

# NEC, Intel Create Smart Recycling Plant for Ishizaka Inc.

**5G-based AI system from NEC and Intel helps Ishizaka Inc., a leading “Zero Waste Design”-based solid waste management firm, remotely control heavy equipment and visualization, resulting in improved employee safety in recycling plant**

## Challenges and Why 5G Matters

Ishizaka Inc., located in Saitama, a prefecture near Tokyo, is a solid waste management company that uses extensive sorting procedures to recycle 98% of the waste it collects. This fulfills its vision of “Zero Waste Design.” The company turned to Intel and NEC, an Intel® Network Builder member, to build a 5G-based artificial intelligence (AI) system to automate its operations and reduce risk of physical harm to employees.

At the company’s main recycling plant, heavy machinery and workers often need to work together in close proximity, which exposes the workers to a dirty and hazardous working environment. This high-risk working environment is a big contributor to ongoing labor shortages in the industry, as fewer workers are willing to work under such conditions.

Thus, reducing the risk of contact accidents while improving the working environment using technological innovation has always been Ishizaka Inc.’s utmost priority. It turned to Intel and NEC for an AI-based automation system using a resilient, low-latency 5G network that could deliver high performance throughout the recycling plant.

In this collaboration, NEC and Intel created a local 5G (similar to a private 5G) network that uses cameras to visualize and remotely control the operating status of heavy machinery and the amount of waste disposed of in real-time.

By combining 5G and AI, the system was also able to improve work efficiency and provide a better assessment of high-risk situations. In addition, through remote control of heavy machinery workers can carry out their tasks safely and securely away from dusty sites, providing a better work environment, improving efficiency and labor savings.

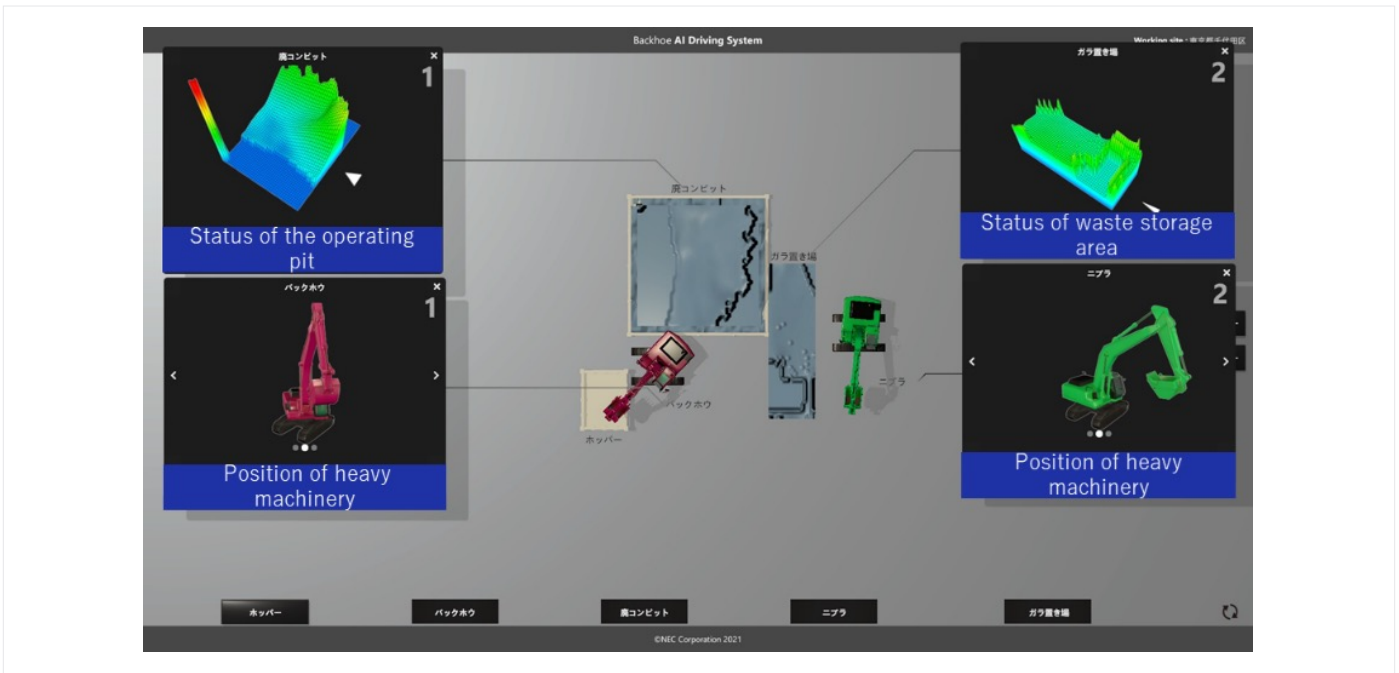
## Overview – How the 5G-based system works

Ishizaka Inc.’s first local 5G network trial used the 4.8GHz RF band and was developed to accomplish the following:

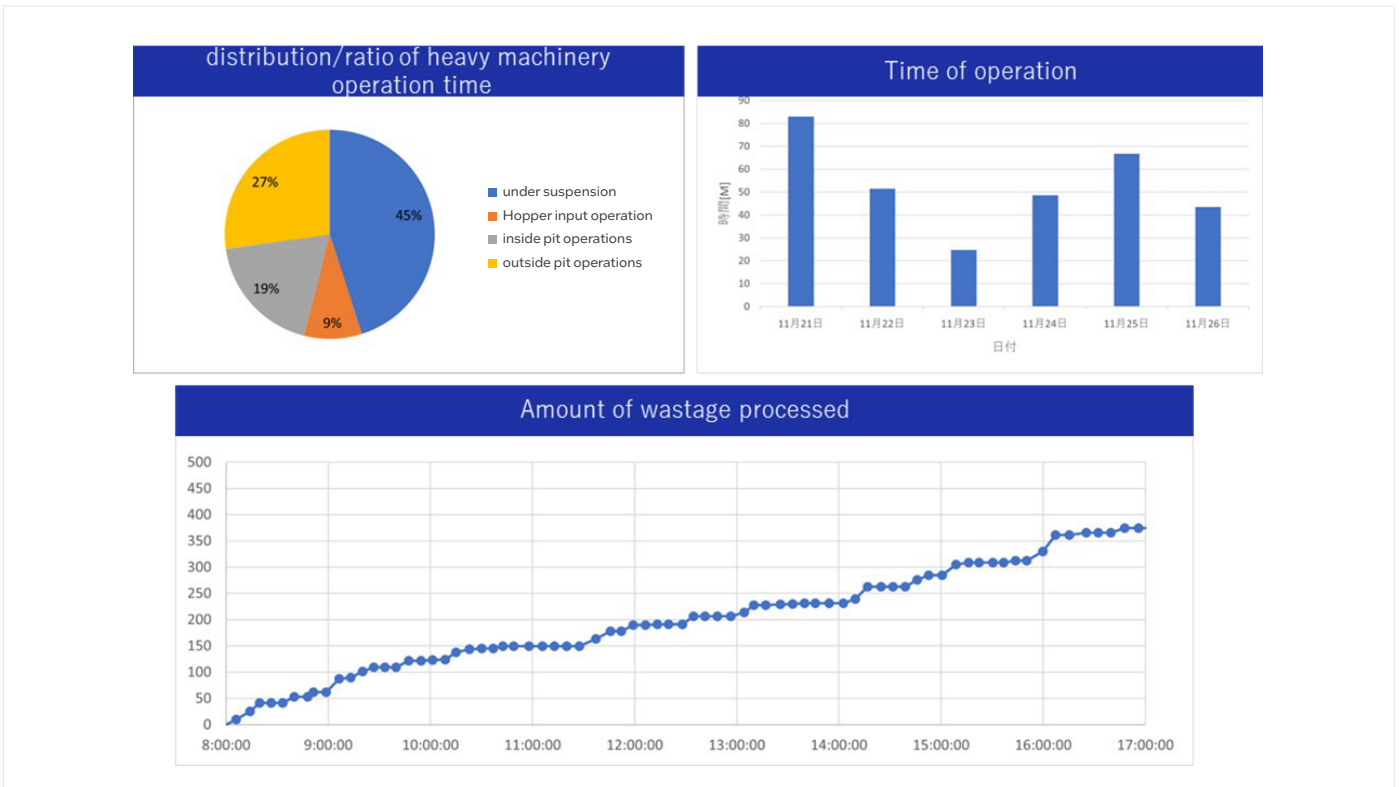
### 1. Visualization of work status in the plant

The local 5G network used virtualized radio area network (vRAN) software running on a server powered by the latest Intel® Xeon® Scalable processors.

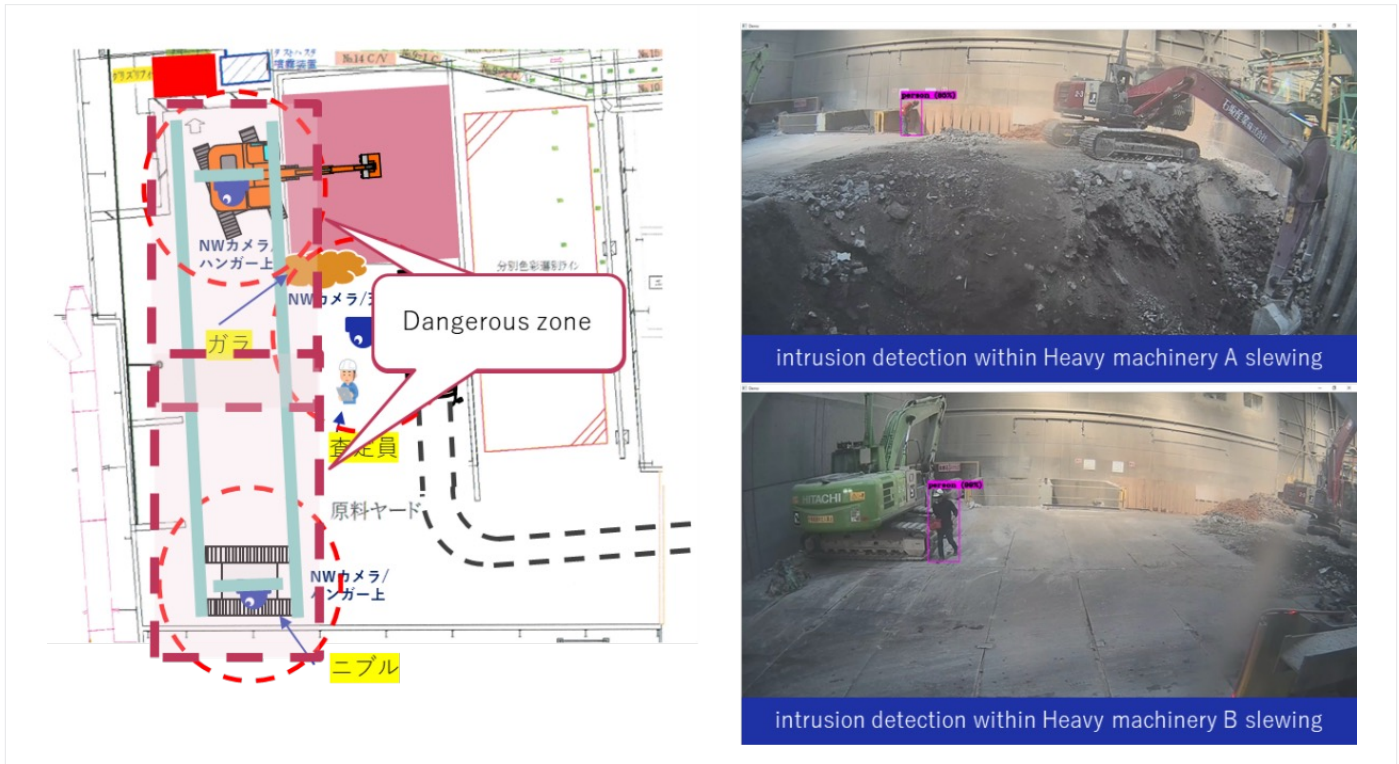
Real-time data collection from cameras and sensors (see Figure 1) installed on heavy machinery is processed by industrial PCs equipped with Intel® Core™ processors installed at the work area. Intel and NEC conducted several trials with cameras in different locations (see Figure 2) to get the best views of the on-site work, quantify work data, and ensure work safety.



**Figure 1.** Visualization of the movement of heavy machinery and the status of the pit are collected in real time and displayed on a remote terminal allowing workers to remotely manage the work at the site.



**Figure 2.** By separating and quantifying the work status using sensors installed in heavy machinery and pits, the ratio of main and indirect operations and the process from unloading of delivered waste to recycling. In addition to the flow, we also quantified the time required for primary treatment of waste brought in from the utilization rate of heavy machinery.



**Figure 3.** Visualization of the high-risk environment to minimize accidents in the plant. The operation of the heavy machine is constantly being monitored with a camera.

## 2. Remote control of heavy equipment

There are multiple cameras (see Figure 4), including those mounted on heavy machinery in the plant. Processing of images and image analytics was done on Intel Core processor-equipped industrial PCs using NEC's **Adaptive Remote-Control System** for network prediction and control.

Servers powered by Intel Xeon Scalable processors are located in the mixed waste treatment plant and provide a remote-controlled environment for heavy equipment utilizing the 5G network.



**Figure 4.** Trained worker remotely controls backhoe over 5G to avoid close contact with hazardous waste.

Information is also collected on the local 5G radio wave environment (see Figure 5) in the plant, where dust resides and equipment, such as conveyor belts, are installed in a complex manner. By studying the wireless situation in this environment, knowledge was gained to further expand the usage area while realizing labor-saving efficiency with new applications.



**Figure 5.** Location of local 5G equipment in the plant.

## Summary

Through this partnership between Intel and NEC, Ishizaka Inc. has a new adaptive remote control system that provides visualization and remote control of heavy equipment and work to help to improve the efficiency of on-site operations and increase worker safety. As a waste treatment and recycle enterprise on a mission to reduce as much of the waste it collects as possible, Ishizaka Inc. believes the technology innovation enabled through 5G will continue to create an efficient, safe, and secure workplace.

## Learn More

[Ishizaka Inc.](#)

[NEC Home Page](#)

[NEC High-precision real-time control of remote robots](#)

[Intel Network Builders](#)

[Intel Xeon Scalable processors](#)

[Intel Core processors](#)



### Notices & Disclaimers


Intel technologies may require enabled hardware, software or service activation.

No product or component can be absolutely secure.

Your costs and results may vary.

© Intel Corporation. Intel, the Intel logo, and other Intel marks are trademarks of Intel Corporation or its subsidiaries. Other names and brands may be claimed as the property of others.

0923/BB/DJA/HO9/PDF

 Please Recycle

356408-001EN