the completed building being handed over for use.
Completed Buildings

Basic Health Unit Khawaja Ratnoi. A bird’s eye view.

Government Girls’ Middle School Kahna Mohri.

Basic Health Unit Kala Mula. As with most of the buildings in the project, they are accessible to the disabled as the ramp here indicates.
At first we didn’t understand why USAID/CDM was asking us to participate in this project, remarked a man in one community.

The above observation also suggests how the level of community participation in this construction project is unusual, if not unprecedented. Long before construction starts, some of the main preparation is engaging local people and leading them to form or reactivate School Management Committees (SMCs) or Parent Teacher Councils (PTCs) or Health Management Committees (HMCs) for two purposes: to prevent and solve community problems related to construction and to work on improving health and education. While the project benefits enormously from this local input, experience in the project will give these community-based organizations strong practical experience to support their school or clinic in future.

The same man (above) went on to say, ‘Building schools and clinics is the business of government, not of us villagers. But now we understand and are very proud to be part of it. Sometimes we see other earthquake destroyed places under re-construction but we know nothing at all about them, not even who is building them. But where USAID/CDM is building our facility, the social team keeps us informed, puts demands on us to contribute and involves us in so much decision making, we now feel much more responsibility than ever before for our school or clinic’.

By the end of the third year of this project, this outlook is consensus in the 75 communities involved and the SMCs, PTCs and HMCs have reached a level of maturity. They:

- Continue on a daily basis to prevent and solve issues, resulting in zero construction days being lost to conflict and only 1 (dismissed) court case, when court actions are very common.

- Share responsibility for management and maintenance of the temporary (tent) clinic or school set-up during construction as preparation to take same responsibilities when their new building is complete.

- HMC and SMC members (along with teachers and students) have been trained in basic maintenance and ‘urgent operation’ (of circuit breaker, water pump and valves, use of fire extinguisher, etc.)

- At these schools, the SMCs are for the first time actively involved, e.g. fundraising (see Library Challenge, page 16) and organizing special co-curricula events involving parents, teachers and students.

- Meetings and workshops with the SMCs in AJK and NWFP are being held regularly to encourage working together for the first time.
Community members at Burka Mehra enthusiastically passed their willingness resolution to carry out duties to help construction and support their school.

PTC members at Paras settled a land boundary dispute.

A community meeting at the Government Girls’ High School Kheral Abbasian helped plan construction of their school.

Students at Government Girls’ Middle School Kahna Mohri were trained on how to use a fire extinguisher.

Even while waiting for their new school to begin construction, at Government Girls’ High School Jaglari, the SMC and teachers organized an event with students presenting skits, poems and songs.
Designing schools and health facilities for the earthquake zone, has presented many challenges. New standards require larger facilities than pre-quake but many of the places have only very small, steeply sloped mountainous land, as can be seen in the photos in this report. In some locations, CDM has met this challenge by building two storey structures while fitting them into the sloped land.

Of course, earthquake resistance is the primary concern (facing page). In addition to the major structural considerations in design, CDM buildings are designed to protect life and safety by providing adequate exits as required by the Uniform Building Code (UBC). This need comes from considerable evidence that in the earthquake many people were unable to escape from buildings in time to save their lives. CDM designs provide enough exits in the right places, despite challenges with the sites.

Durability and long term maintenance are other necessities while considering the life of the building. If not sufficiently considered, the life-span of these public buildings can be seriously curtailed, a common problem. CDM buildings therefore have been designed to require as little maintenance as possible by using long lasting and durable materials such as masonry and good detailing for pitched roofs that have deep overhangs; and by balancing the demands for water, sanitation and electrical use with realistic limited local supply. The space allocation needs of each building have been analyzed to avoid building more space than is needed while still ensuring long-term functionality. Future additions for changing needs have been considered. The building construction methods used will produce buildings with a life expectancy of a century.

Opportunities were also taken with design to bring schools up to modern teaching and learning standards as well as to support up-graded services at the Basic Health Units (BHUs). School spaces include classrooms and offices for primary schools with the addition of multi-purpose halls at middle and high schools, as well as laboratories at high school. BHUs have rooms for urgent care, vaccination, family planning counseling, tuberculosis and malaria care; a pharmacy, laboratory; as well as a labor and delivery room. Most of the BHUs also have basic living quarters to attract and retain medical staff. The proposed 52 bed, thesil (sub-district) hospital is a full service facility serving a population of 37,000. Also included here is housing to attract and retain medical staff in remote areas.

CDM is following the UBC for all building decisions both architectural and structural. The project is using Pakistani architectural and engineering consultants, as well as in-house design capacity, for schools and health facilities.
One of the main reasons for widespread devastation and resulting loss of life from the 2005 earthquake was the overall lack of proper earthquake resistant structural design and construction in the built environment.

Hundreds of thousands of lives have been lost in recent decades both in Pakistan and other parts of the world owing to such poorly engineered and improperly built buildings in high seismic zones. As a result, in many countries lessons have been learned and incorporated into comprehensive seismic building codes, guidelines and standards such as the ‘Uniform Building Code (UBC) 1997’. Widely available and used in such earthquake prone areas as the USA and many other high-seismic regions of the world including Pakistan, CDM has applied the UBC in the design of all the buildings in this project.

What makes a building earthquake resistant? CDM is including several main features from the code to make the schools and health facilities earthquake resistant, such as:

- Concrete (shear) walls, columns and beams which have extra steel to withstand movement caused by the earthquake forces
- Floors and roofs are properly anchored to the walls, beams and columns, which prevents these elements from collapsing onto occupants during an earthquake.

Strict CDM adherence to the UBC codes in the NWFP and AJK earthquake zone will enable buildings to withstand strong future earthquakes, prevent collapse and thus save lives and avoid massive financial loss.
One of the buildings in progress in Yr. 3

Construction

Building schools and clinics in the earthquake areas of the NWFP and AJK is challenging as well as rewarding. Most of the locations have difficult access, limited and restricted workable construction area as well as severe weather conditions. This in addition to the shortage of skilled labor and construction material in these areas, makes managing construction especially demanding.

All construction managed by CDM is carried out by Pakistani construction contractors who are pre-qualified based on their technical and financial capabilities, timely performance records, and experience in working in mountainous areas. Contractor selection is transparent and fully complies with US Government and USAID acquisition regulations. From a pool of pre-qualified companies, contractors are selected for each small group of two to four buildings and awarded on contracts based on competitive bidding. Early in the project local contractors were not familiar with CDM/USAID Construction Quality Control standards and procedures but this situation has greatly improved as CDM engineers and inspectors have worked closely with the contractors at every site and assisted them in managing and executing the construction with high standards.

In view of the obvious seismic hazards in the project areas, CDM takes the quality assurance and quality control at construction sites very seriously. Construction is conducted under the supervision of an experienced regional manager assisted by dedicated deputy regional managers and engineering staff located at Bagh and Mardan. To ensure construction quality CDM assigns its own dedicated Resident Engineer and Inspector at each site who work closely with the contractor's Resident Engineer and Site Inspector. This approach not only ensures world class construction quality and safe and durable buildings, it also helps to train contractor staff for future projects for CDM/USAID as well as Pakistan's construction industry in general.

CDM work safety standards are resulting in over 150,000 accident-free hours every month while working on building sites with combined covered area of 778,326 square feet, utilizing 11 construction sub-contractors and several material suppliers. In order to reduce cost and maintain quality CDM bulk purchases steel, cement, tiles and wooden doors and provides these to its sub-contractors. This helps to reduce the overall cost of each contract as well as decreases the speculation of sub-contractors in material price inflation in a firm-fixed price contract.

Government Girls’ High School Chowki, (main photo), nearing completion of construction, on a typical Kashmir location. After their school collapsed in the quake (inset photo) the 350 students continued studying in the open air.
during construction
Some of the buildings in progress, Yr. 3

Schools in the North West Frontier Province

1. Government Boys High School Berkhund
2. Government Girl's Primary/Middle School Paras
3. Government Boys' Primary School Paras
4. Government Boys' Primary/High School Trappi
5. Government Boys' Primary/High School Mohandri
6. Government Boys' Primary/High School Ahl
Some of the buildings in progress, Yr. 3

Schools in Azad Jammu Kashmir

2. Government Girls’ Inter College, Rerra
4. Government Girls’ High School Chatter #2
5. Government Boys’ High School Arja
6. Government Boys’ High school Dhal Qazian
Some of the buildings in progress, Yr. 3

Basic Health Units in AJK
1. BHU Neelabut
2. BHU Chanjal
3. BHU Sahlian Dundan
4. BHU Thub

Schools in beginning stages of construction in NWFP
5. Government Girl’s Primary/High School Behali
6. Government Boys’ High School Mansehra # 2
7. Government Boys’ Primary/High School Khawari
8. Government Boys’ High School Afzalabad
What Local People Are Saying

‘Such a quality school building is a precious gift for our children. Due to this, CDM/USAID will be remembered for decades’, PTC Chairman, Afzalabad.

‘USAID/CDM is constructing world class buildings in Mansehra district and we are seeing such quality for the first time. We wish that USAID/CDM would construct all the schools here’. District Nazim (elected official) on visiting Mohandri school.

‘At every meeting in every village the people always say to us, please thank everyone who is behind building our new school or clinic. They are always very grateful’. CDM social team.

‘We owe you (USAID/CDM) a debt of gratitude. You gave us the Library Challenge project and motivated us to try to get donations and finally we were successful and established our school libraries’. In self-deprecating humor the member of an SMC added, ‘If CDM hadn’t taken this initiative for the next 50 years we would not think of doing such a thing’.

‘When I saw the Basic Health Unit Bani Minhasan newly constructed it’s such a nice building I would like to transfer to that BHU and continue my duties there,’ in-charge of another medical facility.

‘CDM/USAID is one of many organizations that have been working in this district since the disaster of October 2005, but they have different objectives from the others. They are not only constructing buildings, they are leading us to work together in our communities and improve things in our schools’. SMC member GGHS Jaglari.

Poem composed by Ms. Sabeeha, primary school teacher at GGMS Besuti and presented at the school hand-over celebration by 3 girls in class 8, Ulfat, Ramaish and Tabassum.

‘There is no way we could repay you for the favor you showered on us
Thanks USAID/CDM-One hundred times thanks

That moment in time when the earthquake caused us devastation
All the Pakistani nation came running to help us
Everyone from America and Pakistan stood by our side
Thanks USAID/CDM-One hundred times thanks

Buried under the debris were many children-sons and daughters of Adam
Those smiling faces vanished forever in moments
In the holy month of Ramadan, this was indeed a great testing for all of us
Thanks USAID/CDM-One hundred times thanks

Tanshait! I am thankful to those who stood with us in time of need
We pray that God be merciful to them
That God shower his blessings on them every moment
Thanks CDM/USAID-One hundred times thanks’

‘In our experience, this is the first time that contractors have completed buildings in a given, limited time period. We are proud that our Health Management Committee played a role to avoid problems during construction and this helped keep to the time limit. The government should get this kind of community participation whenever they do construction’. HMC Chairman, Khawaja Ratnoi.

‘I have worked in other countries but I have never seen any participatory project like we are in here. This kind of participation is really successful and prepares communities for further future planning’. HMC Chairman BHU Kotli.
The idea of the Library Challenge and book fair really increases the enthusiasm and zeal of students. These activities give them courage to proceed forward and learn many things.' Head teacher, GGMS Besuti.

As most of the schools being built in this project will have a library room for the first time, but no books, the SMCs and PTCs were challenged by the social team: if they would commit to finding at least one library book per student, CDM staff as volunteers would do the same. Repeating the resourcefulness and dedication already shown in the project, the SMCs and PTCs enthusiastically accepted the challenge and during 2009 many met or exceeded this goal. During 2010 it is expected that the goal will be fully met by all the schools as well as CDM. With a total enrolment of 16,000 students this means finding altogether at least 32,000 library books!

Starting the Challenge in Kashmir, this meant SMCs for the first time ever raising funds for their schools, not until now attempted as these are government schools and people have had the idea that only government has responsibility for these schools and students are from the poorest families. Also, being so remote, there were practically no places to buy books. The solution, the first-ever Kashmir book festival was organized and was successful beyond all expectations. The 25 schools raised an astronomical amount of money in local terms, 700,000 rupees (about 70 times the average teacher's monthly salary) and at the festival bought nearly 4,000 books in two days. Since then, the 23 PTCs in NWFP have already reached half way in their ambitious fund raising goal of 1.2 million rupees to be spent mainly at a similar book festival in 2010.

At first very timid to try raising funds, the SMCs and PTCs quickly gained confidence and even a sense of competition to raise the most money. They were so successful, it has had an empowering effect. Some are now talking about applying this newly developed skill to other school development such as, a 'playground challenge' or a 'computer challenge'.

Nearly 10,000 people attended the book fair, an event that had strong, positive effects in a number of ways. A Pakistani psychologist with a local NGO specializing in post traumatic stress counseling observed, 'this was the most fun many people have had since the quake and such fun and recalling it for weeks or months to come will help with the healing of trauma that many people still suffer from the quake'.

To complete the Library Challenge during 2010, the PTCs and SMCs will complete their book collections and CDM (as a corporate sponsor), CDM staff, family, friends, project construction contractors and others will join hands to meet the CDM side of this bargain to supply an at least equal number of books. The school book collections are already growing even where children are in tent schools before construction is started and schools are introducing such books for the first time to community members and students at special events.

For more information: cdmlibrarychallenge@gmail.com
Visitors to the first-ever Kashmir book fair were treated to a special show with puppets, magic and comedy.

An eager customer at the book fair.

Library Day at GGHS Jaglari. Students get to see their library books for the first time.

Students show off the school’s developing book collection at Library Day at the under construction GBHS Dharrray.

The schools have started ‘Library Days’, a special event where parents, students, community members and those who donated money to buy the books are invited to come and see the books. At a recent Library Day, one student said, ‘we only get to read text books and we get bored with that so having these different books gets us interested’. At another Library Day, some students were busy writing lists of books they want to borrow when they get the chance.

‘Not only have we established a school library, it is becoming a village library as community members are starting to borrow books too’. GGHS Juglari SMC teacher.

‘The concept of a library is very new in our communities and these colorful books are very attractive for the little kids’. SMC Chairman Khana Mohri.
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**Photo Credits:**

- **Umar Farooq:** cover, page 2 'after construction' and bottom photo, page 4 'after construction' and BUH Harighel, page 5 all 3 photos, page 15 students at Besuti, page 16, page 17 'an eager customer at the book fair', back page all 3 photos.

- **Jane Thomas:** page 2 'before construction', page 3 'before construction', page 7 'students with fire extinguisher', page 10 'during construction', page 17 top left tourists to first-ever Kashmir book fair'.

- **Asya Tabassum:** page 17 middle, 'Library Day at GGHS Jaglari'

- **Waqar Gardezi:** page 17 bottom, 'students show off their books'

**Others:** unidentified CDM staff
Teachers and students enjoy their new school. **Government Girls Middle School Noman Pura**

### Main Achievements

| Project Year 1  
(ending Oct. 26, 2007) were: | Project Year 2 
(ending Oct. 26, 2008) were: | Project Year 3  
(ending Oct. 26, 2009) are: | Plans for Year 4: |
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<td>• Established functioning offices in Islamabad, Bagh and Mansehra</td>
<td>• Hired and Oriented 40 staff</td>
<td>• Total of 211 staff were on board</td>
<td>• Design 3 Rural Health Centers in Bagh</td>
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<td>• Hired and oriented 105 staff.</td>
<td>• Engineering, Environmental &amp; Social Assessments completed for 45 sites</td>
<td>• Mobilized a total of 75 communities</td>
<td>• Identify new potential sites for design if more funding available</td>
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<td>• Identified 65 feasible schools or BHUs to build.</td>
<td>• Mobilized 43 communities</td>
<td>• Maintenance Plans made for 40 sites</td>
<td>• Construction completion of total 13 BHUs and 21 Schools</td>
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<td>• Engineering, Environmental &amp; Social Assessments completed for 92 sites.</td>
<td>• Maintenance Plans made for 40 sites</td>
<td>• Design completed for 20 more schools</td>
<td>• Begin Construction on 20 Schools, THQ Hospital and 3 Rural Health Centers</td>
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<td>• Mobilized 40 communities.</td>
<td>• Design completed for 10 buildings</td>
<td>• Design Completed for Tehsil HQ Hospital</td>
<td>• Continue working with 75 fully mobilized communities</td>
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<td>• Completed design of 30 schools &amp; BHUs</td>
<td>• Design Started for 11 Schools</td>
<td>• Design Started for 3 Rural Health Centers</td>
<td>• Finalize the maintenance plans for under construction buildings</td>
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<td>• Bids opened for 25 Schools &amp; BHUs</td>
<td>• Contracts awarded for 32 buildings</td>
<td>• Contracts awarded for 15 buildings</td>
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Basic Health Unit Bani Minhasan in a typical Kashmir landscape. Completed in 2009, this BHU serves a wide public and includes mother and child programs.

Pakistan Earthquake Reconstruction and Recovery Program

Implemented by CDM Constructors Inc.