



NEWS FEATURE

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USACE teams with Afghan power utility to solve outages in southern Afghanistan

KANDAHAR AIRFIELD, Afghanistan — Helmand and Kandahar province residents, businesses and industry have more consistent and reliable power now thanks to the team of U.S. Army Corps of Engineers' electric experts and their Afghan counterparts from Da Afghanistan Breshna Sherkat, the state-run power utility.

Task Force Breshna Barq, a group of American Soldiers whose mission in Afghanistan is to bring electric power to the country, and DABS installed a new power switching center and feeder lines at an electrical substation north of Sangin, in Helmand province, in March.

Chief Warrant Officer 5 Thomas Black, the deputy commander of Task Force Breshna Barq, Staff Sgt. Scott Michael and Staff Sgt. Benjamin Talbert, all from the 249th Prime Power Battalion and assigned to the U.S. Army Corps of Engineers Afghanistan Engineer District-South, teamed with utility company's engineers and technicians to make improvements and perform preventive maintenance at the Sangin Substation.



Afghan utility technicians and their U.S. Army counterpart, Staff Sgt. Scott Michael, assemble the air disconnect switch as part of the Sangin Substation upgrade project in early March. (USACE Photo)

“Because the Sangin Substation caused so many power outages for so much of southern Afghanistan, DABS asked the Corps of Engineers to help make relatively inexpensive and minor improvements to the substation. The improvements promised to have a huge impact on the safety, efficiency and reliability of the electric power that currently flows through the Sangin Substation,” said Jim Murray, the project’s manager.

“The Sangin Substation has all of its original equipment,” said Murray, who deployed from Detroit. “The substation was built a few decades ago so the equipment is worn out, needs to be replaced and could have been hazardous simply because of its age.”

Black agreed. “The lines needed to be re-strung or elevated to reduce phase-to-phase and phase-to-ground faults that were primarily induced by weather, and the power switching center needed to be replaced so that interruptions to power distribution were minimized.”

Engineer Rasoul, the Afghan project lead, estimated that up to 90 percent of the faults at the Sangin Substation caused significant problems for every substation tied into the grid. (Note: Engineer is an honorific, like “doctor,” in Afghanistan.)

“When a small fault happens at Sangin, the whole system — Helmand and Kandahar — is disturbed,” Rasoul said. “We run the Kajaki powerhouse at maximum load capacity, which is about 32 megawatts, continually. When the power is disrupted multiple times a day, it seriously affects the industry in both provinces.”

The engineers worked with Regional Command Southwest personnel from the Command’s Stability Operations Office, or C9, to organize their transportation and the transportation of equipment and parts. The C9 development plans team supports civil and military organizations that perform missions to improve Afghan lives.

“With USACE, we supported the work they did with DABS to not only deliver projects but also mentor DABS electricians,” said newly-arrived Royal Air Force Wing Commander Mark Collins, the C9 development plans chief. “If we can unlock opportunities, smooth passage of information or proactively assist to make things happen then we are meeting our objectives.”

Collins said the C9’s objectives include supporting the relationship between rural farmers and their urban consumers, building the capacity of the Afghan government and supporting strategic infrastructure projects.

“Each of these objectives relies on electrical power to some extent” said Collins. And, “the teamwork needed to deliver the people and parts for this project cannot be overestimated. Wing Commander Charlie Allen, my predecessor, and I worked closely with Chief Warrant Officer 5 Black, the USACE team, and DABS engineers to make this happen.”

Both Collins and Allen are based out of the Headquarters Air Command, Royal Air Force, High Wycombe, England.

The USACE team arrived at the patrol base Feb. 27 and completed the Sangin Immediate Repair Project Mar. 19.

The team met with the Patrol Base Commander Lt. Josh Chambers-Snoddy, 2nd Platoon leader, Kilo Company, the 3rd Battalion, 7th Marines and Platoon Sergeant, Staff Sgt. Derrick Linneman who not only made their stay at the very austere patrol base very comfortable, said Black. “They were instrumental in the movement and coordination of our materials.”

The next day, the task force met with their Afghan counterparts to discuss the project schedule and details.

Like most projects in Afghanistan, this improvement project had logistical and security challenges that had to be overcome, Rasoul said.

“Security in Helmand is always a concern,” he said. “Our transmission lines are always at risk of being damaged and affecting power transmission. We have to repair broken components, transformers and cables and Sangin is particularly susceptible to damage.”

“There is no hardware store where we could get supplies,” Black added. “We had to bring everything we thought we would need. We made tools out of parts of other tools, fabricated and welded the power supply center frame using old, rusty steel pieces and repaired welding equipment before the real work could begin.”

DABS engineers took a leading role in much of the work and were able to purchase some needed items in Sangin or access items at a DABS warehouse in Kandahar.

“Having DABS engineers with us made the project go much quicker because they could do and procure things our guys could not,” said Black.

“Not only were we installing a power supply center at the substation and the associated framing, connectors, trenching and wiring, we also installed new Sangin City and Salancala feeder lines connections and infrastructure inside the substation compound ,” Black said. The team ensured that the new power lines met clearance requirements ensuring, safe operation and with fewer nuisance faults.



Afghan and USACE engineers and electricians clean, repair and service the 110kv main disconnect switch assembly at the Sangin Substation in Helmand province. This work allowed the team to safely work on the power distribution system. (USACE Photo)

The team replaced or added air switch terminals, dead break elbows, load break adaptors, corner pole transition arrays, surge arrestors and other power line components as part of the project. They also tightened or reconfigured power lines to alleviate phase to phase and ground faults and stress on the cables.

“I was thoroughly impressed with DABS throughout the whole mission,” said Talbert, from Kalihi, Hawaii. “I was a little concerned in the beginning that they would not have the technical knowledge or drive to accomplish the project's scope. But, from the very beginning, they showed not only the drive to complete the mission, but also a resourceful and innovative way of attacking each individual task. The Afghans used materials on site that may have been seen by Americans as just scraps or rubbish, to fabricate frames for the switch gear and power control station.”

Talbert also said that teaching their Afghan team members to work according to acceptable code was a good experience. “I believe they learned a lot from us and will use this knowledge for the rest of their overhead electrical distribution.”

“By the time we finished this project, we had learned a lot about being resourceful and using what is available and adapting it to our needs,” said Black. “Sometimes, you just have to use what you’ve got because that’s all you’ve got. Our Afghan teammates showed us how much can be accomplished with very little.”

Rasoul, who has been a DABS engineer for 35 years, said that he had worked with Afghan, Russian, Tajik, German, Chinese and American electrical engineers during those years but the relationship he built with Black was special. “To me, Chief Thomas Black is my brother. I trusted him and I learned a lot from him.”

Black concurred. “I think I learned more from Eng. Rasoul than I ever taught him. The time I spent with DABS’ engineers and technicians taught me that with flexibility, ingenuity and creativity almost anything can be done. Eng. Rasoul repeatedly impressed me by solving problems that seemingly had no solution. Afghanistan is fortunate to have engineers like him.”



Chief Warrant Officer 5 Thomas Black calibrates the distance between a grounding switch and contact as part of the Sangin Substation upgrade project. The U.S. Army Corps of Engineers Afghanistan Engineer District-South partnered with the Da Afghanistan Breshna Sherkat, the state-run utility to perform the upgrades in early March. (USACE Photo)

Sangin substation is so poor, electrical faults and tripped power circuits leading to frequent power outages were common. The significance at this substation was more acute because when those faults occurred, the trip travelled back up the power line to the original power source, the Kajaki Dam power plant, and caused the turbines there to undergo hard shutdowns.”

Hard shutdowns damage the turbines and result in extended power outages, Murray continued.

Located up-river from Sangin, the Kajaki Dam is the site of a twin-turbine power station that will be upgraded beginning in November through a U.S. AID contract that includes the installation of a third turbine.

“Adding the third turbine will greatly increase the power available for the citizens of Helmand and Kandahar provinces, but the existing substations cannot handle the upcoming load,” Murray said. “So, upgrading substations at Musa Qal’eh, Tangi and two near Sangin is critical to the overall power improvement plan.”

The Bigger Project

A critical phase of the overall South East Power System-Helmand project, a joint U.S. Agency for International Development, USACE and Da Afghanistan Breshna Sherkat electric power project, this power switching center installation is a first step in bringing more reliable and consistent electric power to the people in southern Afghanistan.

“We had to make some immediate repairs to the substation even before we award the main contract for the greater SEPS project,” said Jim Murray, the South East Power System project manager. “Because the condition of the existing equipment at the

The South District expects to award the contracts for substation improvements along the Helmand River from Lashkar Gah west toward Kandahar by the end of April with construction beginning in May and the upgrades completed by October 2013.

Also included in the SEPS-Helmand contract award is about 130 kilometers of 110 kilovolt transmission and 20 kilovolt distribution power lines, said Murray.

“The total cost of all the district’s SEPS work in Helmand province will be about \$110 million,” Murray said. There will be new substations, larger power conductors, switchyards, power lines and completion kits.

The completion kits include such things as meters for accurate reading of customer consumption, power poles, replacement power switch centers and other equipment necessary to operate and maintain the new stations and lines well into the future.

DABS will benefit from the installation of tamper-resistant consumption meters at residences and businesses said Murray.

“In Kandahar, DABS estimates it collected about 27 percent of the possible revenue from electric power use because the old-style analog meters are easily manipulated and there are difficulties in controlling power supply. With the upgrades USACE has already made there, they now estimate they collect about 50-60 percent. Once the new meters are installed, it will be possible for DABS to collect up to 85 percent of the possible revenue,” Murray said.

Providing electricity to the citizens of southwestern Afghanistan is one of the most important things that the Corps of Engineers is doing here,” said Air Force Col. Benjamin Wham, the South District’s commander. “We build military installations and police stations which are critical to the security of Afghanistan’s citizens, but projects like this, where we tangibly improve the day-to-day lives of people, are rewarding to all involved. I am proud of Task Force Breshna Barq’s work and the commitment our team has to the future of Afghanistan.”

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