Safety Comes First

DURING DISASTER RELIEF

By Bruce D. Allen

When Hurricanes Irma and Maria hit, WSP, formerly Louis Berger, deployed a team of more than 850 workers and 23 safety professionals, led by the author, to restore power to critical facilities in Puerto Rico. Safety was a chief concern during these efforts, both for the community as well as for recovery personnel.

When disasters strike, emergency response teams go to work to save lives and improve living conditions. These response teams can include hundreds or thousands of laborers and professional staff who travel to the disaster areas to support the affected communities. Response to natural disasters requires professionals and volunteers to work long hours in difficult physical conditions to adequately address community needs and rebuild key facilities and infrastructure. While the community's safety and well-being are at the forefront for every individual contributing to recovery missions, safety professionals focus on the needs of the team members engaged in recovery work. Companies such as WSP deploy dedicated safety and health experts to evaluate the risks involved in disaster response and to provide guidance and support to teams on the ground.

As the frequency and strength of hurricanes and tropical storms increase, disaster response and recovery teams must tackle the immediate needs of community members and the long-term systems and practices that can prevent future devastation (Wamsley, 2017). WSP has a long record of supporting communities in their recovery and rebuilding efforts following major disasters across the mainland U.S. and in the Caribbean territories, Pacific territories and places outside the U.S. such as the Philippines and Nepal.

Over the past year with the Caribbean territories in particular, WSP teams responded in Puerto Rico and the U.S. Virgin Islands before the first storms of the historic hurricane season of 2017 landed. The company supported public agency missions to restore power to the island. It has also worked with private sector partners to supplement immediate power needs, introducing renewables such as solar generators and smart micro grids to help Puerto Rico today while establishing a more resilient future. Throughout this important mission, the company's safety professionals have helped locally deployed contractors and successfully brought down safety incidents while teams on the ground have built lasting bonds with Puerto Rican communities.

Phase I: Emergency Response

Just weeks after Hurricane Irma left 1 million Puerto Ricans without power, a second devastating storm struck. On Sept. 6, 2017, Category 4 Hurricane Irma made a major hit on and knocked out power in the U.S. Virgin Islands, then on Sept. 20, 2017, Category 5 Hurricane Maria made a direct hit on the island of Puerto Rico (FEMA Public Affairs, 2017; Johnson, Arkin, Cumming, et al., 2017).

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As the storm's center moved northwestward, hurricane-force winds and heavy rainfall devastated the U.S. territory's infrastructure. Hurricane Maria knocked out Puerto Rico's entire power grid and nearly all of its cell phone system, effectively disconnecting the island's 3.4 million residents from the mainland (NWS, 2017). Widespread flooding damaged both private and public infrastructure, sweeping away power lines and eroding road surfaces. Hospitals, schools, community centers and homes faced a historically unprecedented recovery process.

Even before the hurricane hit, WSP deployed staff and subcontractor partners to the island. Nearly 300 response staff assembled on site to support the Federal Emergency Management Agency (FEMA), U.S. Army Corps of Engineers (USACE), U.S. Postal Service and Defense Logistics Agency. The joint government and contractor team immediately went to work performing inspections and assessments while bringing in much needed labor, equipment and supplies to directly support the island's residents. About a week after the storm, the company shipped an additional 200 commercial power generators from the Port of Jacksonville to Puerto Rico, with many hundreds more to follow over the next few months.

By January 2018, WSP had expanded the number of generator installations on the island to more than 1,000. This not only restored power to critical facilities but also boosted job opportunities for local workers. With the expansion of the company's power mission came the need for more safety personnel. During this process, the company's safety professionals were also deployed to provide guidance to the more than 850 deployed workers.

Phase II: Rebuilding Resilient

An important part of WSP's continued presence in Puerto Rico centered on building resilient communities. The company demonstrated this commitment to resilient power solutions on the island through both high-profile pro bono projects and day-to-day interactions with communities.

The company's efforts to rebuild resilient communities was illustrated by two pro bono initiatives to restore power in vulnerable communities (WSP, 2017). Each time a stand-alone generator, diesel-powered micro grid or solar-powered micro grid was installed or removed, a safety team member was assigned to observe and report the process. The company worked in cooperation with the government of Puerto Rico to identify and assess communities with power efficiency and stability challenges in the aftermath of Hurricane Maria.

To promote innovative and sustainable energy solutions on the island, WSP worked with WestGen and AEG, along with the Zofnass Program for Sustainable Infrastructure at Harvard University to restore power to La Perla de Gran Precio, a foundation that helps women and children in need. The company also worked to install a mobile solar generator at Casa del Amparo Nursing Home, located in one of the areas hardest hit by Hurricane Maria (WSP, 2018b).

The objective of these projects, implemented at no cost to local residents, was to demonstrate distributed, solar hybrid power technologies while restoring residents' access to fundamental services that would otherwise not be available until the central power grid is fully restored.

In addition to improving the quality of life for the community, these pro bono projects were part of an effort to raise public and private sector awareness of the benefits of cleaner, distributed, mobile and resilient energy solutions. Especially in storm-prone communities, distributed power generation provides many advantages over reliance on a centralized grid alone.

WSP also set up nearly 10 different micro grids consisting of large generators that provide community power 24 hours a day. Two of the micro grids located on Vieques and Culebra islands continue to be the sole source of power for each island and were recently turned over by WSP for continued operation by others since these islands still have not been reconnected to the central grid in Puerto Rico. The main power feed that ran underwater to Vieques from the main island of Puerto Rico was damaged during the storm.

These projects are ongoing until the central power grid is fully restored. At La Perla de Gran Precio, the second phase of the project was recently completed, wherein a larger capacity solar hybrid micro grid was installed along with solar lighting and solar hot water heaters that can more completely and efficiently serve the needs of the facilities, also at no cost to the entities as part of the firm's Give Back program (WSP, 2018a).

Projects such as these not only turn the lights back on for local residents, they inspire communities and build morale for teams working on the island. Of course, much smaller interactions generate the same positive impact on residents and professionals alike. Workers frequently shared stories of how they have helped community members rebuild and stay safe while also connecting with residents on a personal level.

Many schools and other critical facilities were able to continue their work through power from generators. However, these generators are not necessarily safe for nonprofessionals to approach. When WSP teams noted that several schools had generators with exposed wiring, they put up barricades, signs and fencing to prevent students from suffering serious injuries. During their evaluations of haul and install teams working on the ground, the company's safety professionals would meet with students, principals and teachers to discuss how to keep children safe, educating them about potential hazards and sharing techniques for avoiding those hazards. The safety professionals were receptive to feedback from community members, who sometimes raised concerns about noise or smells. In these cases, the safety professionals worked with leadership and the installation teams to move the generators to a different location. Generators were moved downwind to avoid unwanted smells or were positioned around the corner or building to reduce the noise.

Throughout each day and each install, safety professionals worked side-by-side with the install teams to help coach, spot train, provide additional PPE, and point out easier and safer ways to approach the

task. They also worked as an extra set of eyes to provide situational awareness for the install teams. In addition, safety professionals would help with traffic control during preventive maintenance and refueling of generators located on or near blind corners. All of these safety observations took place daily while navigating extremely dangerous driving conditions.

Role of Safety Professionals in Disaster Response

WSP management and safety teams have been incredibly successful in reducing safety incidents during the company's response and recovery missions. They led the temporary power mission's contractors to a 25% reduction in the OSHA total recordable incident rate. There was also a 43% reduction in the contractor cadre's OSHA lost-time incident rate. Constant reminders lowered these rates and communication of lessons learned each time an incident occurred. The collective WSP team also reached one safety milestone after another, at one point achieving 1.3 million hours without a lost-time incident under extremely challenging post-disaster conditions.

The two dozen OSH professionals along with dedicated management drove a culture of safety and responsibility that made these accomplishments possible. Teams working on the ground began every day with a roll-call meeting. The topic first addressed during these meetings was safety. Top-level management also made a point to begin meetings with a safety moment, discussing the practices and behaviors necessary to maintain a safe work environment.

In this way, leadership emphasized the critical importance of personal and professional safety practices while working and living on the island. The post-disaster landscape of Puerto Rico presented unique challenges, such as uneven road surfaces, exposed power lines and unpredictable traffic lights. Power outages, in addition to potholes and frequent rain, caused extremely hazardous driving conditions for haul and install teams that were working to install the generators to remedy these very problems. The hurricane destroyed the public infrastructure, with many roads still not accessible because of debris, low hanging power lines and communication lines, branches sticking out like projectiles, and big potholes and roadways washed away because of flooding and erosion.

The daily safety moments served as reminders to power teams to exercise increased caution, particularly at night. The teams were encouraged to improve their situational awareness, support each other and drive defensively (CDC, 2018). At peak operations, more than 800 vehicles, car rentals, flatbeds, box trucks, vans and tanker trucks were moved daily. The work schedule required by the government contract was 12 hours a day, 7 days a week. Safety teams also developed robust vehicle inspection plans and added spotter roles to monitor vehicles operating in reverse.

While reminders and meeting moments were vital to keeping disaster relief teams safe, WSP teams achieved major safety milestones by putting safety recommendations into action. Going into the haul, install and removal mission, the safety professionals knew that electricity would be the biggest risk. On the first day of the mission, the teams shared information and activity hazard analyses related to electrical work. Teams made lockout/tagout, PPE and arc flash the first focus of observations.

Fatigue was a serious risk for teams working on government agency missions. WSP power teams were working the USACE contracts that required active engagement (i.e., 12 hours a day, 7 days a week). Operating heavy machinery while fatigued can be disastrous for all involved. In general, fatigue slows reaction time and reduces attention span. It can also lead to falling asleep at the wheel or while installing electrical equipment. To reduce these dangerous effects, safety professionals working on the ground implemented a fatigue management plan that mandated 1 day off per week, per person.

Conclusion

The mission evolved into something bigger than originally anticipated by either the government or WSP. Because of top-level management commitment and the constant reinforcement of safety, the company's response and recovery mission was successful and continued to improve every day and every hour across the mission duration spanning 13 months. As the mission expanded, the daily alerts and communications at the roll calls served as key reminders of the teams' commitment to provide a safe work environment for employees and contractors alike. **PSJ**

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