

Promotion of DX —Visualising the Future of Construction Sites 10 Years from Now

Global DX Centre

In April 2026, to further strengthen collaboration between domestic and overseas operations and accelerate DX utilising AI and robotics, we reorganised the former ICT Promotion Office and newly established the Global DX Centre.
While visualising the future of construction sites 10 years from now, we will promote on-site implementation of DX through AI and robotics. With the Global DX Centre at the centre of these initiatives, domestic and overseas operations will work together on construction DX (on-site automation through labour saving and productivity improvement), knowledge DX (operational efficiency through automatic creation of site documents using AI, etc.), and management DX (development of information infrastructure and timely construction management).

Roadmap for on-site automation

3 years later (2029)
Advance implementation of automation Level 2
- Automation of grab dredging
- Land works (Automatic construction of Backhoe and dump truck)

After 5 years (2031)
Automation Level 2 construction type expansion
- Automation and autonomy of work vessels and DX utilisation
- Automatic mountain tunnel construction
- Automatic installation and transport of shield segments underground
- Automation of rebar assembly

After 10 years (2036)
Widespread adoption of automation Level 3
Widespread adoption of robotics

Level 2 : Automating tasks (human operators provide instructions for optimal manoeuvres)
Level 3 : Automating determines optimal manoeuvres
(Conditional: Human support is required)

Initiatives for Productivity Improvement

Domestic Building Construction: Improvement of Construction Productivity Utilising ICT in Renovation Work

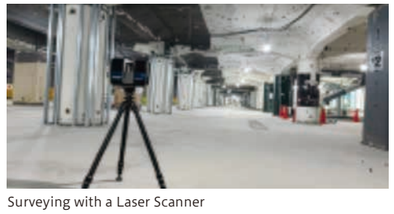
In renovation work on an old large commercial facility that has undergone multiple extensions and reconstructions, we resolved issues such as a lack of accurate drawings using point-cloud surveying with a laser scanner, resulting in a more sophisticated understanding of the current building shape and labour savings.

Issues

- Built several decades ago, with only handwritten drawings remaining
- Due to more than 10 changes of use and more than 20 extensions and reconstructions, the drawings did not reflect the current conditions
- Complex structural shape that is not level and square
- Vast work area

Effects

- Accurately captured complex structural shapes with lasers from the floor surface without installing scaffolding, and reduced surveying errors from manual work
- Eliminated work at heights involving climbing scaffolding, and improved safety during ceiling surveying, etc.
- Reduced surveying costs (reduced to 1/8 compared with conventional manual surveying)


Surveying with a Laser Scanner


3D Scan Results

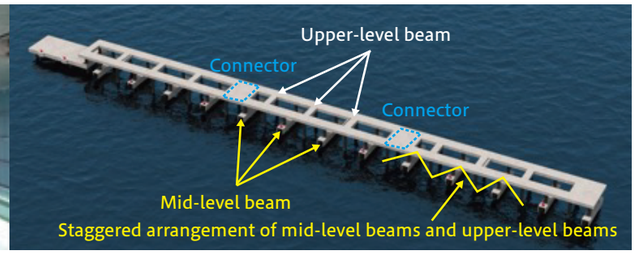
Domestic Civil Engineering: One-time Erection of PCa (Precast) Slabs of the Largest Scale in Japan

In the new pier construction project of Shuhou Mining Co., Ltd., we thoroughly integrated and enlarged pier PCa (precast) members while reducing the number of units to the utmost limit, thereby significantly improving productivity.

Integration of PCa Members

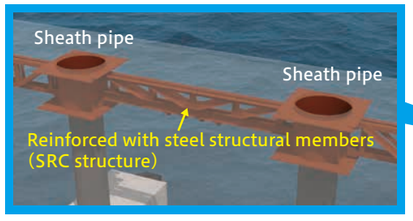
- Integrated the main pier and berthing dolphin, which had been independent structures in the existing pier, and changed them to a rational structure
- Newly installed mid-level beam PCa members and consolidated multiple functions such as the base for installing fenders, support of reaction force from the hull, and connection with the rear-row piles
- Adopted a staggered arrangement to eliminate mid-level beams in pile rows without fenders, resulting in a significant reduction in the number of PCa units

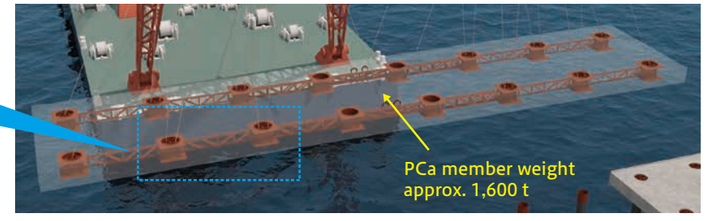




Enlargement of Members through SRC (Steel-renforced Concrete) Structure

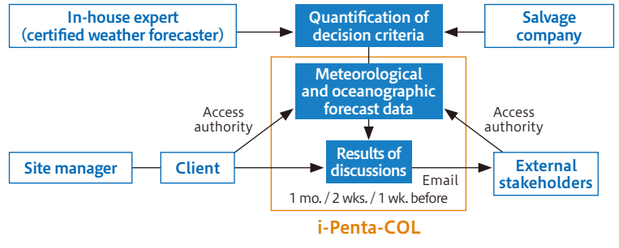
- Placed reinforcing steel inside the PCa to eliminate the risk of deformation and cracking during lifting by a floating crane





Swift Decision-making through an In-house Developed System

- Developed a meteorological and oceanographic forecast system that predicts at an early stage and with high accuracy the four consecutive calm days required for one-time erection of long PCa members
- Shared forecast data and decision criteria in real time with the client and external stakeholders through the Penta-Ocean Construction Data Gathering and Sharing System (i-Penta-COL)





Shuhou Mine Pier Extension Work


PCa slabs of the largest scale in Japan
(Length 53.8–58.4 m × width 11.5 m)