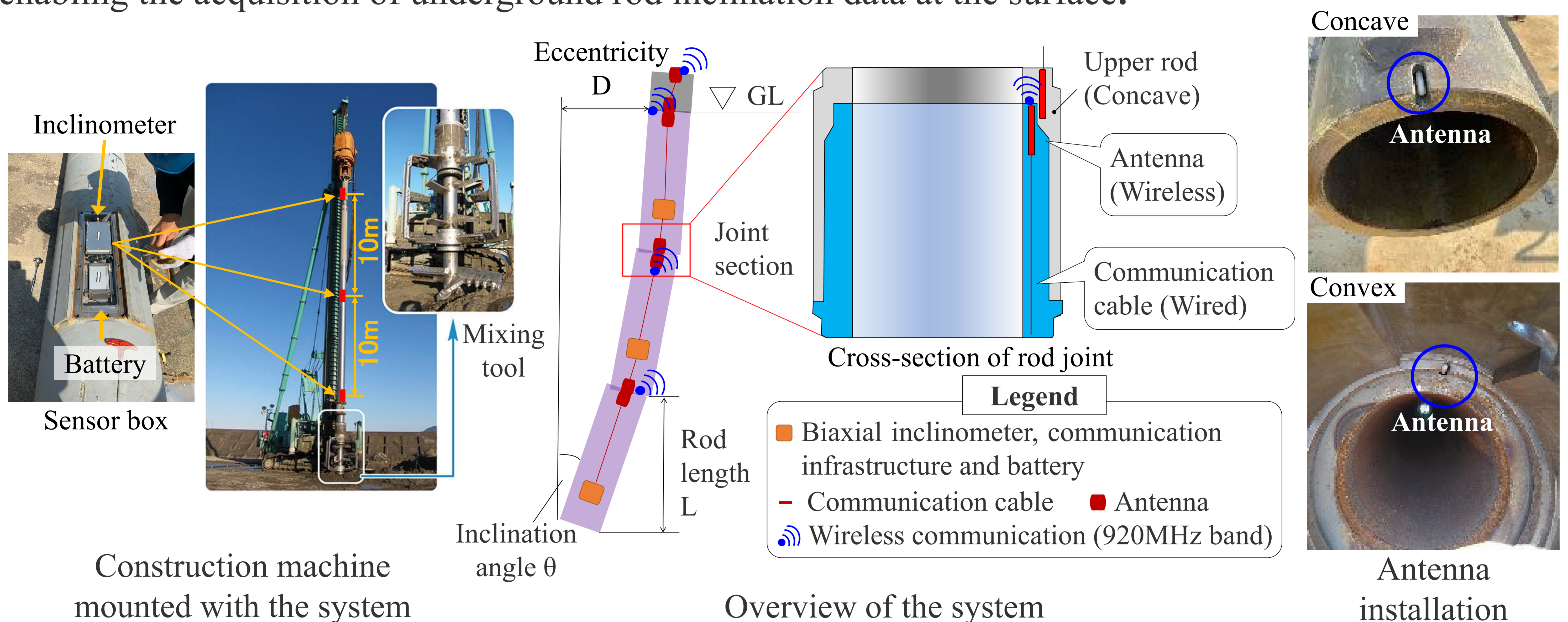


# Deep Depth Tip Position Measurement System

Advanced visualization technology for deep mixing method

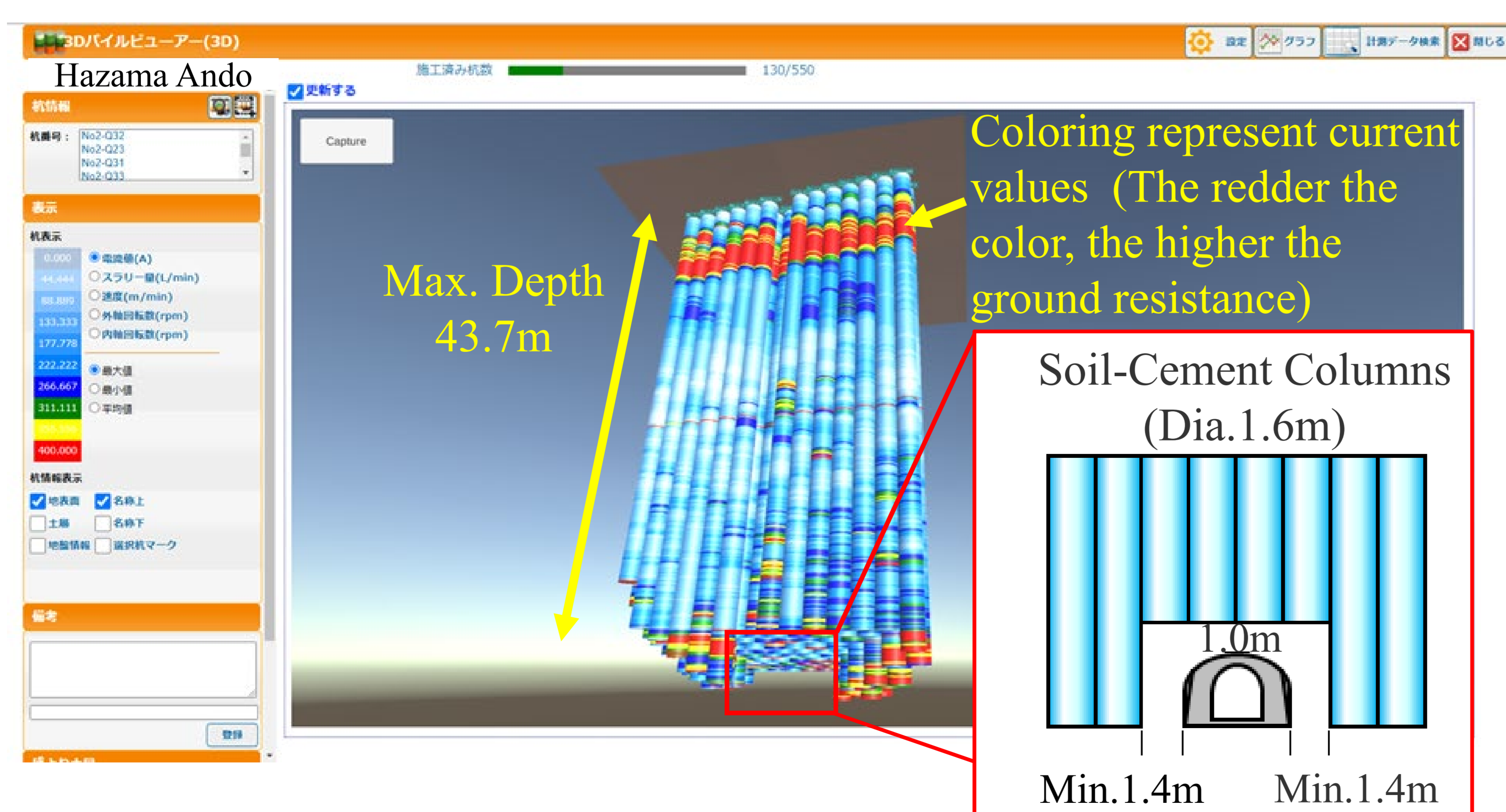
## Overview of Technology

Targeting the Deep Cement Stabilization method (DCS method), this system provides real-time and precise tracking of the rod tip positions in the ground. It measures the inclination of each rod using a biaxial inclinometer attached to the casing rod, combined with the rod length. The rod joint adopts wireless communication, simplifying the process during rod addition. By applying "multi-hop communication technology" with data relay functions in the measuring devices on each rod, enabling the acquisition of underground rod inclination data at the surface.

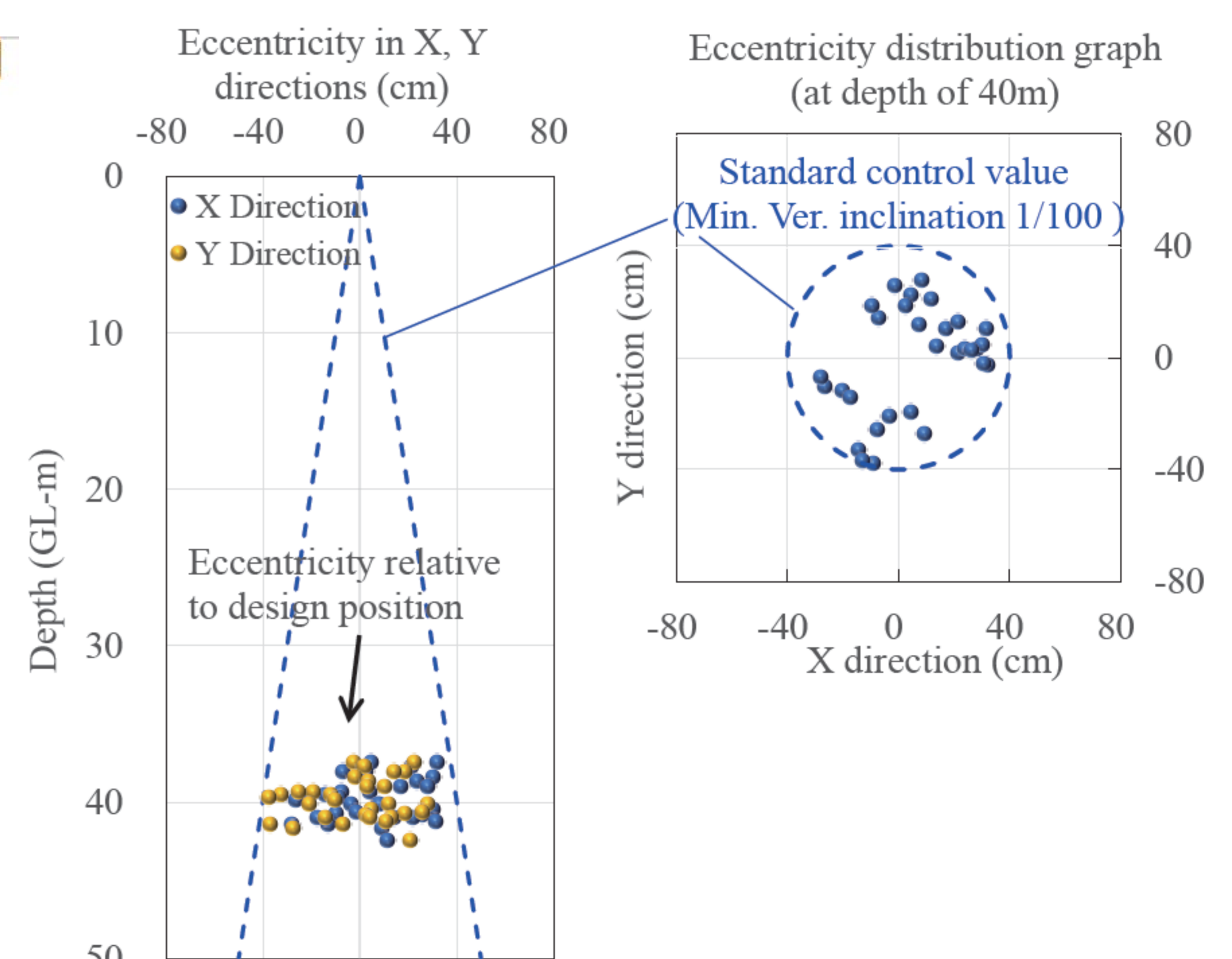


## Effect of Technology

The system was applied to a seismic reinforcement ground improvement project. With a maximum depth of 43.7 meters, the construction required consideration for an existing waterway tunnel at the bottom of soil-cement columns. By integrating our developed construction information visualization system "3D Pile Viewer" with this system, we directly monitored the tip position of the soil-cement columns in real-time, ensuring construction without impacting existing structures.



3D Visualization by 3D Pile Viewer  
(When construction near existing waterway tunnel)



Measurement results surrounding existing waterway tunnel