Scanning for Property Management

LE34 technicians can capture and assemble data for an entire flat in less than one hour.

How a Danish surveying consultancy uses advanced scanning technology to support affordable housing

Trimble X7 scanner provides streamlined field workflows and reduced office processing time

Solution

- Trimble® X7 Scanning System
- Trimble Perspective Software
- Trimble RealWorks® Software
A prominent Danish surveying consultancy won a bid to scan thousands of housing flats, but realized traditional scanning workflows would involve too much time per flat. They chose the Trimble X7 for its automated cloud registration, speeding up not only field acquisition time, but also nearly eliminating office processing time. The resultant 3D models have reduced tenant turnover times for the client, saving many hours and multiple visits for site evaluations and measurements.

Boligforeningen AAB is a non-profit that administers nearly 20,000 homes and flats in the Greater Copenhagen area, managing and leasing these to achieve sustainability and affordable-housing goals. AAB issued an EU tender to scan thousands of these units to streamline the process of tenant turnovers. With 3D models of units, estimating costs for unit refurbishment prior to new tenancy would be reduced.

LE34, a prominent multidisciplinary Danish surveying consultancy, sought to bid on the project but realized that conventional scanning workflows might not provide a competitive edge to win the tender. They were looking to automate the processes. LE34’s Engineering Surveying Director Anders Nygaard Møller was intrigued by a recent demonstration of a new 3D laser scanner, the Trimble X7, and worked with Trimble distributor Geoteam A/S to acquire their first X7 and get up to speed on operations. “It was fast enough—500,000 points per second—but it was the automated cloud-to-cloud registration in the field and on the tablet that stood out. Results looked to be as good as what we could do registering the point clouds in the office,” said Møller.

The client, AAB, required 3D models in Revit of each type of flat as well as the offices, shops, basements and stairwells in each housing block. With a 3D model, AAB can estimate the quantities of painting, carpet, piping, etc., that need to be replaced or repaired before the next tenant moves in. With one site visit, AAB and the departing tenant can view and measure the 3D model, calculate quantities, send these to the contractors, and determine how much of their deposit they get back. LE34’s Chartered Surveyor Richard Lindquist Capion said, “Our job is to scan the flats, merge the point clouds, perform QA & QC per the client’s specifications, and export the clouds for each flat into Autodesk ReCap for Revit model creation.” To turn the
point clouds that LE34 created from the scans into the finished 3D models in Revit, LE34 tapped the expertise of Ramboll, a leading global engineering, architecture and consultancy company.

**FLAT SIMPLE**

The LE34 team notes several key features of their new scanner that have enabled them to scan up to 10 flats per day. Møller noted that the X7 is unlike other scanners they have used, because it has the same type of compensator found in high-end total stations. “It self-levels and calibrates in a few seconds,” he said. “And it does not need to be set in for recalibration—that saves money and we do not have a scanner out of service. This was quite appealing for us.”

Henrik Kjærsgaard Christensen, a chartered surveyor at LE34 who oversaw much of the scanning to date, was impressed by the simplicity of the system. “You do 15 to 20 quick scans of each flat, shop or office, and the scans register automatically. It is easy to train someone to operate and to look for any issues. We can do this in the field without having to do the registration in the office later,” said Christensen.

Capion explains the in-field QC process: “You register scans as you import each into the tablet; this is via a WiFi connection, so it is mostly done before you begin the next scan. While it is doing the next scan, only a few minutes each, the Perspective software is doing the cloud registrations. You can see if there were any problems with the scans or registrations, and if not, there is a refinement step that does a least squares adjustment of the registrations.”
Scanning data was used in ReCap to develop 3D models for each flat.

The scanning and cloud merge for each flat is complete in about 45 minutes, including the time to move to the next unit in the same housing block. To streamline work in the office, LE34 developed scripts to open Trimble RealWorks, check the registration quality, provide a report of the results, and export data for modeling.

Success in performing 60,000+ scans with their first X7 has prompted LE34 to purchase four more, and they are beginning to test the units for other types of projects. As Møller reiterates, “Being able to register and check the cloud in the field, and eliminate much of the office work, has great potential.”

(Right) Scanning captures fixtures and furnishings in each flat. Objects can be removed to produce bare-wall models for use by property managers.

“The Trimble X7 eliminates much of the office time for processing the scans, essentially cutting our time for each site in half.”

— Anders Nygaard Møller, Engineering Surveying Director, LE34