An airport to sustain lives

by Fredrik Rudqvist

St. Helena, located in the South Atlantic Ocean, is a small tropical island island of volcanic origin, measuring 17x10 kilometres (11x6 miles) and is an overseas territory of the United Kingdom, even if the island is almost 7,000 kilometres (4,670 miles) away. It is one of the most remote places on earth. The closest landmass is Africa, roughly 2,000 kilometres (1,333 miles) away from the island. Cargo, mail and equipment transportation limitations make life for the residents of St. Helena difficult and when the aging British ship, the RMS St Helena, broke down in 1999, the 4,000 residents of St. Helena were stranded with no means of coming or going and with no delivery of vital supplies because this ship was the island's only transportation to the mainland. It was decided to finally construct a green field airport, an airport built from scratch on an undeveloped site, on St. Helena and replace the ship as the main access provider to the island. After many years of negotiations and planning, the project commenced in 2012 with a budget of roughly £ 240 million (398 million USD, 300 million Euro), scheduled to be completed in 2016.

"Without a modern airport, there is very little chance of economically competing with anything," says Nigel Kirby, Project Manager at the British Department for International Development. This international airport

Laying the concrete surface for St. Helena's airport runway.

represents a historic milestone for St. Helena and will offer the island a chance to create economic opportunity by developing tourism and jobs, perhaps eventually leading to the island's economic self-sustainability. The project of building this airport is one of the largest being undertaken in the southern hemisphere and was given to the South African construction group, Basil Read.

The construction site, located in the eastern part of the island, near Prosperous Bay, was one of the few areas to actually come in question because of the island's rocky terrain and environmental issues. Dry Gut is the name of the gorge that will be part of the future airport's runway. This gorge had to be drilled, blasted and filled with 8 million cubic metres (8 million cubic yards) of blasted rock for a depth of over 100 metres (328 feet) in order to become part of the airport's 2,000 metre (6,562 feet) runway. After the gorge was filled, it had to sit for at least six months to avoid settlement problems and cracks in the runway, after which paving could begin.

But first the resources and equipment had to be shipped to the island. Basil Read contracted the NP Glory 4, a massive cargo vessel to transport amongst other things, a slipform paver equipped with Leica Geosystems PaveSmart 3D machine control, which was also used with Wirtgen Group's paving & milling equipment, Leica Viva TS15 total stations and 45,000 m³ (58,860 yd³) of dune sand from Namibia, which was needed to pave the runway. To mix the concrete, more than five million kilograms of sand was needed and this was shipped in plastic bags weighing 1,000 kg (2,205 lb) each.

Before the ship set off from Namibia, both the Leica Geosystems specialist and Wirtgen technician worked together on a pre-delivery inspection. With the ship's journey taking five days and only traveling once a month, all equipment had to work, even if an extra set of all equipment was also on-site.

The paving width of the paver is 2.8 metres (9.2 feet) and was designed to match the capacity of the concrete batching plant, which could, at peak operation times, run two shifts six days a week. The teams were able to keep up with concrete production using Leica Geosystems PaveSmart 3D machine control and Leica Viva TS15 total stations. Together, they achieved an optimised yield of concrete by means of measuring with the total stations to precisely track the paver's position and elevation and sending any tracking corrections back to the PaveSmart 3D

machine control, which calculated and corrected the paver's positions. This helped simplify the logistics of the paving immensely.

Paving work started with the apron, a parking area for the aircraft not in use, and a concrete slab of 150 by 75 metres (492 by 246 feet) where the passengers will board and the planes will refuel. Also, close to this area will be a special surface dedicated to the private business jets.

Using the Leica PaveSmart 3D software, together with the TS15 total stations also saved the need to stake out with strings and eliminated the associated manual labour and expense necessary to set them up. The paver, concrete trucks and site vehicles no longer needed to drive around strings and decreased their workflow. Also when crews worked in low light conditions, the string-free work site was by far safer plus there was no accidental repositioning of the guidance strings at any time.

The unique desert ecosystem of Prosperous Bay also profited by the use the Leica PaveSmart 3D machine control. The machine control system minimised vehicle movement on-site and also reduced trips to transport materials. This kept the footprint of the airport project as compact as possible.

Basil Read is also well into completing the airport's terminal building, air traffic control tower, fire facility and fuel storages, all part of a modern airport's infrastructure and the first international flight should land on the completed runway by February, 2016. Basil Read, together with Lanseria, will also continue to maintain the airport for an additional ten years.

Besides building a link to the modern world and providing a fast and dependable means of modern transportation and delivery of necessary supplies, Basil Read, with the help of Leica Geosystems products and solutions, has brought about much needed employment opportunities and the hope of a better economic future with a better standard of living for the population of St. Helena.

About the author:
Fredrik Rudqvist is a product specialist at Leica Geosystems and has a history together with Basil Read since 2010.
Fredrik.Rudqvist@leica-geosystems.com

Challenging logistics

The logistics of the project were extremely challenging for Basil Read and properly planning this project has been a key to its success. There had never been a docking area for ships nor any major construction equipment on the island. Therefore, a temporary landing area at Rupert's Bay to accommodate a small shipping vessel had to be built in order for the equipment and materials to be unloaded directly on land.

St. Helena is also an island with limited infrastructure and there is a lack of construction materials – there's not even sufficient sand on the island to make concrete. Since all local roads have a maximum capacity load of 7 tons (7,716 tn.sh.) it was necessary to build a winding 14 km (9 mi) access road from the dock to the airport construction site.

In July 2012, the first ship loaded with supplies landed directly on the dock of St. Helena Island and since then around 30,000 tons (33,069 tn.sh.) of cargo has been unloaded to date. In November 2013, an additional contract was signed to build a permanent wharf. Both of these wharves were milestones for the people of the island, as it will be the first time that a ship could actually dock on a wharf in the island's history. Before the wharves were built, all cargo had to be reloaded onto small diesel-fueled barges and hoisted to shore by gigantic cranes.