Prakab 2.0
delivered by Zealabs

CABLING INDUSTRY

The real-time location and movement tracking of 10,000+ coils is done by monitoring only 12 forklifts, which transport them.

12

months payback period

Background

A Cabling Company with a Turnover to Rival a National GDP

Prakab is a Prague-based manufacturer that for over 100 years, has been producing railway, fire-safety, and electricity cables. Prakab processes tens of thousands of tons of copper and other precious metals each year, making its overall **annual turnover comparable to the GDP of Comoros**.

Prakab cabling factory in Prague, Czech Republic.

Goals

Reduce Production Costs Using Reliable Data

The goal of the RTLS digitalization was to reduce costs by systematically **eliminating waste** in the company supply chain and production processes.

A core part of the goal was to optimize material consumption by minimizing human errors throughout the production process. Using the same RTLS infrastructure for navigation and operation control, Prakab wanted to improve its efficiency. This includes the elimination of unproductive searching processes, suboptimal driving paths, and unnecessary waiting times for forklifts.

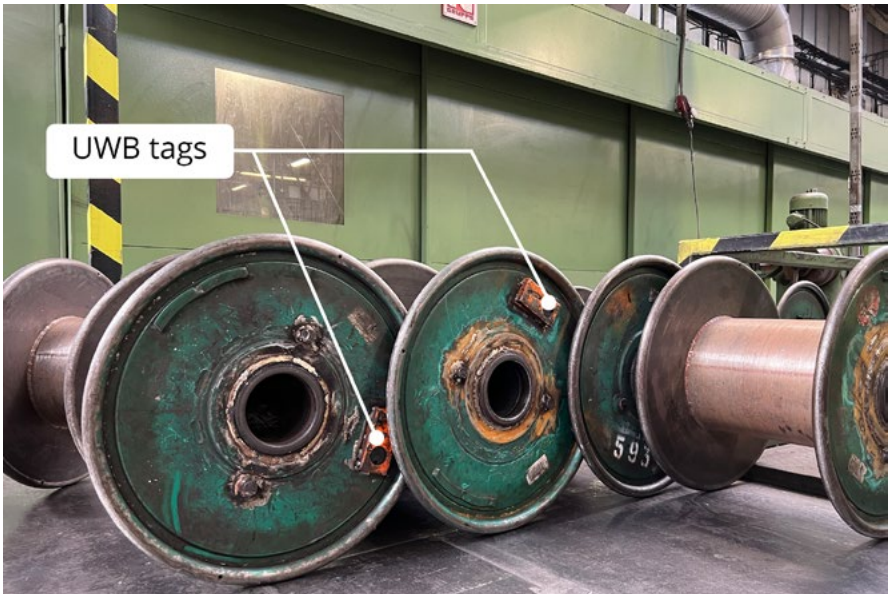
Metallic coils at the Prakab's shopfloor.

Challenges

The Harshest Environment for Any Radio Technology

Cabling factories represent one of the harshest environments for any radio-based location system due to:

1. **Signal reflections** from metal objects – cables, coils, winches, and other heavy machines.
2. Strong **magnetic fields** caused by these metal objects.
3. Due the **rotation intensity** of the coils that are being tracked, the tags on these coils need to withstand the centrifugal force.
4. Coils constantly **hitting other coils** as they are moved and stored on the shopfloor.



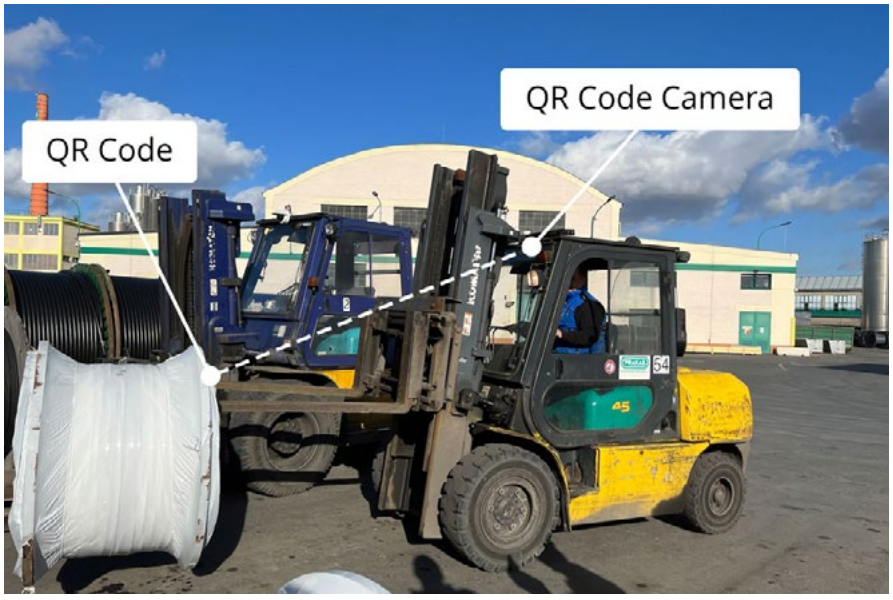
UWB tags mounted on the metallic coils.

Solution

3D Tag-less Tracking of 10,000+ Coils

The Prakab facility stores roughly 10,000 coils. The real-time location and movement tracking of all those coils is done by **monitoring only 12 forklifts**, which transport them. Each coil is tagged with a cost-effective QR code to identify the product. Anytime the forklift loads a coil, multiple systems work together to record valuable information. The camera on the forklift reads the QR code to identify the product, the weight sensor on the fork detects the loading, and the Sewio tag records the position. Then the trajectory of the product's path is recorded until it reaches its destination where it is unloaded and the height at which it is unloaded is also recorded. This entire process ensures full 3D tracking thanks to the lift sensor.

Tag-less tracking was delivered by Zealabs, which dramatically decreased the complexity and costs of the system. All due to tagging only 12 forklifts that manipulate over 10,000 coils.

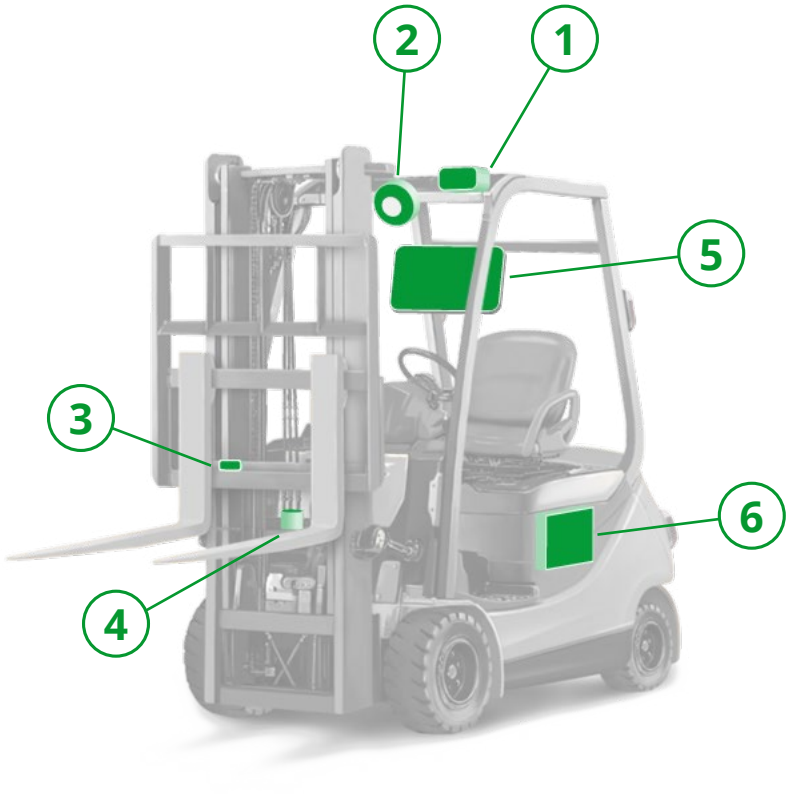


Forklift camera reads the QR code of coil while loading.

"Using Sewio RTLS we have built a comprehensive solution which has empowered Prakab with new use cases now and in the future. As the ROI of the project was met by just only one of these use cases, we are glad that all the others simply exceeded our expectations."

Adrian Cech
CEO at Zealabs

Tag-less Tracking System Components Overview



1 UWB Tag
Accurate sub-meter positioing [x, y]

2 QR Code Camera
Automatic asset identification

3 Lift Sensor
Height positioning [z]

4 Weight Sensor
Enabling bullet-proof automatic load/unload detection

5 LCD Tablet
Driver instructions

6 Connectivity Box
Providing cellular connectivity independent on local infrastructure

The forklift solution includes **six key components** – a localization sensor (UWB tag), a connectivity box, an LCD display, a pairing reading device (QR camera), a lift sensor (mechanical height positioning), and a weight sensor (pressure sensor). The solution is **compatible with any major forklift** type and its hardware can be installed within an astounding 28 seconds.

The UWB tags are communicating with 50 anchors covering 4,000 m^2 of inside area and 9,000 m^2 of outside area to provide the real-time location system. The RTLS is then integrated with Prakab's ERP.

Solution Numbers:

13,000 m²
area covered

50
receivers
(=anchors)

12
tracked forklifts
(=tags)

100+
tracked coils
(=tags)

Results

Top Nine Benefits of RTLS Driven Digitization in Cabling Industry

1. The Core Use Case: Decreasing the Production Costs

A finished cable requires a lot of materials. It is reeled from a combination of wires from **12 to 18 separate coils**, often combining different materials to meet the final cable's needed characteristics, such as its electrical conductance or resistance. Production operators had to search and feed the machine that combines these coils. As with any human-operated process, this procedure was prone to errors and uncertainty as to what coils were being used for the creation of the final cable. For 100% quality assurance of the final product, a buffer of input material had to be created. Therefore, more material was used than necessary to ensure the customers' needs in terms of required cable characteristics.

Copper coils ordered for reeling.

With an RTLS in place, the coils are being constantly tracked so production managers know the exact coils (their material and batch number) going into the production of the final cable. This allows managers to plan and control the process according to the specific characteristics needed for the final cable, **saving 2% of copper annually**.

The coils are not only being tracked in real-time across both indoor and outdoor areas, but they are weighed at multiple locations. Production managers are empowered to **analyze the data retrospectively** to identify issues in the process and optimize it. Every final cable can be traced back to the individual coils that it was made from to answer questions such as: Which coils did this particular cable originate from? Was every coil weighed properly at every weigh station? Could material be saved for the needed characteristic of cable? Etc.

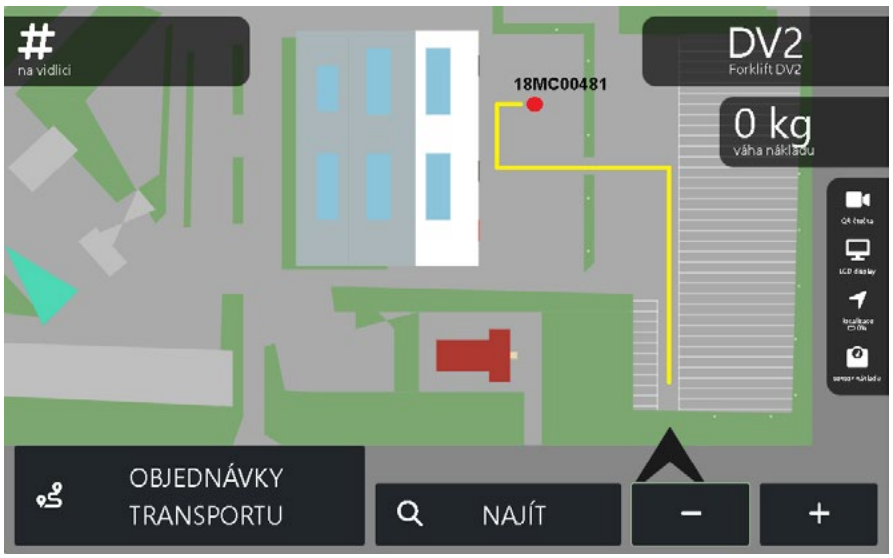
2. Search and Find

Thanks to an LCD monitor secured in the forklift's cabin, operators constantly have a map to locate the next coil in need of transport. If multiple coils are ready for pick up, they are sorted by proximity **to the forklift's current position** to save time and fuel. The time saved thanks to these improvements corresponds to **€10,400 saved monthly**.

Exact 3D position of each coil.

3. Navigation to Load/Unload Position

The RTLS calculates more than the distance to the nearest coil. It also **accounts for the traffic** (other forklifts and personnel) and other work orders in the pipeline to deliver the best path for drivers. Once the driver picks up the coil, they are guided to the final destination in a similar way as Waze or Google Maps navigation. Prior to unloading, the systems verify the correct location to minimize errors. The streamlined forklift operation allowed to **save two forklifts out of 14**, a 12% decrease in material handling operational costs.



Forklift navigation to a particular coil.

4. Warehouse Utilization

When there are clear trajectories for forklifts, it's easier to plan product storage and **increase the utilization of warehouse** space. Best practices include leveraging unused space, following a logical order for storage, and avoiding starting a new row/section before the previous one is fully filled. Leveraging the real-life data Prakab was able to increase **the utilization of the warehouse space by 15%**.

5. Increased Safety

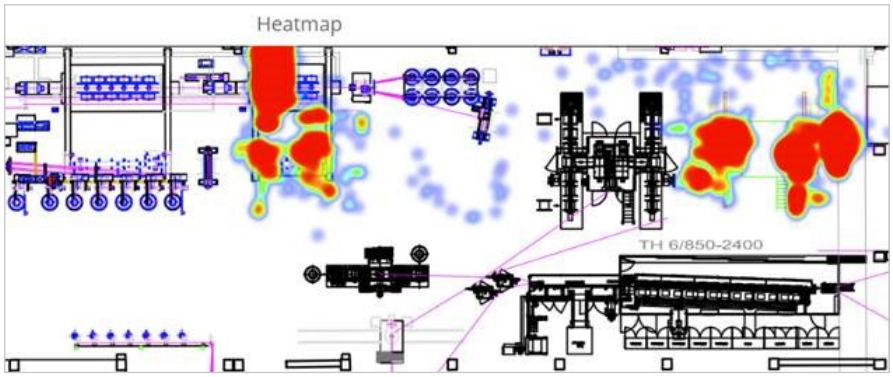
Materials are automatically scanned during loading and unloading thanks to the forklift's camera which reads the material's QR code. This means that **the driver doesn't need to leave their forklift seat** to manually scan materials which minimizes their time outside the safety of the cabin.

6. Inventory Optimization and Control of WIP

The tag-less tracking of all QR codes embedded in coils gives production managers a virtual window into their shop floor operations. **The real-time data of work in progress inventory** helps managers keep track of materials and product stock to avoid stockouts.

7. Data Driven Decisions Using Advanced Analytics

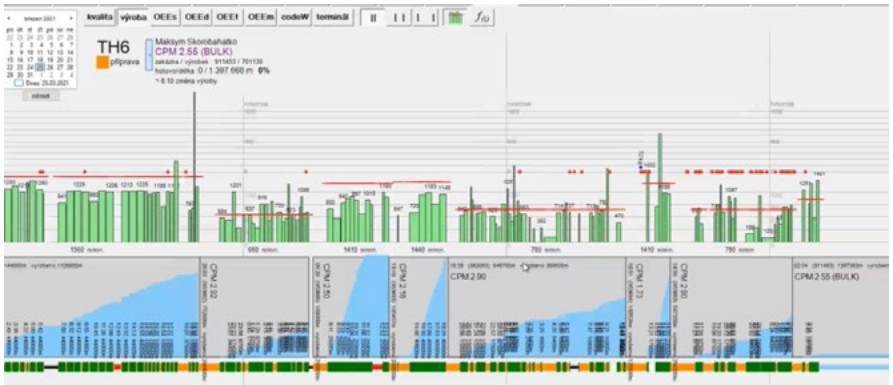
Heatmaps and spaghetti diagrams give a visual representation of the overall traffic within the facility to **identify bottlenecks** in the workflow and opportunities to expedite the process flow.



Heatmap showing traffic density.

8. Boosted OEE

Every forklift is now capable of providing valuable data. This includes the distance travelled, run/stop times, and loaded/unloaded times which, together with the exact trajectories and times, allow companies to **optimize the OEE** for each manipulation device.



OEE data of manipulation devices.

9. Control and Monitor Assets Around the World or Shop Floor

The tracking device includes the **Sigfox** energy harvesting module and a battery-powered **Sewio RTLS** UWB tag. While Sigfox ensures worldwide tracking, Sewio Tag ensures precision tracking for the last mile within the facility.

Results:

2%
decrease of copper usage

€10,400
saved per month due to cut of unproductive search times

12 months
of payback period

15%
increase of warehouse utilization

12%
less forklifts needed attributed to forklift navigation and process updates

Reasons for Sewio

Key Factors for Choosing Sewio RTLS

- Unlike RFID and Bluetooth, Sewio's UWB-based technology works with higher precision and has the ability to work **in harsh metallic environments**;
- the ability to combine both **indoor and outdoor tracking**;
- **easy integration** with other technologies used for tag-less tracking and with the ERP using open API;
- RTLS native zones entering control via **virtual fencing**;
- **onsite in-house support** from both the partner and vendor, as well as the available remote troubleshooting tools for easy issue reproduction and quick fixing;
- the ability to **scale the system** easily and quickly to track more objects and expand the system to more halls.

Partner

Zealabs offers its IoT services of digitization in industry, terraforming, research of sleep cycles and disorders.

Real-time warehouse and logistics operations visibility- we turned another buzzwords known from PowerPoint presentations and visualizations into reality. No more delay between reality and ERP systems. We provide our clients with **instant product searches, real-time inventory visibility, traceable loading and unloading operations, accident records, tools utilization and handling statistics.**

http://www.zealabs.cz/

Manufacturer

Sewio Networks s.r.o.

Sewio Networks is a manufacturer of a **real-time location system (RTLS)** for indoor tracking that drives business results for companies in the intralogistics, retail, sport, entertainment and livestock industries. Sewio system is built on **ultra-wide band technology (UWB)** and delivered with RTLS Studio, remote management and visualization software.

It gives partners and customers a precise, easy-to-integrate, reliable and fully scalable IoT solution for indoor tracking that allows process visibility, boosts production efficiency, simplifies the inventory process and increases safety. Founded in 2014, Sewio is headquartered in the Czech Republic with offices in Germany and France. Sewio has 70+ system integration partners and powers customers in 37 countries. Customers include: Volkswagen, Budvar, Pirelli, Matador, TPCA, Škoda.

https://www.sewio.net/