

THE ALLIANCE BRIDGE AT ZUMBI

In August 1964, Walter Benson, Peace Corps Volunteer at Zumbi, in the Eastern (Oriente) Province of Zamora-Chinchipe, Ecuador, sought technical assistance for a community project from PCVs, John Mulligan and Jim Snyder, civil engineers stationed in Loja, capital of Loja Province. Zumbi, was a small but growing village on the Zamora River recently settled by farmers who had emigrated from drought-stricken areas of the Sierra to homestead new farmland offered by the Ecuadorian government to promote economic development in the Oriente region. The community needed a safer means of crossing the river than by dug-out canoe, which could be risky due to high water from the constant rains of the area's sub-tropical climate. Benson's proposal was to construct a gondola on a 400-ft cable strung across the river to connect the village to what was then only a trail, but soon to be a new road, extending further into the Amazonian rain forest. After discussing the pros and cons, the gondola zip-line was scrapped in favor of a pedestrian suspension bridge. As detailed below, the Alliance Bridge, or "Puente Alianza" as it was named at completion, ultimately developed into a project supported in part by the US Alliance for Progress economic initiative.

In September 1964, Mulligan and Snyder made the 8-hour bus trip plus 4-hour trek through the jungle to Zumbi to study the bridge site and discuss the project with Benson and the villagers. Several days were spent surveying the bridge site and talking about materials, tools, equipment, and workers for the project. Wood for towers, dead-men, and walkway would be cut from the forest by the villagers. The suspension cables would be donated by Grace Lines and purchased from Bethlehem Steel, an arrangement Benson had secured as a promise from a Grace Lines manager, whom Benson had met by chance in Loja. Funding for cement and hardware (bolts, lag-screws, cable-clamps, and hangers), would come from the Consejo (Municipal Council) of Zamora, which Benson believed he could convince to provide financial support.

The design required two 470-ft steel suspension cables, four 60-ft anchor cables, four 6-ft turnbuckles, two 35-ft timber towers, a 407-ft span between towers, and 30-ft ramps at each end of the walkway. To minimize potential overloading the walkway width was limited to 6-ft. In November, Benson, Mulligan, and Snyder, armed with drawings, cost estimates, and high hopes went to Zamora and presented the proposal to the Consejo. The response was positive and the Consejo agreed to provide 22,000 sucres (\$1200) for

cement and hardware. Tools and equipment un-owned by villagers would be borrowed e.g., a winch for stringing cable would be borrowed from the Zamora power utility. As PCVs were providing technical assistance and local people would supply volunteer labor, the Consejo's funds and donated cable would be the only financial support required.

Actual construction started with felling trees from the jungle for tower columns and footings using broad-blade axes, cross-cut saws and adzes. As each finished timber weighed over three tons, it took 80 men all day to haul the timbers through the jungle to the bridge site, after which everyone celebrated with drinks of aguardiente (local "white lightning" distilled from sugar cane). Footing excavation for tower columns on the north river bank was done using picks and shovels to dig a 6-ft-deep trench for a timber footing. The columns were tilted using manpower, ropes, and a chain-hoist slung on a pole-quadrupod. With both columns in place the footing was covered with concrete hand-mixed with sand and gravel collected along the river bank and transported to the site by dug-out canoe. Then both columns were braced and connected at the top with a beam and cross-bracing.

December 1964 through April 1965 was spent erecting the tower on the south river bank, digging holes for two dead-men and four slot trenches for anchor cables, harvesting trees, and cutting boards for the bridge structure with cross-cut saws, an exhausting task in which the local people excelled. Meanwhile, purchase of the cables and turnbuckles hit a snag when Benson learned the Grace Lines Manager could ship, but not donate, the cable because his wife was ill with cancer. In February 1965 Benson travelled to Quito and met with the US Ambassador, convincing him to authorize \$2700 from the Alliance for Progress to purchase the cable.

In April 1965 Snyder completed calculations and details for hardware and ordered fabrication at a Loja metal shop. In May the cables and turnbuckles arrived and work commenced in earnest to complete the dead-men. About this time, we received a big boost with the arrival of PCV Dick Kelsey, a mechanical engineer with a lot of practical experience. A huge boulder was encountered while excavating the hole for the dead-man on the north side and was removed by blasting with safety-fuse and dynamite. Before placing the concrete, the holes were dewatered with buckets manned by soldiers from the Ecuadorian Army post nearby and later with a borrowed pump. After anchor cables were clamped into place around the dead-men, the concrete placed and cured, the holes and slot-trenches were back-filled and compacted by the soldiers.

Stringing the main 1-7/8-inch cables across the river proved to be our biggest challenge, especially with the river about 10 ft higher than normal due to heavy rain upstream. As each cable weighed approximately 2-1/2 tons, its travel across the river was preceded by lighter lines. With the tail-end of the main cable secured to an anchor cable, the leading end was connected to a 3/8-inch cable in turn attached to a nylon cord. The cord was strung over one column of the north tower, ferried across river by canoe, strung over the south tower and down to the ground, where it was pulled by hand until the 3/8-inch cable arrived for connection to the hand-cranked winch. In spite of precautions to control the amount of sag over the river, we had a scare during the stringing operation. As the main cable's center of gravity passed the north tower, the cable sagged into the water and was carried downstream by the current. When all the slack played out, the cable acted like a giant rubber band, snapping out of the water and back upstream until it dipped back in the water and was carried downstream only to snap back again. This kept repeating for what seemed like an eternity until the winch crew, frantically urged faster by Benson, cranked up the slack enough to lift the cable free of the current. Although severely tested, the towers stood firm. After surviving that experience, we secured the slack to a big tree stump before stringing the second cable.

With the main cables strung and connected to anchor cables via turnbuckles, work proceeded seven days a week on the walkway. A thatch-roofed shelter was constructed to continue work during almost daily downpours as workers cut boards and assembled frames consisting of a cross beam with braced posts and steel hangers bolted to beam ends. Then, with Benson on a scaffold hung on the cables advancing toward mid-span from the south tower and Kelsey on a scaffold proceeding from the north tower, preassembled frames were relayed to each scaffold, hangers clamped loosely to the cables, then slid into position and clamped tight. Two crews working from opposite sides bolted stringers to beams, while canoes ferried frames and stringers across to the crew on the other side. This process continued until the two crews finally met at mid-span. This was a major milestone in the project and was properly celebrated on the spot with toasts of aguardiente by all workers. Then floor decking was attached to the stringers with lag screws and hand rails fastened to the posts. Finally electric wiring was strung for lighting the bridge after dark; a sign was attached to the south tower reading "PUENTE ALIANZA - PASAR CON CUIDADO - CARGA MAXIMA 30 qq o 25 PERSONAS – ES SU PUENTE CUIDALO"; and a marble plaque was attached to a column at the north tower engraved with the words: "Puente Alianza para Progreso, construido por los habitantes de Zumbi (and surrounding communities), los Volunterios del Cuerpo de Paz,

Punto IV, Grace Cia, Junta de Recuperacion de Loja y Zamora-Chinchiipe, Municipio de Zamora, Mision Franciscana, y Cia Selva No. 15 Zamora. Zamora, Agosto 15, 1965.”

The inauguration of the bridge was attended by about five hundred people, including all participants in the project: residents of Zumbi and nearby communities, soldiers, PCVs, Governor of Zamora-Chinchiipe Province, Bishop of Zamora, President of Zamora Council, and Civil/Military Chief of Loja Province, with the dignitaries cutting the ribbon and unveiling the commemorative plaque. While it’s hard to summarize our feelings that day, I truly believe that our experience bonding with the local people and working toward a common goal proved that we could make a difference. Thanks, President Kennedy, for making that possible. For current photos type “Zumbi Pasarela” at Google Earth.