NATO Forces Work Toward Bridging the Gap from Military Operations to a Self-Sufficient Afghanistan

During Operation Golden Gate, Army, Navy and Marine personnel convened to construct bridge complex under combat zone conditions

Acrow Bridge delivers bridging solutions around the world under a wide range of difficult conditions, but its Golden Gate assignment in Afghanistan was particularly challenging. It was completed successfully, on time and on budget.

Golden Gate was a Regional Command-Southwest, or RC-SW, combined-joint engineering operation to construct a bridge complex spanning the Helmand River in southwest Afghanistan. Army, Navy and Marine Engineers of Joint Task Force Empire led the mission to improve mobility at the Sabit Oadam Flood Plain Crossing spanning the Helmand River. This strategic crossing links the Sangin, Musa Oa'lah and Now Zad districts close to Forward Operating Base Sabit Oadam (Jackson).

The mission carried strong strategic importance for NATO coalition forces and Afghan National Security Forces (ANSF) as well as the local Afghan population. It also carried historical and inherent natural challenges.

"The research, concept development and engineering design surrounding the crossing of the Helmand River was enormously difficult, especially conducting this phase of the operation from a combat zone with minimal resources," explained Maj. Michael J. Hults, P.E., Regional Command-Southwest/West, or RC-SW/W, coordination cell officer in charge and Operation Golden Gate mission commander. The river consists of a network of adjacent channels, shoals, sandbars and rapids with erratic hydrologic activity and a dynamic topography which makes predicting either component extremely difficult. The crossing point is also a floodplain from March through May when river levels can fluctuate by as much as eight feet, which made the construction of a year-round expeditionary crossing point for both military and civilian traffic particularly challenging. Finally, scarce and subpar construction materials, a small budget and the fact that it was constructed in a war zone requiring increased security aspects added difficulty to the project.

Coordinating with the local contractors for material delivery was another hurdle. The project required crushed stone, or riprap, for soil stabilization and 60 concrete box culverts for hydraulic pressure relief along the elevated causeway. Contractors were hired, but each required security protection and were susceptible to delays due to route clearance requirements along the roads to the site.

Two medium girder bridges (MGBs) previously constructed for seasonal crossing at the site had failed during the flood season when earthwork introduced into the river during construction caused the

water to scour the shoal and increase the gap to more than 160 feet. With the increased gap, it was determined that an MGB was no longer feasible.

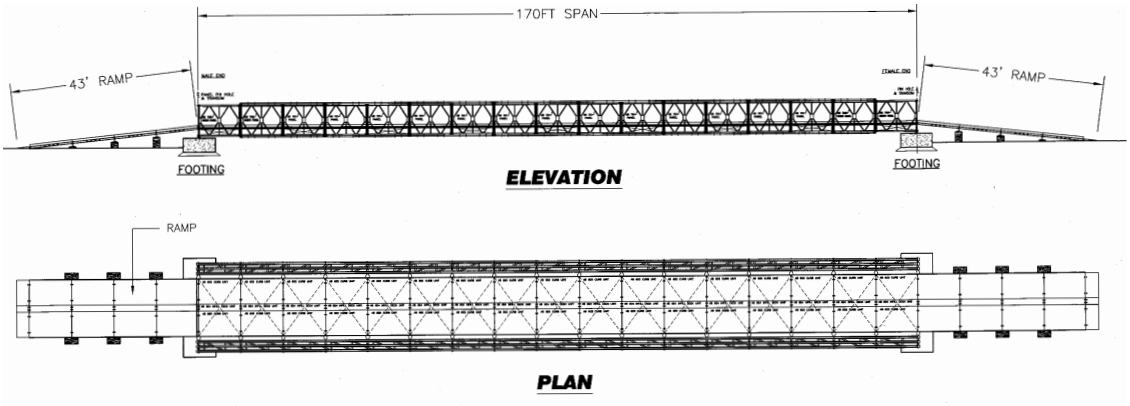
A virtual river model was developed with software that predicts hydraulic events and subsequent outcomes to identify and evaluate different risk factors and engineering solutions to mitigate the potential negative outcomes. The final solution consisted of two 17-bay Acrow bridges with a 300-meter interconnecting elevated causeway system. After providing a full design package, Joint Task Force Empire was tasked with the development and oversight of the project. The bridge was constructed by the California National Guard's 132nd Multi Role Bridge Company (MRBC) out of Redding, CA, which provided the mission's name Operation Golden Gate.

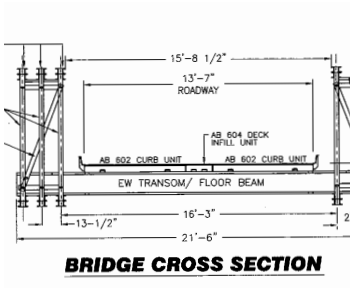
Task Force Anchor took the onsite lead on the bridge complex construction. U.S. Navy Seabees modified the existing pier by both increasing the elevation and width, constructing levee systems and bridge abutments and formed the elevated causeway with crushed stone and local fill. Finally, they compacted, shaped and graded the bridge complex. Box culverts were installed within the elevated causeway. Riprap hauled by the Afghan National Army's 2nd Battalion, 215th Brigade engineers was placed along the levees, bridge abutments, causeway and around the culverts.

Engineers worked around the clock for 50 days on rotating 12-hour shifts under increasingly harsh winter conditions to complete the project, which is 170 feet long and 14 feet wide with the capability to span a 150 foot gap. This supports normal one-way traffic, and can sustain a rise in the river level of 10 feet before the bridge would need to be removed. The second constructed bridge can sustain a rise in the water level of 9 feet.

The mission's result has been greatly improved freedom of movement for coalition members, ANSF and the surrounding Afghan population which had become dependent on lengthy alternate routes or a limited and costly ferry system.

"The mission was incredibly successful as witnessed by the construction of an impressive bridge complex within time and budget and, the extremely positive atmospherics of the local population. From the standpoint of the local populace, ANSF, coalition forces and the engineering community, this was a huge success," stated Hults. "For the first time since we operated in the Helmand province, it brings year-round freedom of movement while providing a quality of life improvement for the locals. It strengthens security, commerce and prosperity for the local population."





Design Specification

(TDTCMB) Trilateral Design and test code for military bridging – January 1996

Live load:
MLC-80T Normal Class
MLC – 110W Caution Class

Bridge finish:

- All major components galvanized to AASHTO M111 – ASTM A 123 which is 610 gm/m^2
- All bolts are hot dipped galvanized
- All pins are electro galvanized

Bridge design:

(A) Panel chords, diagonals and verticals, raker, transom brace reinforcing chords AASHTO M223 Gd 65
(B) Decking, transom, swaybrace, raker brace, top chord brace, diagonal brace AASHTO Gd 50
(C) Panel pins ASTM A 193 Gd b7
(D) Bolts AASHTO M164 – A325

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