Development of New Technologies

Needs relating to good eating habits have been growing and diversifying among customers and within society at large. In the drive to further strengthen its core competencies and proactively resolve social issues, Nichirei will leverage its production technologies and logistics expertise, while drawing on new developments including those in AI, IoT, autonomous driving, and robotics.

Launch of Single-serving Noodles Using Original Technology That Keeps Noodles Cold When Prepared in a Microwave

https://www.nichireifoods.co.jp/news/2022/info_id13305 (Japanese only)

In March 2022, Nichirei Foods launched *Hiyashi-Chuka* (chilled Chinese noodles), a household-use frozen food product it developed as the first in a series of single-serving noodle products that can be prepared in a microwave. A microwave oven heats food by causing the water molecules in food to vibrate. The bonded hydrogen molecules in ice are less affected by microwaves, so they are harder to melt, while the molecules of the frozen noodles are further apart, making them easier to warm. We put these different characteristics of each food product to use in developing an original technology* for producing chilled noodles that remain cold even after they have been prepared in a microwave. This product took about five years to bring to market from the initial concept, with about three of those years for commercialization. With our many years of research into frozen foods, we take pride in the concept behind this unique product, which is the first in the industry to utilize the characteristics of ice in a microwave.

*Patent pending

Three Features

1. Patented technology for maintaining coldness of noodles once prepared
2. Frozen noodles that retain a chewy texture
3. Two-level tray that attractively displays the ingredients

In fall 2022, we will launch the second product in this series, *Gokubuto-Tsukemen* (chilled thick Chinese noodles served with a dipping sauce). This product also applies our original technology that uses ice to keep the noodles cold while enabling the broth to warm. It features homemade-style extra-thick noodles made with whole wheat flour and a rich broth with a seafood and pork flavor.

The development of these products was driven by the move toward lifestyles that rely on cooking and eating outside the home, as well as an increase in single-person households that has in turn increased demand for personal-use, single-serving meals containing a staple food and a main dish, as well as snacks that can be eaten with one hand. In response to this situation, Nichirei Foods' Yamagata Plant in Tendo City, Yamagata Prefecture invested approximately ¥4 billion in a production line for personal-use, single-serving frozen foods. It began operating in February 2022. This will help us meet personal-use product demand, which is expected to grow, and capture stay-at-home consumption.

Expiration Date Reader AI Solution for Tablet Inspections*

Following field tests, in FY2021 Nichirei Logistics Group began introducing an AI solution for automatically reading expiration dates from image data at 50 bases nationwide. As part of its efforts to fully digitalize warehouse operations, the Group has adopted tablet devices and is using AI solutions to enhance their functionality. Previously input manually, expiration date input can now be completed hands-free using AI, enabling highly accurate readings of 93% or higher and fast processing speeds of about two seconds. This has further improved quality control as it enables us to capture expiration date images and to then convert those images into data records, simplifying overall operations so that they can be performed by anyone, thus facilitating stress-free work.

* Automated expiration date reader AI solution: Preprocessing technologies that use AI-OCR (Optical Character Recognition/Reader) and image recognition to identify the characters of the expiration date from the image and cross-reference the recognized expiration date with information in the cloud, thereby achieving higher reading accuracy.

Autonomous Driving Forklifts

In January 2018, Nichirei Logistics Group began conducting field tests of autonomous driving forklifts at refrigerated warehouses. In 2021, they were introduced at the Daikoku Distribution Center of Group company Kyokurei. A distinctive characteristic of autonomous driving forklifts is that they can be given instructions using a tablet device, thereby making safe operation possible for employees who might otherwise lack the physical strength or operating skills to manually operate a forklift. Going forward, we will steadily increase the number of facilities with autonomous driving forklifts and tie that measure into reducing working hours, economizing on manpower for on-site work, and improving occupational health and safety at our warehouses.

An autonomous driving forklift featured in OriOri, an in-house Group publication

Automated Guided Vehicles (AGVs)

In 2021, Nichirei Logistics Group introduced automated guided vehicles (AGVs) at the Sendai Distribution Center of Nichirei Logistics Tohoku. AGVs are used for transporting pallets supplied by Phoxter Corporation (Headquarters: Toyonaka City, Osaka; President & CEO: Junichi Sonoda), which develops image processing technology and AGVs. AGVs for transporting roll pallets have also been introduced at five transfer centers.

The Group is focused on process innovation to address labor shortages, reduce the load on workers, and revolutionize on-site work so that anyone can do it. We will continue to work on building an optimal labor environment and system leveraging the characteristics of both humans and machines.

AGV for transporting pallets

AGV for transporting roll pallets

Start of Proof-of-Concept for Introduction of New Robot

Nichirei Logistics Group Inc. collaborated with Telexistence Inc. to conduct a demonstration test in which Telexistence's remote-controlled robot loaded mixed cargo on basket carts in the refrigerated area of a logistics facility.

The test confirmed the feasibility of creating a remote, stress-free work environment in logistics centers in which an operator in an office remotely controls a robot in a refrigerated area. The work involved the operator visually confirming each piece of cargo and its place of loading, them moving the robot and its arm by remote control.

We will continue to proactively introduce cutting-edge technology and digitalize operations in working to achieve sustainable logistics that support the supply chain.

Robot loading cargo on a basket cart

Robot operator using goggles to check the cockpit view for remote control operation