



AFTER THE STORM: Ensuring Education Can Continue

The destruction from Super Typhoon Yutu led to a coordinated response from the Federal Emergency Management Agency that included construction of 66 temporary school structures for students in Saipan, Northern Mariana Islands.

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On Oct. 25, 2018, Super Typhoon Yutu swept through the Northern Mariana Islands. The Category 5 storm was the strongest ever recorded on the U.S. territory. Storm surges reached 20-ft and some areas faced rainfall up to 10-in. Winds of 180-mph left significant devastation, including in the capital city of Saipan, where both Hopwood Middle School and Northern Marianas College were severely impacted, leaving hundreds of students displaced.

To allow classes to resume under more normal conditions as soon as possible, Saipan Public Schools performed an assessment





and identified the need for 66 temporary school structures: 24 structures for the college and 42 for the middle school. In response, construction funds were obligated by the Federal Emergency Management Agency (FEMA) to construct the temporary structures.

However, this critical mission, which addressed a near-term humanitarian need while underscoring the commitment to the Indo-Pacific Region, came with a highly compressed schedule that would challenge contractors.

The 66 structures had to be completed in two-and-a-half months from contract award, in time for students to begin the next semester. A typical design-build project of this size generally requires at least that much time just to complete work plans, preliminary design, and mobilization logistics.

Irrespective of the schedule challenge, Brice Engineering was committed to support the effort and was contracted to perform the disaster response project by the Honolulu District of the U.S. Army Corps of Engineers (USACE).

GAUGING COMPLEXITY

The temporary structures were provided by FEMA and came with their own instructions. Accordingly, the project's design work was of medium complexity and focused primarily on horizontal construction: soil testing for concrete foundations (a perimeter footing plus 25 interior footings would be formed for each structure); structural design to stabilize the structures against future typhoons; as well as utilities (electrical and waterlines), layout, drainage, roads, and pathways.

Given the shortened schedule, however, the project ranked "high" in project management complexity, making the assignment of the right mix and number of staff the key to successful delivery.

Within two weeks of contract award (six weeks after the typhoon struck the island), a six-person construction management team mobilized, consisting of a site supervisor, a quality control manager, a site safety manager, a project engineer, an electrician, and a surveyor. The team first spent a few days in Guam to procure materials before arriving in Saipan where they would lead a group of local hires to work across two sites, 5-mi apart.

SEASONAL CHALLENGES

Logistics challenges pressured the timeline. With much disaster response work already in progress in Saipan, the primary sources of equipment and materials were all but sold out to other emergency response contractors and agencies. Moreover, the availability of the local workforce significantly dropped as the Christmas and New Year's holidays approached. The initial plan had called for 40 local hires working seven days per week for the duration of the project schedule, but only six were willing to work during the holiday season.

Between Christmas and New Year's, the construction manager identified additional staff willing to mobilize within days to Saipan. Soon, 14 people traveling from eight states were committed to the effort, and within the first two weeks of the new year, they had arrived on site. They consisted of site superintendents, foremen, equipment operators, and craft labor. Additionally, a C130 cargo plane from Alaska and a barge from Guam had delivered higher quality heavy equipment, parts, and materials. With the holidays over, Brice was finally able to contract 60 local hires as well, to assist with the mission. By this time, approximately five weeks remained to complete the 66 structures and associated infrastructure.

WORK CHARGES AHEAD

With the infusion of resources, fieldwork was restructured to ramp up productivity. Each of the two project sites now had a dedicated site supervisor and site safety officer. The local workers were divided into five teams—each led by an experienced field lead—to perform a specific task: there was one earthwork team, one electrical team, one concrete team, and two teams for structures.

The restructure was effective in many ways. Daily issues were addressed immediately by the field leads. This avoided management bottlenecks and any idling of the workforce. For example, whenever equipment failed, like the forklift, which broke down more than



A total of 24 temporary school structures were constructed at Northern Marianas College following Super Typhoon Yutu. PHOTO COURTESY BRICE ENGINEERING



More than 1,600 concrete footings were poured to form foundations during construction work.

PHOTO BY KARINA QUINTANS



The team worked 11 hours a day, seven days a week for two-and-a-half months to complete the project.

PHOTO BY KARINA QUINTANS

with a dedicated field lead was a game-changer. Each field lead was cognizant about taking time to explain the tasks at hand. Daily, they demonstrated the work to be done, often using hand signals to communicate. This direct engagement with the local workforce also led to the cultivation of strong working relationships that kept everyone enthusiastic, focused, and committed to working seven days a week in order to deliver the mission.

With instructions understood, the local workers were empowered to perform the remainder of each day. Field leads provided support and ensured work was completed in accordance with USACE quality standards. For many of the leads, it was a valuable learning experience—that despite a language barrier, it was still possible to successfully communicate with few words.

SUCCESS ACHIEVED

Ultimately, an 80-person team worked 11-hour days with almost no days off throughout

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once, crews were formed into assembly lines to manually move construction materials from the staging area to the foundation to keep the work moving forward. Technical issues also arose that required design on the fly. When fill material for foundations was in short supply, field leads had to reconfigure the design of the anchoring system to ensure stabilization against future typhoons.

In addition to the design and construction challenges, a language barrier initially posed a performance risk. Though most of the local workforce spoke basic English, breaking into smaller teams

the period of performance to complete the project. The ramp-up of field resources and robust teamwork triumphed.

Following ribbon cutting ceremonies, barbecues, and speeches by local officials and USACE and FEMA representatives, the students of Northern Marianas College and Hopwood Middle School resumed their studies on time, inside safe and durable school structures—a mere three-and-a-half months after the record winds of Super Typhoon Yutu swept the roofs off their classrooms.

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