Terberg Benschop B.V.

Benschop, Netherlands

Terberg is a family-run company that was founded in 1869 by blacksmith Johannes Bernardus Terberg in Benschop. Today, the company is run by the fourth generation of the Terberg family and generates an annual revenue of 825 million euros. Terberg Benschop is a specialist in the manufacture of terminal vehicles, RORO vehicles, shipyard tractors and the like, which are used in ports, distribution centres, airports, in industry and in road and rail construction. The vehicles are deployed around the world in over 100 countries and are maintained by a network of international distributors and subsidiaries.

Terberg specializes in innovation and is a pioneer in this niche sector. By constantly further developing its products, the company offers vehicles of the very highest quality and performance.

Location	Benschop, Netherlands
Sector	automotive, production
Application	automatic small parts warehouse to supply picking work stations and the production line
Storage system	OSR Shuttle™ with capacity for quadruple-deep storage of various types of containers (50 shuttles, 2 aisles, 25 levels, 2 lifts)
Locations	25,000 pcs
Performance	500 double cycles/hour
Transport objects	of two different containers 600 x 400 x 220 mm 400 x 300 x180 mm
Work stations	2 Pick-it-Easy Flex work stations
Special features	Kanban picking process with Pick-to-Light
Software	KiSoft One with webservices to the customer system Dynamics AX KiSoft SRC KiSoft SCADA

The challenge

In order to process the increased number of orders efficiently and flexibly, Terberg needed to centralize the production warehouse for bodywork construction, the line supply for vehicle assembly and the global spare parts warehouse in a new building. The small parts stored in the existing high-bay racking system for pallets needed to move to a new automated small parts warehouse to make room for large parts. This all needed to take place during ongoing operation without interrupting production.

The solution had to fulfil the following requirements:

- A throughput of 500 containers/hour by 2027
- Approximately 15,000 load unit locations
- An interface to Terberg's Microsoft Dynamics AX 2012 R3
- Highly efficient solution for production orders as well as kanban and spare parts orders

Based on Terberg's demands, we created a flexible, automated solution that provides Terberg with maximum availability for their vehicle production. The OSR Shuttle™ covers diverse logistical tasks with high efficiency. The finished solution will serve as the basis for future company growth, guaranteeing capacity and performance until 2027.

Wolfgang Skrabitz, General Manager
at KNAPP Industry Solutions GmbH

The choice for an automated solution was a big step for Terberg. We felt the need to work together with a supplier that has already proven systems in action worldwide, that also offers the possibility for local support and maintenance.

Alexander Kühne, Supply Manager
at Terberg Benschop B.V.

Terberg chose a solution from KNAPP that met these demands, which comprised the following:

- OSR Shuttle™ with two rack line systems, 25 levels and 50 shuttles for containers weighing up to 50 kg (dimensions: 600 x 400 mm, 400 x 300 mm, height up to 220 mm)
- 4 decanting work stations
- 2 Pick-it-Easy Flex picking work stations where 3 different picking processes can be conducted
- 2 dispatch work stations
- KNAPP KiSoft One with Webservices interface to the customer's system Dynamics AX
- KNAPP KiSoft SRC

The solution at a glance

The software solution

The software comprises **KiSoft One** and a Webservices interface to the customer's system Dynamics AX and serves as the brain of the solution. KiSoft is a product line for software belonging to the KNAPP group and covers all levels of the software hierarchy, from warehouse management and control through to machine control, within a tailor-made software solution. As a result, a single software programme can map all of the processes. Besides this, permanent availability was crucial, which is why **KiSoft SCADA** was chosen to provide a complete overview of all the system components. It is possible to check the technical state of the system in real time at any given time.

1 Goods-in

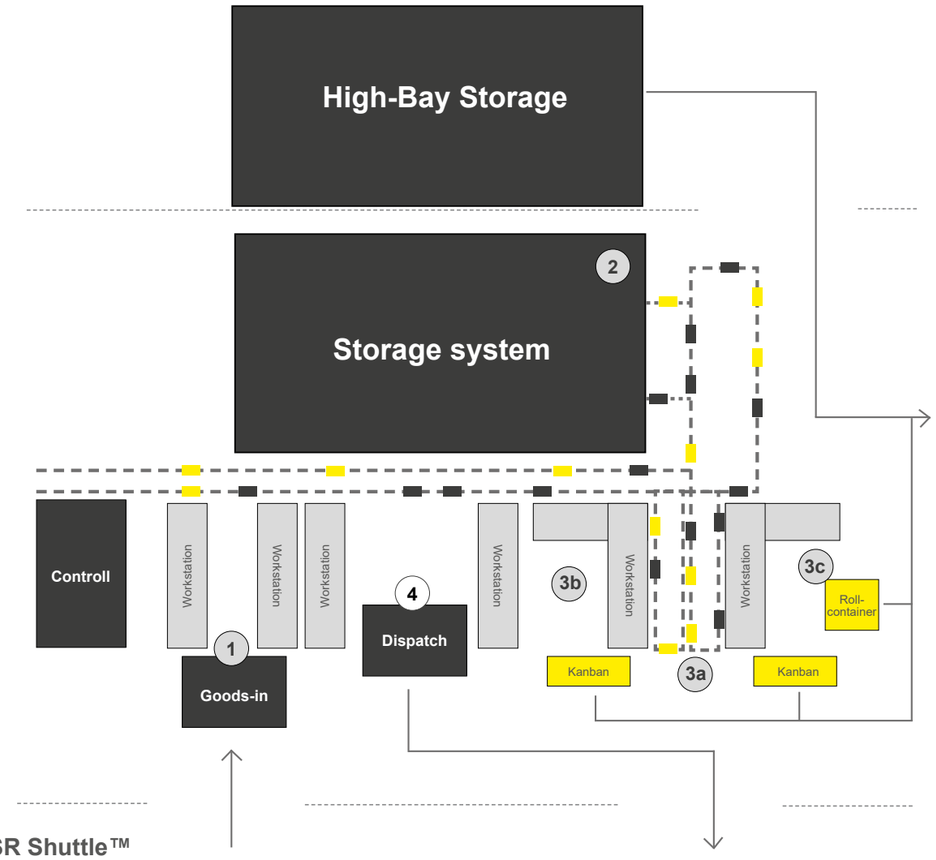
Prior to storage in the OSR Shuttle™, the goods are repacked at decanting work stations. Forklift trucks supply employees at the decanting work stations with articles on mixed pallets at an ergonomic height. The employees identify the individual articles for the **OSR Shuttle™** in the customer system (Microsoft Dynamics AX), and by doing so, send dispatch notification information to KiSoft. At the same time, a label is printed to identify the notification. A constant supply of containers is available on two empty container conveyors for storage in the OSR Shuttle™.

This comprises two container sizes as well as insertion bins to accommodate the different goods to be stored: 600 x 400 mm and 400 x 300 mm with a height of 220 mm. To guarantee an efficient picking process, KiSoft specifies the suitable container size with insertion bins for the employee at the station.
The decanting stations are equipped with check scales to check that the containers do not exceed the maximum permissible weight of 50 kg per container. Following the check, the employee pushes the containers onto a take-away conveyor and the containers are stored in the OSR Shuttle™ automatically.
The storage process verifies that the maximum load per channel is not exceeded and follows an ABC storage strategy.

Order start

The orders are prioritized and sorted by Terberg's Microsoft Dynamics AX system and are forwarded to the **KiSoft One** warehouse control system. KiSoft One starts the orders in the correct sequence before transmitting them to the control system of the OSR Shuttle™. In this way, orders for spare parts with an earlier dispatch date can be prioritized and processed rapidly.

The solution at a glance



2 OSR Shuttle™

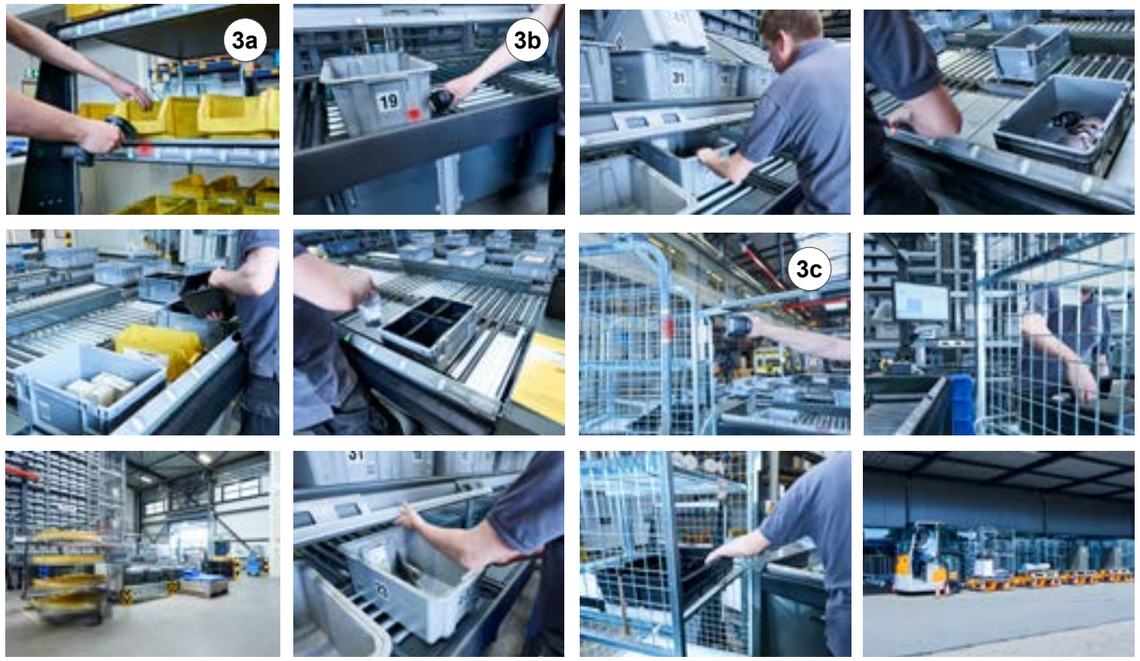
All small parts are stored in the OSR Shuttle™ and are retrieved when they are required at the production line or when they are shipped as spare parts. The OSR-Shuttle™ comprises two rack line systems and 25 levels. Thanks to dynamic quadruple-deep storage, it has a storage capacity of 14,250 load unit locations for containers measuring 600 x 400 mm or 28,500 load unit locations for containers measuring 400 x 300 mm. The system contains a shuttle for every level and rack line system, which handles all storage and retrieval movements.

3 Goods-to-person picking

The picking area consists of two **Pick-it-Easy work stations**. Picking is performed according to the goods-to-person principle: The containers with the required parts are retrieved from the OSR Shuttle™ and are supplied to the work stations at an ergonomic height. A **Pick-to-Light system** and **KNAPP's easyUse principle** assists the employees with picking. Three different types of picking are carried out at the work stations:

- Spare parts picking
- Picking into roll containers
- Picking into kanban racks

Goods-in: The employee scans the identification and activates the corresponding dispatch notification information in KiSoft. The packing cartons are automatically disposed of via the trash conveyor.



Merging and defragmentation: The customer is guided at the multifunctional Pick-it-Easy work stations to improve the defragmentation of the warehouse.

3a Picking into kanban racks

There is a special picking mode for filling kanban racks, which are required for assembly and production. The kanban rack is positioned behind a special frame with Pick-to-Light displays. The frame has a display and a location bar code for every position within the kanban rack. The employee enables the “Kanban picking” mode after which no other order type is started for this station. A barcode on each of the individual kanban containers contains order information such as the article, quantity and cost centre. Scanning this barcode and linking it with the location barcode automatically creates a picking order in KiSoft and verifies whether the required quantity of articles is available. The Pick-to-Light displays guide the employee through picking and inform them whether the order can be fully processed. When all orders on one side of the rack have been processed, the employee turns the rack and fills the other side of the kanban rack as required. After the kanban rack has been filled, the rack is transported back to the assembly and production line.

3b Spare parts picking

The employee scans the barcode of the target container to start the picking process. At the beginning of the picking process, an address label is printed and applied to the container. The Pick-to-Light displays inform the employee which items and how many of each they should remove from the source containers. The containers are then automatically conveyed to the dispatch area. The source containers are automatically weighed before storage and are then stored in the OSR Shuttle™ with the updated weight. As a result, Terberg has an up-to-date overview of their stock at all times.

3c Picking into roll containers

Articles that are required at the assembly and production lines are picked into roll containers manually. Employees then take the roll containers to other warehouse areas where large articles are added or they are brought directly to the assembly and production lines.

4 Dispatching spare parts

As soon as spare parts picking has been completed, the spare parts orders are conveyed to the packing area. Here, small parts from the OSR Shuttle™ are merged with larger parts from the high-bay racking and are prepared for dispatch. Two dispatch work stations containing packing machines are available for this purpose. The packed parts are placed on a pallet and are manually transported by a forklift truck to a heavy goods vehicle.

Prioritizing order types

There are five different types of picking orders at Terberg, which can be processed individually or flexibly combined with one of the three types of picking previously described. As a result, Terberg is able to prioritize their order types.

Merging and defragmentation

As the insertion bins in the source containers cannot be weighed individually and consequently there was no weight data for each article per insertion bin available, KNAPP developed a solution to optimize storage space within the system especially for the customer.

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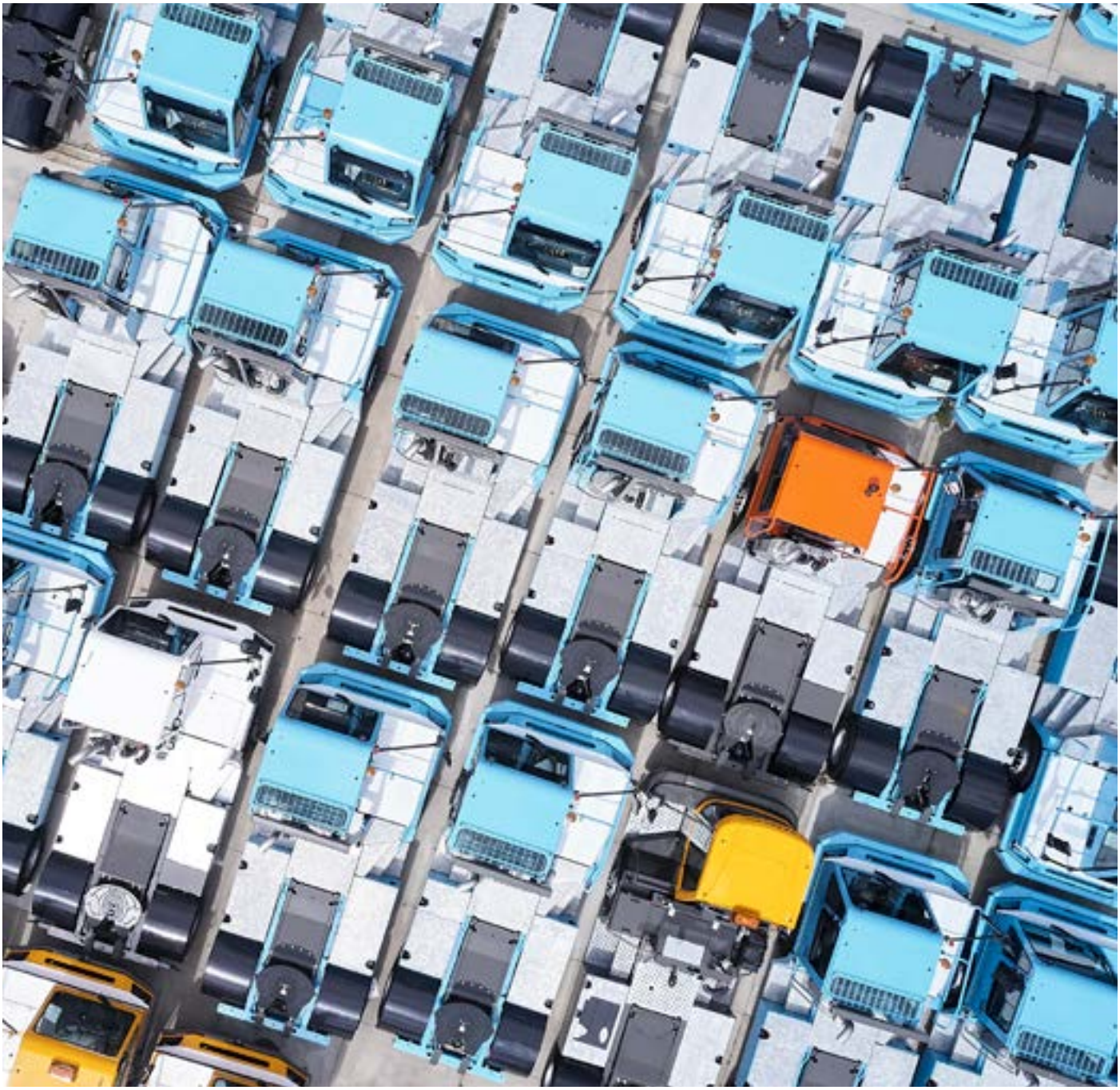
Of course, the goods to person system has a higher capacity by eliminating the time a person would need to navigate through the warehouse. Other advantages are that the pick to light system supports the person and helps avoid mistakes in item and/or quantity picked and that working according FIFO can be forced due to the fact that every new goods receipt is stored in a new empty container.

Alexander Kühne, Supply Manager
at Terberg Benschop B.V.



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