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## **Launch of Digital Systems for Enhancement of Engineering, Procurement and Construction (EPC) Execution**

Chiyoda Corporation ("Chiyoda," TSE: 6366, ISIN: JP3528600004) is pleased to announce that Chiyoda has developed digital systems for material and field labor controls to maximize the efficiency of construction sites. Chiyoda introduced these systems into the hydrogen plant in Negara Brunei Darussalam, currently under construction. Chiyoda also plans to implement both digital systems into future internal and external projects.

### **Background**

At a construction site of a typical international mega project, tens of thousands of materials are utilized, and thousands of workers are mobilized every day. Workers manage materials using barcodes. The workers' locations are monitored by an IC chip, which communicates with a fixed antenna and/or Wi-Fi gateway antenna. Since material and field labor controls impact on work efficiency and precise schedule management, Chiyoda has launched the development of digital systems, which enhance engineering, procurement and construction (EPC) execution.

### **System Details of Material Controls**

Tens of thousands of materials are manually checked by workers using barcodes in the laydown areas. This ordinarily requires a huge amount of workforce to locate materials and may cause decreased work productivity at the construction site. In order to solve this problem, Chiyoda and SkymatiX, Inc. (Head Office: Chuo-ku, Tokyo, President: Zentarō Watanabe, "SkymatiX" \*1) jointly developed a system to display the locations of materials on an aerial image of the laydown area by utilizing an RFID (Radio Frequency Identification) system and a drone. This system is expected to increase the productivity at the construction site by reducing time spent searching for materials, workers' idle time, and material remanufacturing costs.

\*1 SkymatiX is a startup company that provides remote sensing services for drone business.

### **System Details of Field Labor and Safety Controls**

In order to monitor the locations of workers, GPS (Global Positioning System) or IC chips, carried by the workers communicate with fixed antennas and/or Wi-Fi gateway antennas. Challenges with this method include the need to deploy many fixed antennas to ensure constant coverage on a construction site that changes daily, an inability to operate until the full system has been installed, and the high cost of antennas and equipment. To address these issues, Chiyoda and NTT PC Communications Incorporated (Head Office: Minato-ku, Tokyo, President: Motoo Tanaka, "NTTPC" \*2) jointly developed a system which enables the monitoring of workers' locations. In this system, supervisors' smartphones function as portable antennas, which allows for ideal placement of antennas within an ever changing construction site. Since installation of fixed antennas is no longer required, this system makes it possible to greatly reduce implementation costs. The use of this system is expected to improve both safety management and scheduling by visualizing the workload of each worker and the configuration for each work area, detecting workers without a work permit, and locating missing workers during a site incident.

\*2 NTTPC is a service engineering company which covers the network, data center and cloud businesses.

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