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JGC Holdings Corporation
Yokogawa Electric Corporation

Conducting a Demonstration Experiment of a Token System to Visualize Behavioral Characteristics of Plant Construction Workers

~Using blockchain and behavioral economics to create a highly motivated construction site

Yokohama, Japan – JGC Holdings Corporation (Representative Director, Chairman and Chief Executive Officer: Masayuki Sato) hereinafter "JGC HD " and Yokogawa Electric Corporation (President and CEO: Hitoshi Nara), hereinafter "Yokogawa Electric" announces that they have conducted a demonstration experiment to visualize the behavioral characteristics of workers at construction sites in Japan where JGC Japan Corporation (hereinafter "JJPN"), a group company of JGC HD which is carrying out construction work and improved their motivation by using a token system based on blockchain and behavioral economics.

At large-scale plant construction sites, a large number of workers from various occupations, such as civil engineering, architecture, electricity, and instrumentation, are dispatched from multiple companies to work on construction projects, and it is a challenge to share the workers' sense of purpose and promote voluntary actions to improve work efficiency and construction safety.

From February to July 2021, JGC HD and Yokogawa Electric introduced a trial system to visualize the behavior of on-site workers and promote positive behavior in a biomass power plant construction project being carried out by JJPN in Ishinomaki City, Miyagi Prefecture.

In implementing the system, the companies defined three desirable behavioral characteristics: "teamwork," "emphasis on safety," and "cheerful behavior". The companies built a system in which supervisors gave tokens*1 to field workers who demonstrated these behavioral characteristics, and visualized the route and frequency of communication between field workers and supervisors. The design of the system was based on behavioral economics*2 and incorporated psychological effects such as positive encouragement and commendation from the supervisor. In addition, blockchain

technology was used to record the granting of tokens to prevent tampering and make it possible to track the history of granting them to each worker.

Since the beginning of 2020, the spread of the new coronavirus infection in Japan has restricted the activities of the "Iifureai Campaign "3 that JJPN has been conducting at construction sites in Japan. The token system was highly evaluated at the sites where it was introduced, as it promoted communication between site workers and supervisors as well as between site workers while maintaining a certain distance. In addition, according to the results of a questionnaire survey conducted after the experiment, about 60% of the field workers answered that the application had led them to voluntarily take positive actions, and about 70% of the supervisors answered that it had brought about positive changes in the construction site. In the interviews at the construction sites, some workers said that both psychological and financial rewards motivated them to work harder, and that the increased communication between supervisors and workers reduced the psychological distance between them and facilitated the communication of work orders.

After the completion of this experiment, the two companies will continue to operate this system at the construction site to verify its effectiveness, and are also considering expanding the system to other JGC Group construction sites in Japan and overseas, as well as maintenance work sites. In addition to the development of this system the two companies will promote open innovation with other companies, aiming to put into practical use solutions to create a rewarding and productive work environment, such as the introduction of more advanced human and objective measurement technologies and linkage with external systems.

JGC HD is currently promoting the IT Grand Plan 2030 and strengthening its EPC execution capabilities through the use of digital technology, with the aim of realizing the key strategy of its medium-term management plan, "further deepening the EPC business". In addition, the company will continue to anticipate future trends in digital technology and aim to transform our EPC business through upfront investment in such advanced technology.

Yokogawa Electric has set the realization of well-being as one of its "Three goals" for sustainability. By utilizing digital technology and co-creating value with the company customers and partners, the company will contribute to the improvement of people's safety and health, and to the realization of a work environment where people can fully demonstrate their abilities.



Supervisors give tokens to field workers for positive behavior.

- 1: This refers to the value used in place of conventional money, and in this verification experiment, it refers to a unique type of point issued using blockchain technology.
- 2: An academic system of analysis that focuses on the irrational behavior of humans that is actually observed, rather than the rational individuals that conventional economics assumes. It deals with methodologies for considering barriers and facilitators of various behaviors, using findings from psychology and neuroscience. In this empirical experiment, we focused on psychological phenomena such as hyperbolic discounting, cognitive saving, and framing effects, among others.
- 3: A generic term for a range of activities designed to create a safe and secure work environment by building strong human relationships among workers at the work site and JGC HD Group employees, based on the slogan "All people work with health and peace of mind and return safely to their families".

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