SATO Powered On Site

Connected & Flexible with SATO Solutions

Manufacturer tracks metal pallet cages with RFID

Goods are kept moving, leading to improved production planning.

Case study NTN Corporation

■ Business:
Manufacture and sale of bearings, driveshafts and precision equipment
■ Employees:
5,948 (As of March 31, 2021)

Company website

SATO provided a solution for tracking the quantity and location of returnable transport items (RTIs) such as pallet cages and containers that are used to carry and transport finished products. This enabled smooth production planning and warehouse dispatch, helping NTN Corporation cut related costs and adapt its worksite to rapidly changing market needs.

Solution

RFID asset management system

Android handheld terminal
BHT-1800

RFID reader/writer
SP1

FR4 on-metal RFID tag
(attachable to pallet cage as pictured)

Asset management

- RTIs are used to move goods from the plant to warehouse then to the customer. After goods delivery, they are sent back to the warehouse for cleaning before being returned to the plant.
- For tracking, print RFID tags with the same ID and attach one each to the two sides of every returnable.
- Scan tagged RTIs to capture and manage their data centrally in a back-end system.

Inbound & outbound processing

- Shipping out RTIs with goods: Scan to record "checkout" from plant and "check-in" at warehouse.
- Receiving returned RTIs: Scan to record "checkout" from warehouse and "check-in" at plant.

Benefits of using RFID

- ☑ Save time with bulk scanning.
- ☑ Manage RTI quantity and location accurately.
- ☑ Prevent manual errors.
- ☑ Support efficient and flexible production.

Before

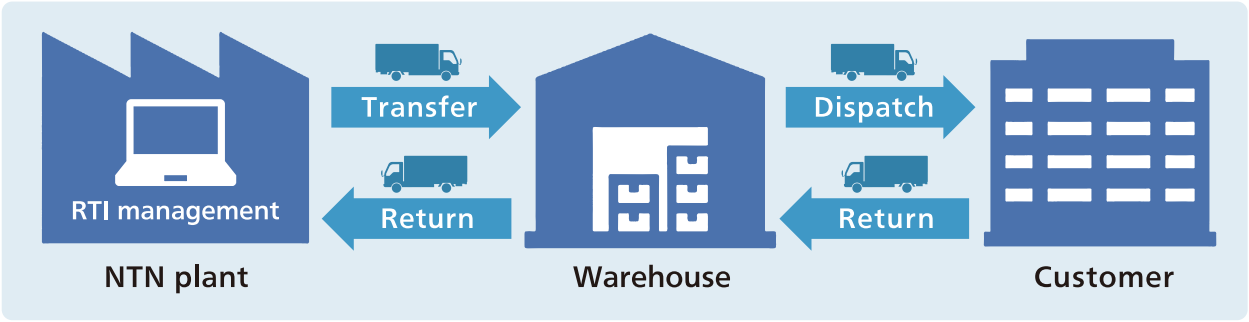
Lacked visibility of when, where and how RTIs were utilized, resulting in issues as follows.

① Unplanned changes to production plans **(5 times/year)**.
② **Irregular tasks** needed to look for RTI,
reload goods or update records when switching RTI.
③ Costs spent on additional RTIs and express transports **(¥3 million/year)**.

After

Use RFID to keep track of RTI quantity and location, with the following improvements.

① **Zero** disruptions to production and supply schedules.
② **Smooth logistics flow**, involving much less irregular work.
③ **Zero** reinvestments and express delivery costs.



●What the customer says

A growing trend toward high-mix, low-volume production

Founded in 1918, NTN Corporation is a leading Japanese manufacturer that makes and sells bearings, driveshafts (constant-velocity joints) and precision equipment. The company started expanding its operations postwar to outside Japan, and has since grown its market share to rank first for hub bearings and second place for driveshaft bearings worldwide. With the global automotive industry shifting increasingly from mass production to high-mix, low-volume production, NTN's factory for automotive parts — Iwata Works C.V. Joint Plant — needed to react quickly and flexibly to such diversifying market demand which can fluctuate unpredictably. Pallet cages and containers for shipping out products must be available when the plant needed them, but it was difficult to identify the whereabouts of the RTIs as they move from site to site. Being unable to track RTIs and manage them centrally was impacting the plant's production plans and supply chains negatively.

Naoki Kawashima, Subsection Chief of Production Control Section at the NTN plant, speaks about how they came to implement SATO's RFID solution to address this problem.

Our challenge to keep manufactured goods moving

Answering to changing customer needs, accurately and efficiently

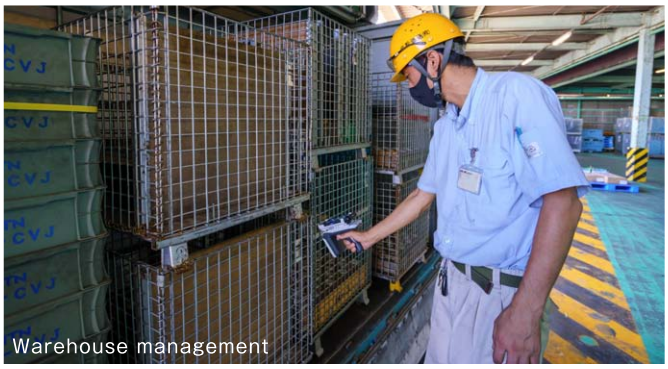
To meet rising market demand for high-mix, low-volume production, we needed to run our plant in a timely manner, planning production operations meticulously to shorten lead time for shipping out. Even as we move away from mass production, it was important that we continue to live up to our factory motto to make and deliver orders to customers on time by ensuring smooth and efficient production.

The link between RTIs and production delays

At our plant, we make it a principle to get RTIs ready before starting production because our products include specialized, highly functional precision equipment that require pallet cages and containers customized to their specifications. Although we use 42 types of RTIs, they are costly and bulky so we keep them as lean as possible and operate on a minimum fleet size of approximately 5,300 units. While tracking each RTI was essential to avoiding outbound downtime, our plant workers often found themselves looking for the container they need or updating records to use a different container (in place of the original one which was not available) when fulfilling huge orders that were not initially planned for. Sometimes, we even ended up changing production plans to wait for RTIs. It was a problem dealing with such irregular work and additional costs.


Truck loading


Pallet cages (metal/wire mesh)


Warehouse management

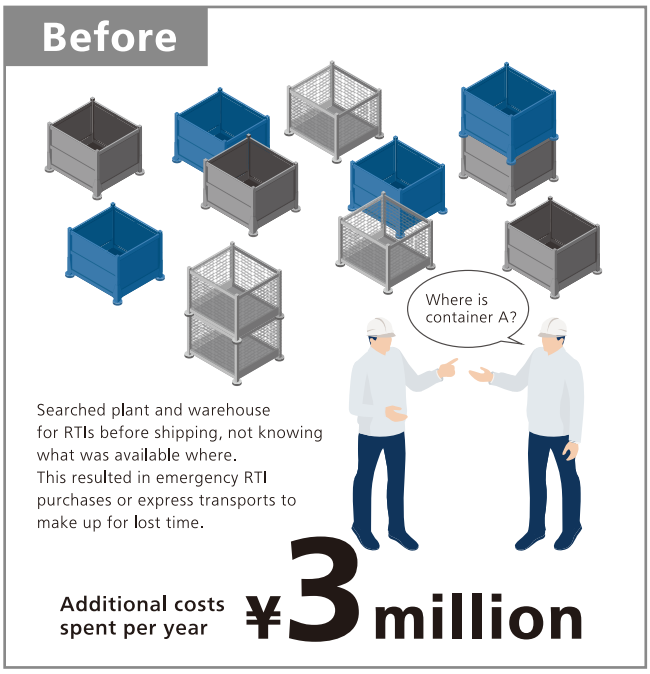

Scanning of outbound shipments

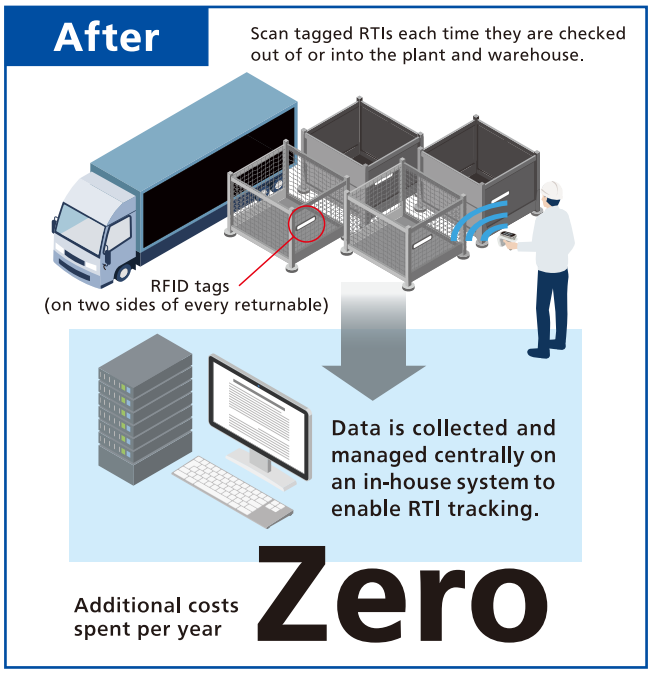
No more production delays or irregular work due to RTI shortage

Asset visibility, key to reducing workload on site

We were in need of a solution that could identify moving RTI assets and manage their data centrally. Recognizing RFID's benefits in item-level tracking and bulk reading, we contacted SATO, from whom we have been purchasing our printer labels for years.

As we discussed tagging our RTIs with RFID, we initially considered automating checkouts/check-ins while loading them on trucks or forklifts and passing them through RFID gates, but decided on handheld terminals eventually, considering that they were easier to roll out. We then looked into how to actually set up the RFID solution to get it working as intended, testing various methods and tools in the process. Finally, we found that the best way was to have our drivers go one full circle around RTIs with RFID reader in hand to scan them before they were loaded to trucks or after unloading. We also fitted each RTI with the same RFID tag on its two sides to increase read rate and accuracy.





While we used to change production plans due to RTI shortage some five times per annum, we no longer need to do so in our first year upon implementing SATO's RFID solution. We also do not need to search for RTIs or handle other related irregular tasks now that we can accurately track the movement of each individual returnable. This reduces the workload of our on-site workers and helps us save about 3 million yen ($26,000) per year, which we feel is a satisfactory return on our RFID investment.

The best solution, built upon extensive expertise and experience

SATO's strengths in choosing the most suitable RFID tag and setup for us

With RFID, multiple tags can be read simultaneously and enable the contactless identification of tagged items from a few meters away, but the technology does not typically work well near metals that would cause detuning and reflecting of radio frequency signals. So while we started with the idea of using RFID gates to automatically read RTIs loaded on trucks, we soon learned that the read performance of pallet cages that were loaded first and kept at the far end closest to the cab was below our expectations due to interference from the cages and the truck's metal structures. As we needed a more accurate and reliable method, we consulted SATO for their know-how in production/logistics sites and did field testing over and over again before deciding on handheld terminals.

Tag selection was particularly challenging as well because there were more than 40 types available and we did not know which one would perform consistently across all RTIs at our target read distance. Luckily we had SATO to help us narrow down to a few choices and test them repeatedly on site, starting with the tagging process. In the end, we chose the FR4 waterproof on-metal tag as it was proven to withstand the harsh environments that our RTIs would be exposed to when used outdoor. Thanks to SATO's deep knowledge of worksites and associated pain points, we were able to arrive at the best solution that fitted not only our operating requirements but also our budget.

Further improving our production, together with SATO

Our success with RTI tracking at the Iwata plant is gaining attention across the company. I would say that we have set a precedent for other plants also facing challenges with asset management by achieving productivity improvement and cost savings in our case. While we succeeded at bettering logistics operations this time, we are keen to also introduce RFID in production processes for further worksite enhancement. RFID will be useful in helping us streamline our product inventory and shorten lead time for shipping out as we change and adapt to high-mix, low-volume production. As a supplier, we hope to play our part in continuously improving how things move along the supply chain to automotive manufacturers who are our customers and eventually to consumers, our customer's customer. We look forward to working again with SATO and tapping their expertise, experience and strengths in diverse worksites and technologies.

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