No Matter the Weather, Vodafone Fiji Provides Reliable Service Across the South Pacific

How disruptive would it be if your mobile connection changed with the weather? Mobile networks allow us to stay in touch with family, browse social media and stay up to date on the latest news. For businesses, they provide voice and data services, for employees in the office and on the go. Many industrial, commercial and emergency services applications also depend on cellular networks. These include ticketing systems, weather information, security and surveillance and emergency phone lines. With the advent of 5G—which will have higher speeds and lower latency—even more applications like medical monitoring through smart wearables, smart power grids and vehicle communication systems, will begin to rely on wireless networks.

Vodafone Fiji is Fiji's leading mobile telecommunications provider. Thousands of customers rely on the company to stay connected. Vodafone Fiji launched in 1994, and in 2014, became fully owned by Amalgamated Telecom Holding (ATH) of Fiji. Over the last five years, ATH has expanded its network into other South Pacific Islands including Samoa, Kiribati, Vanuatu and Papua New Guinea. It is on track to become the leading cellular provider in the South Pacific. Vodafone Fiji has provided engineering and technical expertise in the setup and running of these newer ATH entities.

Vodafone's customers need to know they can count on the company to connect on the go, but sometimes the South Pacific weather conditions can threaten network stability. Without additional precautions, the area's tropical storms, heavy rains and lightning can damage equipment and cause outages, leading to damage to the company's reputation and the potential loss or frustration of customers. Worse still, these outages can affect availability and connectivity of essential services.

Grounding systems are critical to protect telecommunications infrastructure and personnel, across the globe. Grounding and protection systems provide a preferred path to the ground for lightning strikes, noise control and personnel safety. When lightning strikes a well-grounded cell tower or other piece of equipment, the bulk of the electrical currents pass through the tower steel, grounding conductors and ground electrodes on their way to the ground, instead of passing through sensitive equipment that may be damaged by the arising voltages. There are other effects from lightning including electrical and magnetic induction that also need to be considered. These systems have several components, including air termination networks, down-conductor systems that carry the current to the ground, equipotential bonding systems, surge protection devices and ground electrodes that help dissipate energy into the earth. In telecommunications systems, high levels of electrical noise can severely affect the data transmission speeds and the bandwidth, which affects the customer experience. Grounding systems also help minimize the effects of noise. It is paramount that companies also protect personnel working on telecommunications installations, as well as the general public, from electrical shock hazards. Grounding systems provide this personnel protection by keeping dangerous currents away from people.

For Vodafone Fiji, a network outage caused by lightning could affect customers living on upwards of 150 islands in Fiji. The company's cell towers and other equipment stretch across a wide area, including many sites that are quite remote and difficult to

reach. Remote sites can be costly to repair because of their locations. Even an inexpensive or easy-to-repair part can cost the company many times its value to replace. Vodafone engineers estimate that the minimum cost to repair a site damaged by lightning is around $USD 2000-3000. Those costs can quickly grow depending on what equipment needs repair or replacement, how long the outage lasts and the location of site.

Vodafone staff analyzed the company's ongoing repair costs and decided the best course of action to establish strong protection. Vodafone initially put in grounding systems as it was building its network and expanding its coverage area, but at that time it focused more on expanding coverage than protecting sites. As the company grew, its focus expanded from just coverage to reliability and densification. In this phase of the company's evolution, eliminating damage from lightning strikes to the extent it was reasonably possible made good economic sense for Vodafone—that meant protecting its towers with the best equipment and design methods possible.

Technology in the telecommunications industry is always evolving. When choosing a vendor for its grounding systems, Vodafone looked for a partner that could customize solutions and provide design support for grounding system installation. The company also needed a partner that could regularly train its engineers on the grounding system design, installation and testing so Vodafone staff would be ready to service systems efficiently. This was particularly important to Vodafone Fiji because of its strong focus on staff development. Fiji also has high rate of outward migration among its population, which leads to high staff turnover.

nVent provided Vodafone Fiji with complete grounding and protection systems for more than 350 of its 528 sites through its **nVent ERICO product line**. This included air terminations, conductors, ground bars, copper bonded ground electrodes, **nVent ERICO Cadweld** exothermic connections, surge reduction filters, **nVent ERICO System 3000** at critical sites and more—everything Vodafone needed to minimize lightning strike damage. The incidence of lightning damage to Vodafone sites that are fitted with nVent grounding protection systems is extremely low. nVent also provides protection for critical sites such as mobile switching centers, buildings that contain equipment that supports the entire Vodafone Fiji network. If these sites were to go down, the entire network or a large part of the network would fail.

"Our systems contain expensive items that are not always available in Fiji," said Ronial Sami, Telepower Engineer at Vodafone Fiji. "The lightning protection system helps take care of them so there's minimum risk to [the power] systems."

nVent also provides the design support that Vodafone needs to ensure its systems are protected. Vodafone frequently sends nVent schematics and soil tests from installation sites and asks for feedback from nVent engineers on the best way to design its grounding systems. nVent engineers also frequently cross-check work done by Vodafone technicians to make sure Vodafone's sites are protected. Vodafone has saved significant engineering costs by relying on nVent to provide engineering support.

In the event lightning damages grounding systems and Vodafone needs rapid onsite support, nVent has a local agent in Suva, Fiji to provide it. The agent, Midlink Marketing, can respond to Vodafone's needs with site visits and services. Midlink Marketing also provides field services like ground resistivity and ground resistance testing and commissioning. nVent also frequently provides onsite remote support to Vodafone.

"For Vodafone Fiji the training and design services we offer have been very important," said Rohit Narayan, nVent Director of Global Telecom. "If you look at some of the components (though not all) like ground rods, connections and conductors, they can probably procure those from anywhere, but we try to create much more value by providing our engineering and training. That's very unique."

In addition to supporting Vodafone in designing, implementing and servicing grounding systems, nVent engineers conduct trainings for Vodafone technicians and engineers. They cover new and updated technology, proper installation of grounding systems and industry best practices. Vodafone frequently brings on new staff, so regular training is critical. If Vodafone employees need additional training between their regular visits from nVent, nVent can step in with remote assistance or Midlink Marketing can provide support. Because of this training, Vodafone engineers and contractors are well educated on grounding and the protection of Vodafone facilities and can service and troubleshoot at sites effectively.

nVent's partnership plays an important role in Vodafone's goal of eliminating lightning strike damage to mobile network equipment. Though it cannot control the weather, Vodafone can count on the reliability of its network to continue to help its customers connect.

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