Mission and Direction of the Technology Research Institute

The mission of the Technology Research Institute is to solve technical issues at the request of construction sites and to provide Nishimatsu Construction with support from a technical perspective by developing pioneering technologies. In order to achieve this mission, the institute pursues research and development in four areas: civil engineering technology, architectural technology, environmental technology, and advanced technology. For example, by steadily accumulating results such as improvements in technical capabilities for mountain tunnels and shield tunnels in civil engineering and using precasting to boost operational efficiency in building construction, and by making productivity enhancements from many different angles, the institute contributes to the construction business. Going forward, the institute will continue to proactively adopt cutting-edge technologies, deliver new values, and solidify the technological foundation of the Nishimatsu Construction brand.

Message from the Director

Katsuya Iwanaga
Director of Technology Research Institute

The Technology Research Institute has diverse roles, but one of our main responsibilities is assessing and verifying social needs and cutting-edge technologies in order to pioneer new approaches. To that end, I continually encourage researchers to take an interest in a variety of fields and digest relevant information. At present, we are collaborating with each of Nishimatsu Construction’s divisions, and proactively promoting communication in ways such as participating in academic conferences, external committees and industry-academia-government collaboration.

As we continue these types of initiatives, we will strive to acquire and accumulate valuable technological expertise and skills that will contribute to creating new businesses.

Initiatives at the Technology Research Institute

Mock-up test of precast concrete tunnel-lining segments at the Technology Research Institute

Integration of construction data management and advancement of labor savings and efficiency gains

At earthwork sites using ICT, there have been advancements in mechanization and systemization to achieve automation and labor savings. However, the burden of issues such as the growing volume of data that must be handled has increased. To improve this situation, we have built a platform for an ICT construction system that uses centralized cloud-based management of construction data and are working to move data stored and managed at individual sites to the cloud. This will enable us to use an app or other method to gather piecemeal data that was previously spread out across many sites and store it on the cloud so that it can be used by anyone, anywhere, anytime. The system will ease the workload of construction site workers and site foremen, and in the future we expect to use it to manage the traceability of materials and waste products.

Development of an ICT Earthwork Management System

Remote Control and Automated Construction of Mountain Tunnels and Shield Tunnels

Working to enhance safety and productivity through labor-saving and unmanned approaches to construction

By researching the use of ICT and AI in the construction of mountain tunnels and shield tunnels, the Technology Research Institute aims to improve safety and productivity through advances in unmanned and automated construction. The first steps are coming in fiscal 2020. For mountain tunnel construction, we are aiming for labor-saving or unmanned operations near the tunnel-cutting face, in addition to significantly improving related working environments. For shield tunnels, we are aiming to automatically control boring direction and reduce or minimize the number of workers on site. By fiscal 2027, we are also aiming to increase the degree to which each construction site has progressed in implementing unmanned operations and automated technologies, in addition to furthering the centralization of project management and reducing personnel by 30% through efficiency gains. Furthermore, in order to ensure that our technologies are passed on, we are actively sharing knowledge in ways such as formalizing knowledge that comes from personal experience.

Shield Tunnel Segment Management System

Working to enhance safety and productivity through labor-saving and unmanned approaches to construction

By researching the use of ICT and AI in the construction of mountain tunnels and shield tunnels, the Technology Research Institute aims to improve safety and productivity through advances in unmanned and automated construction. The first steps are coming in fiscal 2020. For mountain tunnel construction, we are aiming for labor-saving or unmanned operations near the tunnel-cutting face, in addition to significantly improving related working environments. For shield tunnels, we are aiming to automatically control boring direction and reduce or minimize the number of workers on site. By fiscal 2027, we are also aiming to increase the degree to which each construction site has progressed in implementing unmanned operations and automated technologies, in addition to furthering the centralization of project management and reducing personnel by 30% through efficiency gains. Furthermore, in order to ensure that our technologies are passed on, we are actively sharing knowledge in ways such as formalizing knowledge that comes from personal experience.

Development of an ICT Earthwork Management System

At earthwork sites using ICT, there have been advancements in mechanization and systemization to achieve automation and labor savings. However, the burden of issues such as the growing volume of data that must be handled has increased. To improve this situation, we have built a platform for an ICT construction system that uses centralized cloud-based management of construction data and are working to move data stored and managed at individual sites to the cloud. This will enable us to use an app or other method to gather piecemeal data that was previously spread out across many sites and store it on the cloud so that it can be used by anyone, anywhere, anytime. The system will ease the workload of construction site workers and site foremen, and in the future we expect to use it to manage the traceability of materials and waste products.

Integration of construction data management and advancement of labor savings and efficiency gains

At earthwork sites using ICT, there have been advancements in mechanization and systemization to achieve automation and labor savings. However, the burden of issues such as the growing volume of data that must be handled has increased. To improve this situation, we have built a platform for an ICT construction system that uses centralized cloud-based management of construction data and are working to move data stored and managed at individual sites to the cloud. This will enable us to use an app or other method to gather piecemeal data that was previously spread out across many sites and store it on the cloud so that it can be used by anyone, anywhere, anytime. The system will ease the workload of construction site workers and site foremen, and in the future we expect to use it to manage the traceability of materials and waste products.