



C&J CLARKS WESTWAY GREAT BRITAIN



SOLUTION PROVIDER

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Goods-in



Conveyor



AS/RS

THE CUSTOMER

The story of the English shoe manufacturer Clarks began when in 1825 Cyrus Clark set up a sheepskin rug business in the village of Street, Somerset. In 1828, Cyrus was joined by his brother James who started the production of sheepskin slippers. The purchase of Singer sewing machines allowed shoe production to expand further. Comfort was always a key feature in the design of Clarks products. From 1900 on, Clarks experienced considerable growth, not only due to the introduction of new technology and materials, but also through female emancipation: women's shoes were suddenly the centre of interest. At the end of the 1940s Clarks expanded rapidly and succeeded in conquering the world market with such legendary models as their "Desert Boot" in the 1950's and, in the 1960's, "Lance Clark's Wallabee", a moccasin-style shoe which is still worn frequently today. Since the seventies, robust new man-made materials were developed by Clarks for the manufacture of shoe soles. Clarks sell approx. 41 million pairs of shoes annually along with other leather accessories which are on sale in over 1,900 outlets. In Great Britain alone Clarks has more than 532 shops and cooperates with 450 wholesalers. With a yearly turnover of € 1,439 million (2004/2005), 13,000 employees and an average growth rate of 15-20%, Clarks is one of the world's leading shoe companies and also enjoys cult status.

THE CHALLENGE

Due to a rise in Clarks order and distribution volume, KNAPP was commissioned with the optimization of the company's newly-built 28,000 m² distribution centre, designed to handle a total of 6 million product units, and a daily throughput of 200,000 pairs of shoes. The main challenge was in the adaptation of the conveyor system to accommodate shoe cartons of varying weight and dimensions (180x100x65 mm to 700x510x400 mm, 200 grammes to 2.5 kilogrammes). Furthermore, it was also necessary to align the cartons on the conveyors in such a way so as to allow their product barcodes to be read easily. The integration of a comprehensive visualization system was also a crucial aspect of the project.

THE SOLUTION

In answer to the customer's specific needs, KNAPP, the Solution Provider, implemented a tailored logistics solution for the storage of the company's daily production output and the seasonally fluctuating distribution of its summer and winter collections.

The realization of this huge project saw KNAPP breaking new ground, its technical features including:

- Management of a complex goods-in area
- Automatic high-bay racking with 480,000 carton storage locations
- Warehouse with cross-belt sorters for processing 12,000 cartons/hour on 600 ramps
- Specially adapted conveyor system and mezzanine (platform construction)
- Intelligent label applicator
- Realization of a comprehensive visualization concept
- 25 stacker cranes



AS/RS



i-POINT work station



RF-Picking

THE CLARKS DISTRIBUTION CENTRE

Covering an area of 28,000 m² the automatic batch and dispatch sorting system of the Clarks distribution centre processes several thousand shoe cartons on a daily basis. The facility can be divided into the following areas:

Goods-in and storage

Following the delivery of goods – a carton normally contains between 8 and 12 pairs of shoes or other leather products – certain checks are carried out before the goods are accepted. Packed into the barcoded cartons are products of only one sort. The ID label on the upper side is read by one of 5 scanners. These scanners are connected to both the KNAPP PLC and – via an RF terminal – to the WMS. For all arriving cartons, transport orders are automatically transmitted within 20 seconds from the WMS to the KNAPP warehouse control system, KLASS-X. The following stations can be specified as target stations:

• Automated high-bay racking AS/RS

Cartons to be put into storage are registered at the storage location management system, KiSoft MOTION, indicating the unique container ID of each, the product and exact quantity contained, and the carton's width classification (plus further information if available/required). Based on the transmitted data and information regarding cartons already in storage and crane activity, a calculation can be made as to which aisle should receive each carton.

• Refill area of picking zones

Cartons delivered to the warehouse which are not due to undergo quality checks can be refilled directly into the appropriate racks of the six available replenishment areas located on the second and third levels (connected by conveyors). On their way to their various target stations (storage location in a static rack or flow-rack) the cartons pass an ink-jet printer which marks each one with the required storage location to help the worker

handling them. Each storage transaction is confirmed at an RF-terminal, connected directly to the WMS.

• QA (quality audit) area

Cartons which must undergo quality checks are sent to the two QA stations along with cartons whose weight and dimensions were detected as exceeding the maximum permissible limits when passing the volume measurement system on the goods-in conveyor. If found to be without error following the quality checks, cartons are then directed onto a conveyor for onward transport.

• Dispatch

So-called "pre-packs", stacked shoe cartons containing different products which are transported in tray-shaped containers, can be sent directly to the dispatch area.

Automated high-bay racking AS/RS

The high-bay rack system is equipped with 25 stacker cranes and houses over 480,000 cartons. Either side of each aisle are 25 rack levels, reaching as high as 12.9 m and up to almost 120 m in length. A special feature of the system, used by KNAPP for the first time, is a load-handling device which can handle two-deep rack positions. This solution enables an increased storage depth and a throughput of 2,400 cartons/ hour to be achieved.

Retrieval for replenishment purposes

The WMS generates order records which trigger goods-in cartons to be transported from the AS/RS to the different picking levels. A series of transport orders are consolidated by the WMS to one or more replenishment batches.

Retrieval for customer order fulfillment

Cartons can be retrieved from the AS/RS and transported directly to the dispatch area. This applies to customer orders requiring full case cartons or pre-picked orders. The cartons are generally directed via the conveyor system straight to the target ramp in dispatch.

Picking / sorting

The picking area extends over two levels, constructed on separate platforms. Picking is carried out using RF terminals which communicate with the WMS. Before the picking process can start the customer orders are grouped in batches and allocated to free sorter chutes in the sort area. Only then can an operator scan the relevant cartons and place them on one of ten conveyors for onward transport. At this stage the cartons need not be positioned in any particular way as they are turned on their journey to the sort area so that the labels are uniformly on the rear of the cartons (as seen in transport direction).

The sorting area consists of two crossbelt sorters, lying one above the other) which sort the arriving products into percustomerbatches and divert them onto a total of 600 sorter chutes. A throughput of 12,000 cartons/hour can be achieved. Here is where order-related packs are formed. As each sorter receives information about the products' dimensions it is possible to calculate the volume of all diverted cartons. If these correspond to the volume of a complete pack the sorter sends a pack finished message to the WCS. If further products of a customer order are to be sorted after a pack has been formed, the sorter requests a new sorter chute from the WCS.



Shrink-wrapping



Packing station



Dispatch

In order to achieve the required throughput, the finished packs must be continually removed from the chutes. As soon as the final product of a pack reaches the sorter chute, a packing list is printed. This list indicates the delivery address and sort ramp ID as well as other information about the content of the pack. A container ID is also assigned to the newly-formed pack by the WMS (necessary for control purposes) and also appears on the packing list as a barcode. After retrieving a packing list from the printer an operator goes to the indicated sort ramp and transfers the products to a tray for easier transport. The packing list is then affixed to the top of the pack before the tray is placed on a conveyor and transported towards the wrapping station.

Value added service area (VAS)

International orders often require additional processing, e.g. application of certain labels or accompanying documents. This work is carried out in the so-called VAS area, where all corresponding packs can be diverted to undergo such processing. First, the

containers are put into flow racks, then packed manually into dispatch cartons. The completed orders are subsequently transferred temporarily to a pallet storage location or returned to the AS/RS for longer storage periods. Again, the WMS is responsible for all stages of processing.

Dispatch preparation

As soon as the packs reach the wrapping station they are removed from the transport containers and stacked on top of one another before passing through a shrink wrapper. Here, it is ensured that the packing lists affixed in the sort area are clearly visible. Having been conveyed automatically to the dispatch area the packs are diverted to the appropriate ramps. Five telescope conveyors then transfer the arriving packs directly onto the waiting delivery vehicles. The telescope conveyors are not only adjustable in length (8 m - 15 m) but also in height, and can be moved from side to side to make the loading process as flexible as possible. The mobile label applicator, a new KNAPP product, mounted on each of the telescope conveyors, then comes

into action, printing and affixing self-adhesive transport labels. The innovative heightadjustable application device detects the flattest surface on each of the (partly bulky) packs for precision label application.

Software solution

To deal with the enormous flow of information as well as visualizing, monitoring and controlling all system statuses, Clarks opted for KNAPP's innovative i-POINT solution. As a central control software, i-POINT combines all hardware and software systems in a single user interface. i-POINT is based on serverclient architecture, and was adapted especially for Clarks to incorporate a number of important functions, e.g. the power management system for the highbay racking, connection to the sorter system, and an 8-screen display.

KEY DATA	
Sector	Footwear
Location	Somerset, UK
Warehouse size	28.000 m ²
No. of articles	Designed to manage 6 million pairs of shoes
Throughput	200,000 pairs of shoes per day
Storage capacity	

SOFTWARE
KLASS X™ V4.1 (WCS)
KiSoft MOTION Subsystem
KNAPP i-POINT Visualization
KNAPP power management system

INTEGRATED SOLUTIONS	
Mobile label applicator	5
Labelling machines	2
Telescoping conveyors	10
Volume calculation	2
Dispatch ramps	5 ramps with 8 possible positions
Goods-in	5 ramps with 8 possible positions
Cross-belt sorter	600 sorter ramps