



Afghan metal workers install structural strength arched panels to form the roof of a barracks at the Gamberi Garrison near Jalalabad. The arched shape is very strong, eliminating the need for columns or support beams.

Innovative ideas for Gamberi Garrison

By Bruce J. Huffman

Who says you have to build with masonry in Afghanistan? According to Damon H. Durham, a project engineer at the Corps of Engineers Resident Office in Jalalabad, you don't. In fact, about the only vertical structures being built out of masonry at the Gamberi Garrison, an Afghan National Army installation under construction near Jalalabad and the Pakistan border, are the stone perimeter walls and guard towers.

Instead of masonry, the garrison is being built with K-Span metal construction, a technique that was widely used by the U.S. military during World War II. These arched metal buildings called Quonset Huts, fell out of popularity after the war, but there are still various types of K-span style structures commercially available for industrial use.



The perimeter of the garrison is one kilometer square.

“Although most of the construction in Afghanistan is done with CMU block and masonry, we decided to use K-span metal construction for the Gamberi project, because we thought the work would go faster,” said Durham. “But this technique is not the norm here, and the contractor had a hard time getting the systems online and the



The K-span metal arched panels are made on site.

skilled personnel to construct the K-span sections.” During the process, large rolls of coiled raw steel are fed through a trailer mounted machine and bent into structural strength arched panels. The panels are cut to length then machine seamed together to create a very strong, watertight construction that spans the length and width of the foundation. There are no bolts or fasteners to create leaks, and the arched shape is very strong, eliminating the need for columns or

support beams. “Almost the entire garrison is being built with K-Span construction, steel studs and fire retardant panels, and it has plenty thermal insulated windows, ceiling fans and air-conditioning units for increased ventilation during the 125 degree summer months,” said Durham. “These innovative design features make Gamberi very economical and efficient.”

When the Gamberi Garrison is finished it will be home for about 4000 Afghan National Army Soldiers and 250 embedded American trainers. It will be the largest ANA presence in the Nangahar Province along Afghanistan’s eastern border with Pakistan. The Garrison is located in the Gamberi Desert about six kilometers from the nearest major paved road and 13 kilometers east of the city of Jalalabad.



The garrison is strategically located between the Pakistan border, and about 13 Kilometers east of the city of Jalalabad. It will be home for about 4,000 ANA Soldiers and 250 U.S. embedded trainers and support personnel.



The sprawling one kilometer by one kilometer project has been broken into three phases. Phases I & II are currently under construction and the contract for Phase III is expected to be awarded in summer 2009, and expands even further into the desert. During phases I & II, facilities are being constructed for both the ANA Soldiers and the embedded U.S. training teams, and Phase III will be a high-tech new training range.

combat support services battalion, brigade headquarters, 13 additional enlisted barracks, bachelor officers buildings, a fire station, a spacious training facility, sports field and track, a helicopter landing pad, three maintenance garages with motor pool, enormous warehouse space, and an underground ammunition storage facility located outside the perimeter of the garrison.

A walled inner compound is also being built inside the perimeter of the Gamberi Garrison for the U.S. trainers and support staff, which includes five barracks, dining and recreation facilities, a laundry facility, storage buildings, a motor pool, a communications center, a waste collection point, Morale Welfare & Recreation facility, parking for 200



Project Engineer Damon Durham greets Afghan workers.

Three battalion complexes will be constructed in Phase I, and each will feature weapons storage, a battalion headquarters, individual supply facilities, shower and latrine facilities, nine enlisted barracks with adjoining offices, staff noncommissioned officer quarters, separate bachelor officer housing, and reinforced concrete bunkers for the Afghan Soldiers.

Phase II includes a medical clinic, a public works facility, a combat support battalion, a



Separate compounds are being built inside the garrison for U.S. embedded training teams and their interpreters. vehicles, and reinforced concrete bunkers. There is even a separate facility being built for the Afghan interpreters, with their own MWR, showers, latrines, and parking.



In Phase III, a new ANA training range for grenades, mortars, and heavy and light machine guns will be constructed.



Hollow floors provide easy access to high-tech wiring.

In addition to the K-span construction, there are numerous other innovative ideas being incorporated into the Gamberi Garrison that are not typical in Afghanistan, like a state-of-the-art telecommunications center that features hollow, accessible floors so wires and cables can be re-routed easily. The telecommunications facility will have year-round climate control in all rooms to protect sensitive equipment, and will feature an uninterruptible power supply and emergency back-up generator.



The prime power plant features six Cummings Diesel generators, and provides power to the entire garrison.

Even the generators in the powerhouse have been equipped with special features not commonly used. Each generator has special oil separators installed so used oil can be piped directly into a storage tank with the turn of a knob, and the new oil added.

“We are in the process of building the capacity to provide enough water, sewer, and power for the Soldiers in Gamberi,” said Durham. The power plant will produce five megawatts of electric power, and the well and underground water distribution system will be capable of delivering sufficient water, and two hydro-pneumatic storage tanks have also been installed to ensure the ANA Soldiers get the water they need.



There are two large aerated waste ponds, concrete drying beds, sediment ponds and an effluent pond in Gamberi

The Waste Water Treatment Plant is large enough for a small city, and will have the capability to store sanitized/re-claimed water for irrigation.

Extra planning has also been incorporated into the ANA dining facility at Gamberi as well. The facility, which will seat 1000 Soldiers at a time, has a detached kitchen



Two Afghan metal workers install the HVAC system in the DFAC kitchen. Serving windows and seating for 1000 ANA Soldiers can be seen in the background.

annex with wood burning stoves and a covered wood storage area in case propane is not available to operate the stoves in the main kitchen.

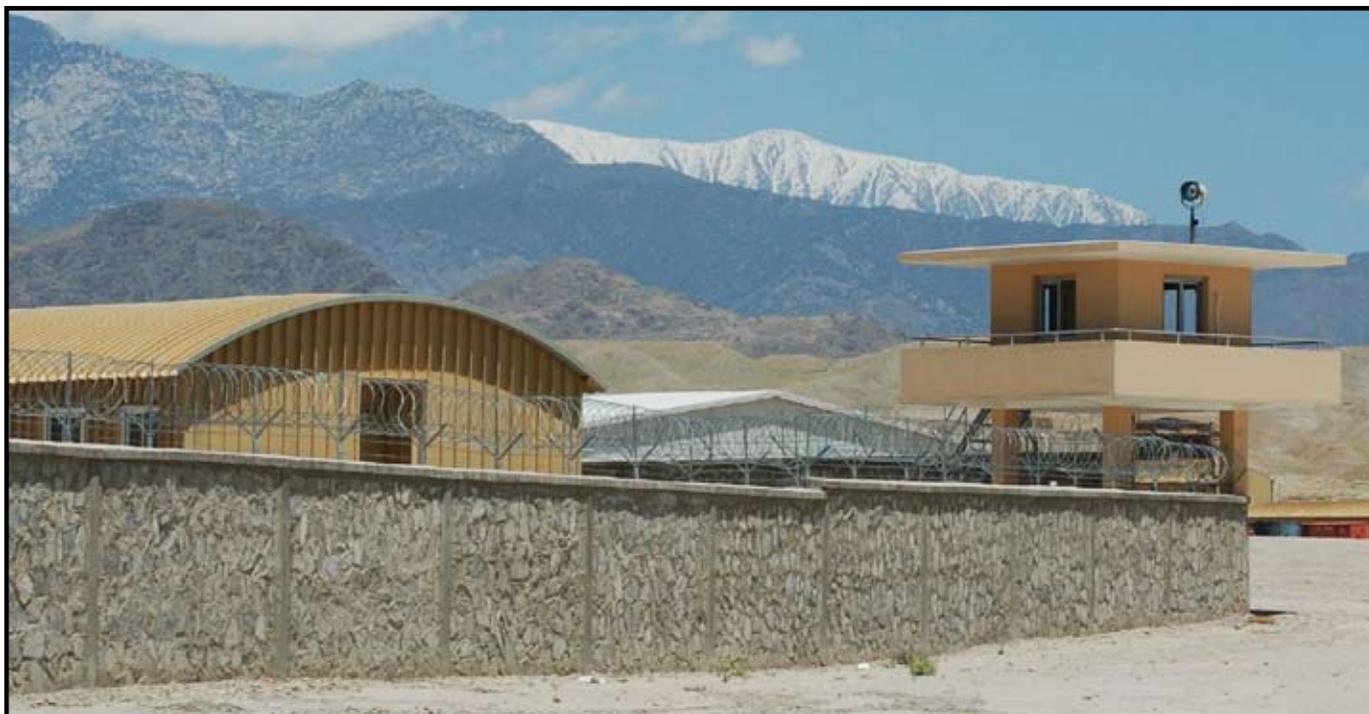
“Although these techniques are common in the United States, they are literally being used in Afghanistan for the first time,” said Roger Green, Resident Engineer in Jalalabad.

“Pre-engineered metal and K-span style construction require more coordination and planning than basic masonry structures, and you have to ensure that the poured foundations match the manufactures specifications or the pre-engineered components won’t go together properly,” said Green.



Each K-span enlisted barracks building sleeps 72 ANA Soldiers.

For now, most of the ANA Soldiers that will be stationed in Gamberi are being trained in Kabul, but when the sprawling \$90 million garrison project is completed, it will be a one-of-a-kind showcase that 4,000 lucky ANA Soldiers and 250 US embedded trainers will call home. 



While most ANA bases in Afghanistan are built of masonry, the Gamberi Garrison near Jalalabad is being built of K-span metal construction. This and other innovative construction techniques make Gamberi a showcase of ideas.