



## Highly accurate 3D laser-scanner system verifies floor flatness

### GLS-2200 and Rithm check the flatness of concrete floors installed by robots

Nikken Lease Kogyo Co., Ltd., which was established in 1967, is the largest scaffolding rental company in Japan. The company has adopted the Topcon GLS-2200 3D laser scanner and Rithm software to measure the flatness and levelness of the concrete paved by their high-quality, automated, concrete-floor-finishing system. We visited the Musashi plant to see the results.

#### Robotic method achieves high degree of flatness and levelness

Mr. Takeshi Yamauchi, general manager of the Floor Tech Promotion Department in the Tokyo branch, explained that the company established the department to promote its floor-finishing system. "Instead of renting out equipment, we offer a packaged service from construction to inspection," he said.



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General Manager of the Floor  
Tech Promotion Department in the  
Tokyo branch*

In this approach, the concrete is placed by hand and then screeded by a robot. Hand-screeded concrete will inevitably be uneven but using a robot will consistently achieves a high degree of flatness, even over large areas. Mr. Tomoyuki Morita, manager of the Floor Tech Promotion Department in the Tokyo branch said: "The standard allowable tolerance of construction is  $\pm 7\text{mm}$  at a pitch of 3m. We aim to meet a finer tolerance of less than a  $\pm 7\text{mm}$  variation over the entire construction surface by using the robotic system." Now that the robot can achieve such a high degree of

flatness, the department realized it was important to inspect the finish with equal precision. The focus on precise measurement led the department to the GLS-2200 and Rithm analysis system.

#### Highly precise measurement and visualization of the results were the last piece of the puzzle

"Conventional measurement is done visually where the operator cuts a 3m mesh and uses a spirit level. These operators need skill and experience to measure accurately and obtain repeatable results. We want the results to be accurate, no matter who does the measurement," Mr. Morita continued. "We believe we need to show the results of the installation as data since the work is done by a robot." Mr. Yamauchi said that, with the GLS-2200 and Rithm, "we can visualize the results using a heat map with 1mm increments. This means we can offer a complete package, including the finished inspection. This is the most significant benefit of these products. The construction industry seems hesitant to use scanners for inspection because of the expense. We can reduce the cost by offering a



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packaged service and differentiate ourselves from other construction services. However, there is still a need to check the measured values with a mesh. We need to figure out how we can present the information better," he said. To face this challenge, Takahiro Saiki, from the Floor Tech Promotion Department in the Tokyo branch came to the Topcon BuildTech Building Construction Solution Center and took a series of training courses from measurement to analysis. "I did not have any problem operating the machine or software. I was able to use them immediately," he said. "We will continue to pursue the best way to display the results, such as setting thresholds in analysis and putting the mesh on the heat map."

#### We would like to contribute to the ICT development of construction sites

Finally, we asked Mr. Yamauchi about the prospects for the company. "I would like to develop this method as a rental system so that any craftsman in Japan can use it. A major issue in the construction industry is the lack of skilled workers. We have a long way to go in the use of ICT in building construction, and we would like to help the industry by introducing mechanized and robotized systems."

