

No.1 on the

Hawaii-based Jas. W. Glover knew that acquiring Trimble 3D technology was an important investment as they began re-construction of Honolulu International Airport's 12,000-foot Reef Runway.



"Trimble was the choice for Jas. W. Glover because the technology would keep us on schedule, within contract amounts for material, and help us meet extremely tight tolerances and specs for smoothness and finished elevation," said Gregg Nathaniel, Glover's General Superintendent.

The initial investment was a Trimble 3D PCS900 Paving Control System for milling machines and a Trimble PCS900 3D Paving Control System for asphalt pavers, plus four Trimble SPS930 Universal Total Stations guiding the PCS900 systems and two Site Positioning System rovers. The Federal Aviation Administration (FAA) and the Hawaii Department of Transportation (DOT) required that each section of the runway take no longer than 15 days to complete, with stiff penalties written into the contract for missing deadlines. With a tight schedule, Glover divided the Reef Runway variable depth milling and paving project into three phases. The team worked in 24 hour shifts to keep portions of the runway open at all times and to ensure minimal flight disruptions. The first phase was a 3,000 foot section on the east end and, while this was being performed, the 9,000 foot west end section was active. Next, the 3,000 foot west end section was milled and paved, and finally the middle 6,000 foot section of the runway.

To increase production, Glover added a second Trimble 3D PCS900 milling system and 3D PCS900 paving system. These additional systems also included four more SPS930 Total Station to guide the PCS900 systems and two Site Positioning System rovers for topos, layout and checking grade.

"We ran two 12.5 foot wide 3D mills and two 25 foot wide 3D pavers to keep up with production," states Nathaniel. "Being able to control the milling elevation, and placing material to elevation with the pavers while maintaining slope and smoothness was key to our

it without stringline or wires. Each machine was controlled by a total station, and we used additional total stations so we could leapfrog every 1,000 feet without having to stop the machine. Then we had a grade checker checking the elevation behind each machine with another total station and rover system."

The Trimble technology meant Glover was able to finish each section on time, even completing the overall project two days early. In fact, the team completed the third phase, which was the biggest in terms of length and square yardage – 3,000 feet longer – in the same 15-day timeline as they did the first and second phases. This was especially significant because missing any one of these deadlines would result in a penalty of \$240,000 per day.

The company built the 3D models in Business Center – HCE software, with the 3D design then transferred to the machine and displayed to the operator to show areas that are on, above, or below grade comparing the actual drum position and slope with the 3D digital design. Not only did the PCS900 on the milling machines provide a smoother base for paving, Nathaniel explains that smarter milling means they have to remove less waste material and mill off the minimum depth only.

"With the Trimble system, we were able to input everything into the model, set the mill down and just start cutting, and it cut everything to grade," said Nathaniel. "Because of the existing slopes of the runway, it would have been nearly impossible to mill everything to the new profile without using 3D technology. It saved us huge amounts of time and manpower in terms of layout, topos and establishing where the grades should be."

"In previous projects we've had to rely on string lines and topos, and we almost always overran on material," said Nathaniel. "This is the first project that we've really nailed it to a tee on the yield," he concludes. "We couldn't have asked for anything more with no waste and no excess or overruns. This was a huge saving because any overages would have come out of our pocket."

Runway

Benefits Summary

- With 3D milling and paving control from Trimble, Jas. W. Glover laid down 5,000 tons of asphalt per night in a 12-hour shift, compared to 2,000 tons per shift on other jobs
- Within tight material yields, hit slightly below the original estimate of 92,600 tons of asphalt
- Met each phase requirement for the resurfacing work to be complete in 15 days or less; avoided penalties and liquidated damages of \$240,000 per day for missing deadlines
- Obtained superior surface smoothness; met the half-inch tolerance, quarter inch up or down for the entire length of the runway



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