Mining Point Clouds

Field and office teams used Trimble solutions to overcome the challenges of scanning large, complex structures in remote locations and difficult environments.

How an Australian surveying firm uses advanced scanning technology to support mining operations

Trimble X7 provides rapid workflows for tight timelines in challenging environments

Solution

Trimble® X7 3D Laser Scanning System

Trimble SX10 Scanning Total Station

Trimble TX6 3D Laser Scanner

Trimble RealWorks® Software

overview

A prominent Western Australian surveying firm won a bid for pre-design surveys for a complex of mining infrastructure spanning tens of kilometers—but with a tight window for completion. They chose the Trimble X7 for its ease of use, durability in harsh environments and automated cloud registration, speeding up not only field acquisition time, but also reducing office processing time.

Location
PILBARA REGION,
WESTERN AUSTRALIA

The Pilbara region in the northwest of the state of Western Australia is remote, arid and rich in mineral resources. The region accounts for nearly 40 percent of global iron ore production; local residents joke that in some places you could "weld rocks together." The mining town of Tom Price is the hub of a complex of dozens of some of the world's largest iron ore mining operations. The region's mining, conveyance and processing infrastructure, some of which were first built in the 1960s, is undergoing rapid modernization and expansion. One such project is the Western Turner Syncline Phase 2, which will cost over $1 billion. The new and expanded infrastructure will enable the mine operators to sustain approved production of 30 million metric tons per year, with the first ore to be delivered during the third quarter of 2021.

Survey Group (SG) is a prominent surveying consulting firm with a portfolio of services that extends across minerals, energy, construction and civil engineering. Ben Simpson, who heads up Operations & Business Development for SG said, "There was a whole range of different areas spread over about 80 kilometers between the main processing plants, conveyors, transfer stations, pump stations and so on. Most of the scans are for the design of new infrastructure there, but they're really worried about the alignment to existing geometry and facilities." The time window for the survey, which could encompass thousands of scans, was only a few weeks and just ahead of the commencement of construction in early 2020.

ALL HANDS AND EQUIPMENT ON DECK

After consulting with HL Geospatial, their local Trimble distribution partner, SG added a second scanner, a Trimble X7, to their existing Trimble TX6 to double up on scanning for the project. "It is lightweight, self-calibrates, is easy to use and looked to meet all of our technical requirements," said Simpson. "We evaluated several options, and in that price range we believe it's the best product for our needs."
SG ran their X7 and TX6 in tandem to meet the tight

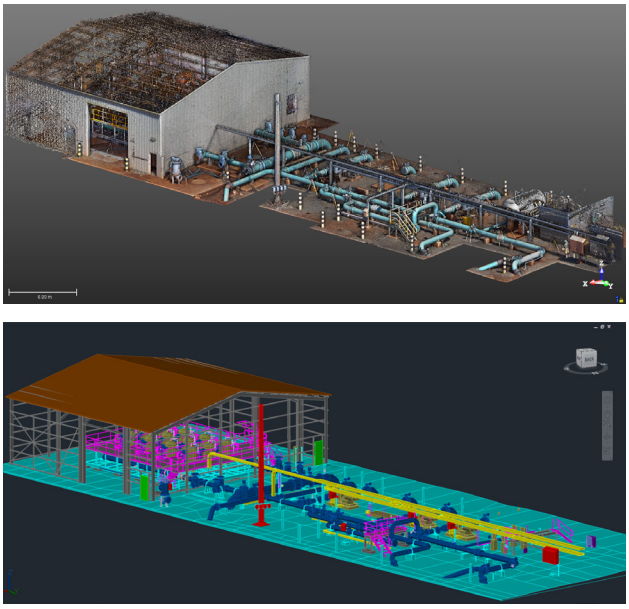
A photo (top) and scan data of a pebble crusher illustrate the detail provided by 3D scanning.

timeline. They worked 10-hour shifts; with travel that meant the scanners were running 9 hours a day and SG crews used battery swaps and lunchtime recharges to handle the long workdays. Most scans were registered conventionally, including setting targets and doing cloud registrations in Trimble RealWorks. "We registered the surveys by baseline, setting black-and-white check targets with our SX10," said Simpson. But for some structures, such as conveyors, the automated cloud registration capability of the X7 helped speed up production.

VERSATILITY AND DURABILITY

Although the Pilbara region is arid, it is subject to acute torrential downpours of rain, particularly in the season of this survey. "It was hot in March, very hot, but a huge rainstorm rolled in. We evacuated the crew, but some instruments were left out in the storm," said Simpson. "The X7 survived fine."

The Trimble X7 on site in Western Australia. The instrument's self-calibration and in-field registration significantly improved the SG crews' productivity.



After scanning, technicians used point cloud data to produce 3D models of a pump station and its equipment.

Another attribute of the X7—its self-calibration capability--was particularly interesting for SG. For many scanners and surveying instruments, calibration can mean having a key unit out of production for a lengthy period, not to mention service costs. "West Australia is very isolated, and this presents logistical problems for calibrations," said Simpson. "Sending an instrument in back for annual calibration can be costly, but it is the downtime that really becomes problematic."

On another mining project, SG used the in-the-field scan registration feature of the X7 exclusively. Jordan Booker, an SG office tech and GIS analyst said, "We did about 600 scans for one huge pebble crusher at Cape Preston. The crusher was more than 50 meters high. We had to scan all levels of the crusher and the conveyor systems, but with the in-the-field registration this only took a few days." SG's new X7 has proven to deliver the high-precision data their clients need. The instrument is a time saver and is fast becoming their go-to instrument for a wide variety of surveys.

"Scanning is a standard part of our workflow for mining and other clients. Our X7 scanner has definitely paid for itself and have made a lot of money for us."

— Ben Simpson,
Operations and Business Development Manager,
Survey Group

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