

# Engineer Skills Development Workshop

By Captain Sharmistha Mohapatra

The Engineer Skills Development Workshop (ESDW), a Commander's Emergency Response Program (CERP)-funded training and education initiative, is founded on an Afghan-American partnership that is developing a skilled construction workforce capacity in one of Afghanistan's most remote provinces. Of the nearly 400,000 people who live in the province, 99 percent live in rural districts with minimal exposure to skills enhancement opportunities. Half of the province is mountainous, and the eastern side borders the hinterlands of Pakistan. This geography explains why the region is accessible to insurgent forces that run intimidation and recruiting campaigns among the population. To counteract their influence, the government of the Islamic Republic of Afghanistan aims to

bring development to its citizens in the forms of infrastructure improvements and educational opportunities.

## Conception

The Afghan Skilled Labor Academy, simply called the Winter Workshop, was executed first by Task Force Pacemaker, 864th Engineer Battalion (Combat) (Heavy), and the provincial reconstruction team (PRT) in February 2006. It was conducted in the winter when the construction tempo was low, allowing Soldiers to serve as instructors. The immediate purpose was to teach Afghan contractors and their laborers construction skills in carpentry and masonry. The Task Force

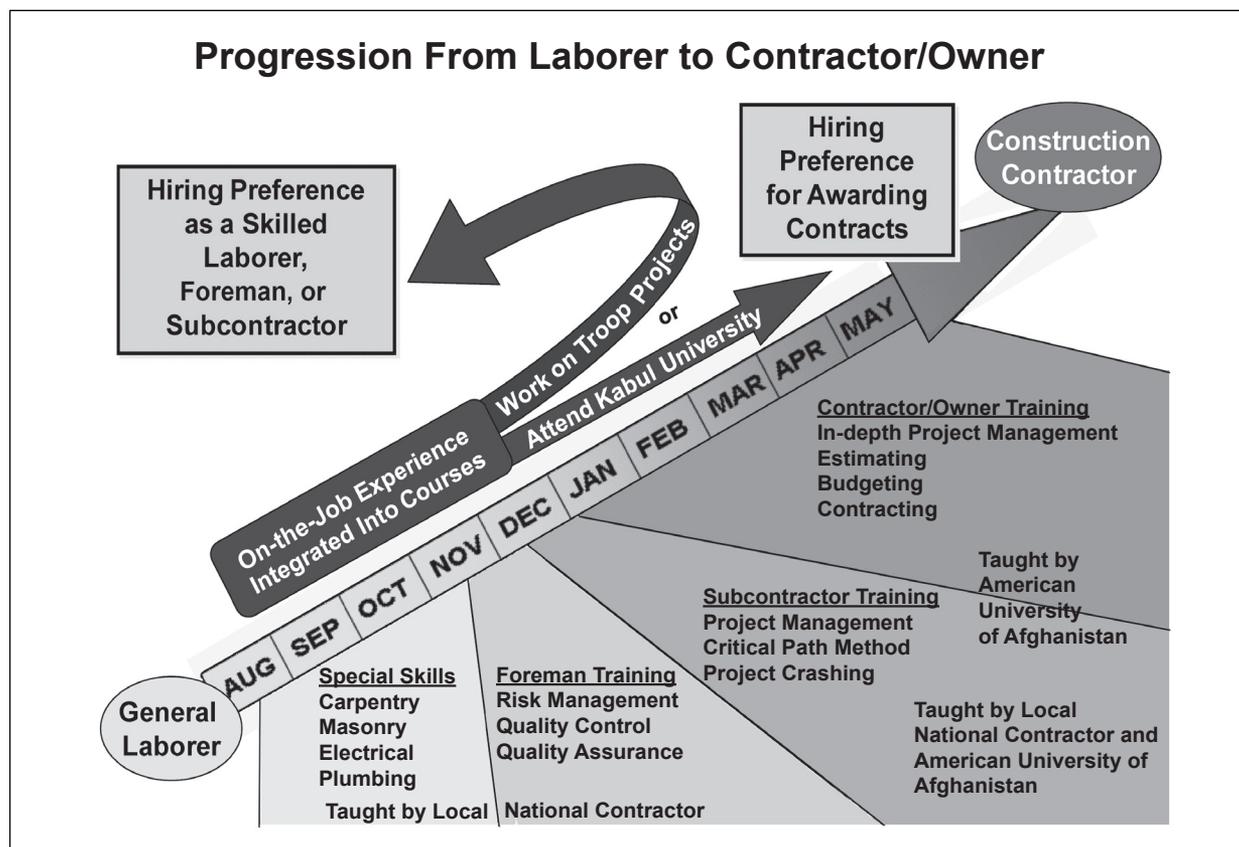
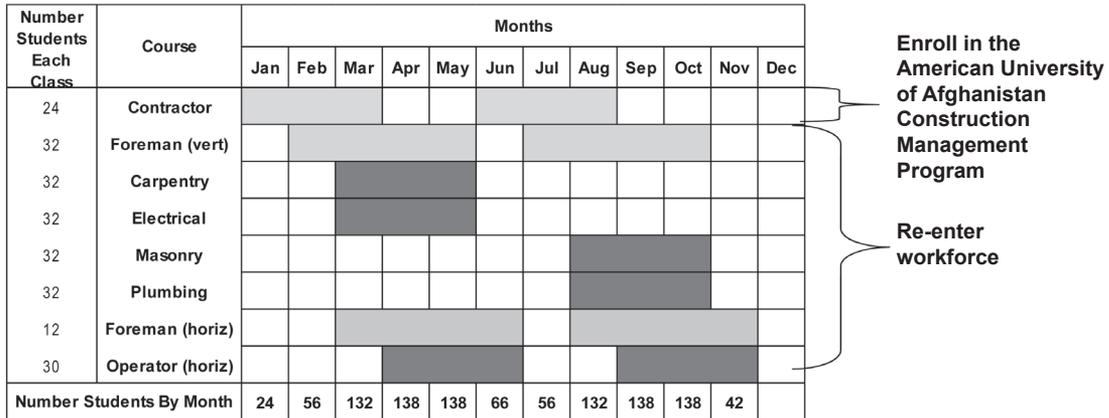


Figure 1

## Evolved Concept

- 3 levels of classes: contractor, foreman, and laborer
- Contractors learn project management skills and quality assurance/quality control (QA/QC) (literacy required)
- Foremen learn tool and/or equipment familiarization, safety, and QA/QC (literacy required)
- Vertical construction offers carpentry, masonry, electrical, and plumbing training
- Horizontal construction covers heavy equipment operation on bulldozer, grader, roller, water truck, excavator, and bucket loader



**Figure 2**

Pacemaker engineer leadership, having received insight from visiting jobsites and talking to contractors, developed the curriculum for the original Winter Workshop using as a template a course taught at Gulfport, Mississippi. The PRT facilitated the local government advertisement and press coverage while the provincial engineer was responsible for civilian enrollment. A contractor provided CERP-funded billeting, food, transportation, tools, and materials for the students. Total expenses came to \$198,500.

The planning committee decided to start with a 40-hour, 7-day workshop. Ten Afghan National Army engineers attended a practice training session, giving the U.S. military instructors time to rehearse and amend the curriculum. For the workshop itself, 63 civilian contractors and laborers enrolled. For the first 3 days, students built wooden guard shacks; for the last 3 days, they placed a concrete slab and constructed a short masonry wall. During the classroom training, contractor students shared their business experiences and practices, to include contract reading, quality control, and quality assurance. Though brief, the discussion proved that students thirsted for knowledge of the construction business. Graduation was held on the seventh day, with graduates receiving certificates of completion from local Afghan government officials. The students also were presented with their tools to give them an advantage in securing employment.

This first workshop served as a base from which advanced workshops could be developed and exported to other regions throughout Afghanistan. During the first quarter of 2008, Task Force Pacemaker, on its second Operation Enduring Freedom tour, took the next step to spread this initiative. It conducted 1-week workshops at forward operating bases (FOBs) in two regional provinces, training more than 180 Afghans. At one FOB, 25 students went on to gain employment on the base. While contractors provided the logistical support for the training, there remained heavy United States Army involvement in coordinating the instruction and administration of the program. Total expenses came to \$540,000.

### Advanced Development

**I**n May 2008, Task Force Hammer, 62d Engineer Battalion, began to amplify the efforts of Task Force Pacemaker by planning for a year-round program with additional construction subjects taught in a three-tiered, progressive approach. The new curriculum—the ESDW—consisted of four vertical construction courses in the first tier:

- 10 days of carpentry training
- 15 days of masonry training

- 12 days of electrical training
- 8 days of plumbing training

After completing the first tier of laborer training, exceptional students could move up to the second tier with 14 days of foreman training, then to the third tier with 10 days of subcontractor training. A fourth tier, yet to be developed, will provide university-level construction management training for contractors.

Each laborer class covered the fundamentals of construction, including safety practices and international building standards. Students received hands-on training on projects such as constructing a hut, placing a concrete pad, wiring an electrical system, or installing a water basin. Students exhibiting higher aptitudes were recommended by the course's Afghan technical director to pursue the foreman course, which starts with practical laborer construction skills and then advances to materials estimation, risk management, and quality control. Finally, the subcontractor course emphasizes project management for those seeking, or already working in, supervisory positions. Each course was planned not to exceed 2 weeks so that graduates could return to the workforce quickly, minimizing disruption to their wage-earning potential. Despite losing 8 to 15 days of wages, the benefit of attending a course yielded workers with higher earning power as semiskilled laborers.

To execute this design full-time, the civil-military operations (CMO) section had to overcome resource restrictions. Because troops were unavailable as instructors and only two people were in the section, CMO hired nine trilingual Afghan engineers as the primary instructors of the training. These men were employed by the same contractor who provided the materials and tools for the workshops. In August, the section ran a 2-week train-the-trainer session to prepare the instructors to lead their own classes in technical and administrative faculties. Members of the CMO section realized that shifting from a military-led to an Afghan-led program would be beneficial for several reasons. It would minimize language and cultural barriers between students and instructors and give students educated role models from among their own countrymen. Putting the training onus on the Afghan instructors would also force the staff to implement their own chain of command and develop their own leadership skills. In the long run, this model would ease the transition to total autonomy.

To maximize government involvement, the provincial governor reviewed and approved the training initiative and delegated advertisement and student recruitment to his director of social work and labor. This director was responsible for passing on the compiled list of students to the contracted all-Afghan instructor team, which then provided students with free lodging, food, transportation, take-home safety equipment and tools, materials, and invaluable training for the duration of the course.

From September 2008 through February 2009, vertical construction training took place on an FOB to provide a secure training site and to allow the CMO section to

provide constant technical and administrative guidance to the ESDW staff. During this time, the staff conducted one masonry, one electrical, one plumbing, one foreman, one contractor (revised from being called subcontractor), and two carpentry classes. In after-action reviews, students surprisingly commented that they wanted longer courses with more exposure to practical construction. They recommended teaching additional subjects such as furniture making, insulation installation, generator repair, shower installation, steelwork, and materials testing.

From October through November 2008, a second contract executed the horizontal ESDW. This training took place both on and off the FOB, led by a technical director-engineer and 11 skilled operator-instructors. The students spent 11 days learning to operate heavy equipment, including bulldozers, graders, rollers, water trucks, and bucket loaders. Then they spent 5 days on a capstone road project for the local bazaar. The ensuing foreman class ran for 15 days, executing road and land upgrades around the city. Combining construction training with urban development projects spurred the idea of including this practice in the vertical ESDW as well. This benefited the city and gave students a sense of civic pride. A downside to the horizontal ESDW was that because of poor recruitment efforts, only 22 students arrived to fill the 42 allotted slots. For the ensuing courses, Task Force Hammer got the word out on the provincial radio station. As time progressed, this enrollment method was successful and the coordination responsibility was passed on to the contractors.

It became apparent that the vertical engineering instructors, though technically savvy, lacked sufficient practical construction experience. In January 2009—at the instructors' request—the CMO section augmented the training team with skilled workers from each trade. Henceforth, each engineer was paired with a tradesman in a relationship analogous to a platoon leader and platoon sergeant. After integrating the new staff (to include a second technical director), it became the natural course of action to divide the instructors and execute two simultaneous skilled-trade courses. This maintained an ideal ratio of one instructor to four students and generated geometric growth in the ESDW program.

In February, the officer in charge of the Task Force Hammer CMO met with a representative from the United States Agency for International Development (USAID) to exchange information about the ESDW program and another training center, which offers 3-month classes in construction skills. The Task Force Hammer officer came away with instructional material needed for lengthening classes, and the USAID advisor came away with the tiered-training model of skills development. Back at the FOB, the vertical workshop engineers incorporated the new material into their existing training plan and identified civic projects for practical training. The new program, scheduled to go into effect in June, implemented a reverse tiered-training approach. Instead of conducting separate classes that progressed from laborer to foreman to contractor, the class was

a semester-long collaborative effort, with students interacting as they would in real-world projects.

In the midst of planning curriculum changes, the vertical ESDW reached a critical milestone during April—the movement of the training site from the FOB into the provincial capital. The provincial director of tribal affairs volunteered his compound for classroom space in exchange for an upgrade of his grounds and buildings. This move allowed greater accessibility to the population, which otherwise would have been afraid to come onto the FOB. In addition, the physical transition signified a crucial step that the ESDW instructors took toward autonomy.

During this time, Task Force Storm, 168th Engineer Brigade, obtained the Green Machine, an apparatus for making bricks from compressed earth. This novel technology uses natural soil mixed with a minimal amount of cement to produce interlocking bricks that do not require mortar. The spring masonry class experimented with this machine, using the bricks to construct a test building for the tribal affairs compound. Time will tell how these bricks fare in Afghanistan and whether their use will be a viable alternative construction method in an earthquake zone.

April also marked the beginning of the second round of horizontal workshops. The contract implemented the reverse-tiered, semester program with the first 21 days

dedicated to foreman training, followed by 66 days of joint foreman and operator collaboration. Equipment familiarization took place on the FOB for the first month and the practical roadwork projects began in June. The contractor's design engineer had met with the local mayor to identify and prioritize horizontal projects, to include road upgrades for the bazaar and earthwork for a future subdivision.

### Statistics

**A**s of 13 June 2009, the ESDW had graduated 247 Afghans and presented a total of 299 certificates, including the students who returned for additional courses. The ages of students ranged from 15 to 60 years, with an average of 20.2 years. Graduates had an average of 9 years in the workforce but only 3 years of formal schooling. Only 40 percent of the laborer students were literate, hence the impetus to improve their handiwork skills. Foreman and contractor students, in order to be capable supervisors, had to be able to read and write to enroll. Fifty-four percent of the graduates were married, with an average household size of 12.3 per student, making secondary benefits available to more than 2,300 family members. Although tracking students after they graduated was difficult, it was safe to presume that at least 40 percent of graduates received a job immediately after course completion.



Carpentry students erect a wall for a B-hut.



**A technical director reviews B-hut designs and work schedules with a student.**

In the 11 months that the initial vertical ESDW ran, more than \$1.2 million were injected into the local Afghan economy through the purchase of tools, equipment and materials and the salaries for 32 employees. Total expenditures for the fall 2008 horizontal ESDW came to \$394,796, including the cost of 13 pieces of rented heavy equipment, salaries for 23 employees, and gravel.

### Way Ahead

Currently, the focus is on shifting from the short training sessions to the semester program. On 28 June 2009, the contractor class began with 10 days of theoretical work, followed by 21 days of joint training with the vertical foreman class and another 21 days of joint training with the horizontal foreman class. This concept was designed to give contractors enough field time in both vertical and horizontal disciplines to practice their planning and supervisory skills. The vertical foreman class, after its initial 3 weeks of hands-on construction, will then go on to train and supervise the follow-on laborer students—either masonry and plumbing or carpentry and electrical—for another 76 days. In total, contractors will receive 52 days of training, vertical foremen 97 days, vertical laborers 76 days, horizontal foremen 87 days, and heavy equipment operators 66 days. The extended duration meets the requests of the students and follows the USAID model. Student stipends matching unskilled laborer wages serve to alleviate enrollee worry about lost earnings.

The long-term vision is to establish the provincial capital as the education and trades training hub of the region. One of Task Force Hammer's final accomplishments was winning approval from the Ministry of Education to occupy the local Center for Educational Excellence facility for the workshops. Using this location gives both workshops a centralized location to work and consolidate both vertical and horizontal ESDW staff and students. It also provides free lodging for out-of-town students.

Additionally, Combined Task Force Castle, 420th Engineer Brigade, began talks with a couple of American universities to develop a 2-year construction management degree program for contractors. The idea was to send exceptional students, engineers, and current con-

tractors to Kabul for further study in an emerging construction management major program at the American University of Afghanistan (AUoA). When Combined Task Force Castle redeployed in March 2009, this initiative was passed on to the incoming unit, Combined Task Force Storm.

Although currently there is collaboration between the Afghan government and coalition forces, the ultimate goal for the ESDW is to be a self-sustaining entity that continues to shine as a beacon of progress for the people of the province. With the provincial government having very limited funds, the appeal must be directed at the national ministerial levels. Some suggestions have been to request support from the Ministries of Labor, Social Affairs, Martyrs, and Disabled; Rural Rehabilitation and Development; or Transport and Civil Aviation. Another possibility under consideration is to request financial support from the Ministry of Defense in exchange for training Afghan National Army engineers in a program resembling advanced individual training in the United States Army.



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