PROMAT 2015

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The DTC Fulfillment Beast

How to Make the Unpredictable Predictable

Sponsored by:

KNAPP

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E-Commerce Fulfillment

- A case study with extraordinary results of a new solution addressing the challenges in “Apparel and Omni-channel general merchandise” distribution

Agenda

- Apparel & Omni-Channel Order Fulfillment
  - Industry Challenges
- Fulfillment Strategies
  - Overview and concepts with
  - New developments and approaches
  - Benefits/advantages
- Design Parameters and Case Studies

Industry Challenges

- Order structure with low amount of order lines per order
- Order structures with low amount of SKU per order line
- Increasing number of SKUs in inventory
- Seasonality of SKUs
- Synchronized order item consolidation - different items, different product families or bulk locations, at the packing stations

Industry Challenges

- Huge seasonal peaks (Black Friday/Cyber Monday – Back to School Sale); up to 4 - 5 times from the average
- Variable workflow through every single day
- Unpredictable amount of customers and order structure
- Hard to predict Fast- and Slow-Movers
- Perfect quality and 100% accuracy of the shipments

Industry Challenges

- Express deliveries and late cut-off times
- A predetermined delivery sequence (customer or store friendly deliveries)
- Efficiently managing returned items
- Different process for In-Season and Out-of-Season returns
- Flexibility and scalability for future changes with regards to capacity and performance

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Overview and concepts

The 3 most common concepts for "Apparel and Omni-channel general merchandise" fulfillment are:

- Batch Picking & Sortation
- Goods-to-Person & Pick+Pack with shuttle systems
- Batch Picking & Sequencing

Overview and concepts

First, let's agree on a couple of definitions:

What is sortation:

Definition of Sortation:
To arrange according to class, kind, or size; to classify.

What is sequencing:

Definition of Sequencing:
A following of one thing after another; a succession.

Batch Picking & Sortation

Storage System

Picking

Manual Storage

Automated Storage

Manual Pick

Automated Pick

Single piece order

Super Tote

Multi piece order

Batch Tote

Direct to packing

Sorter Induction

Split- OR Tilt-Tray- OR Cross-Belt-Sorter (200-600 chutes)

Mix Tote

2nd Consolidation Sort manual)

Batch Picking & Sortation

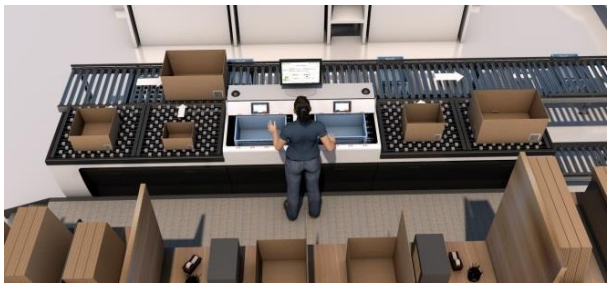
- Low cost form of storage automation (picking may be manual)
- Good picking efficiency due to "Batch Picking"

- Batch size is constrained by the numbers of chutes
- Large amount of small orders require a large number of chutes OR require a manual second sort (put wall)
- Number of chutes is fixed → fixed order number → batch size is inconsistent
- Many "product touches" in the fulfillment process
- Separate GoH handling and order consolidation process may be required

Goods-to-Person "Combined Pick & Pack"

Storage System

Picking



Pick & Pack Station

Automated Storage

Single piece order

To Packing

Multi piece order

Goods-to-Person "Combined Pick & Pack"

- Highly efficient picking process (> 800 items/hr)
- All products (fast, medium and slow movers) in one system
- Not limited by any batch size or batch factor
- Fast order processing
- Low operational cost

- Higher investment cost upfront
- A separate GoH handling and order consolidation process may be required

Batch Picking & Sequencing

Before continuing with the 3rd concept, let's introduce a new technology:

What is a Pocket Sorter:

The Pocket Sorter

A new approach to order fulfillment!

What is the idea behind it?

- ✓ Use proven technology & safe valuable floor space by using the whole cube of the building
- ✓ Handle as much as possible different products in one system (flat apparel, GoH, shoes, cosmetics, general merchandise, …)
- ✓ Handle each item as an individual, separate unit

The Pocket Sorter

What is the idea behind it?

- ✓ Use buffers to temporarily store the items & sequence them
- ✓ Maximize the batch picking efficiency
- ✓ Minimize the influence of the permanent changing workload
- ✓ Allow easy, subsequent integration into existing facilities
- ✓ Make it adjustable and modular for future demands

Pocket Sorter

Basic fulfillment process:

Storage & Picking + Induction + Buffering & Presort + Sequencing + Packing

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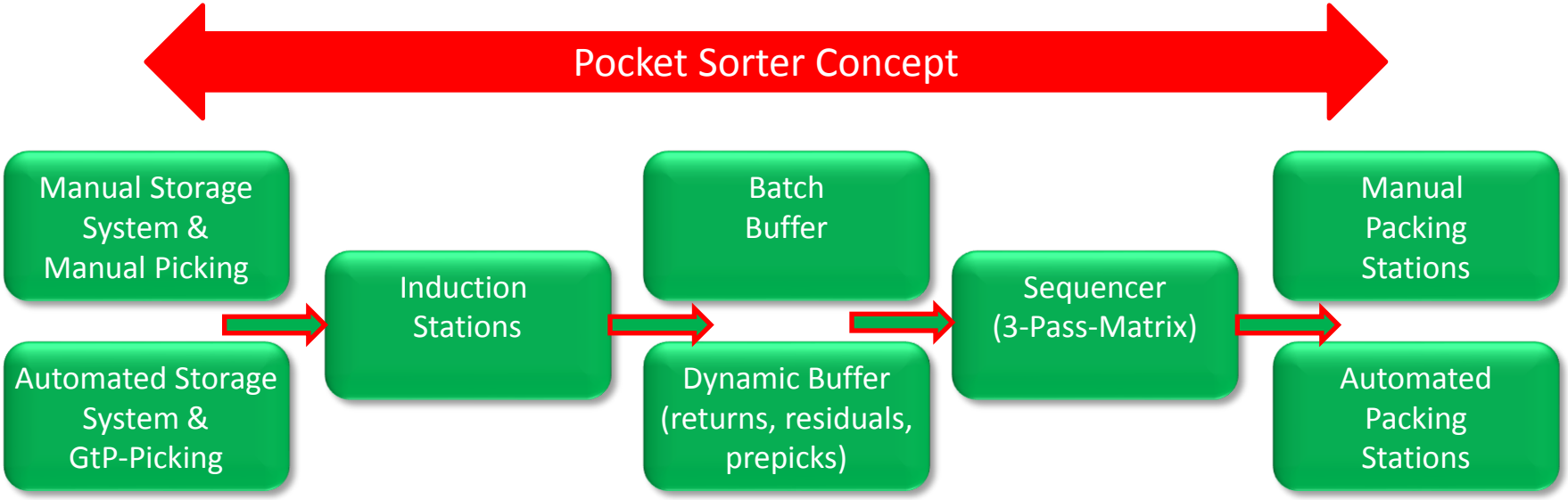

The Pocket Sorter

Technology used:

An adapter + a pocket + a conveyor

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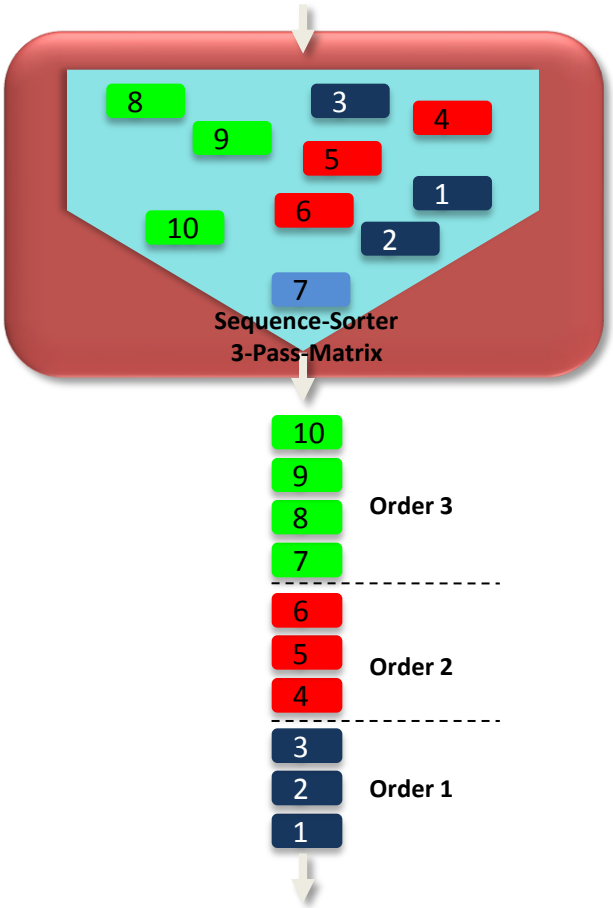
Pocket Sorter System

The Pocket Sorter

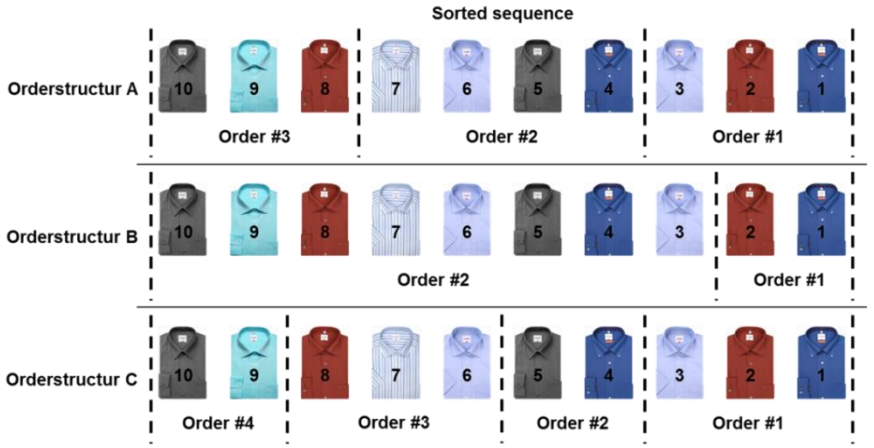
Product handling capabilities:

Sequencer – 3 Pass Matrix



Generating a specified sequence from random initial positions using a mathematical algorithm in 3 steps

Sequencing is always to a position; the order structure has no influence to the performance and is only a software functionality of the WMS



Batch Picking & Sequencing

Now that we know:

- ✓ What a Pocket Sorter is…
- ✓ The difference between sortation and sequencing…

Here is the 3rd fulfillment concept!

Batch Picking & Sequencing

Storage System

Picking

Single piece order

Multi piece order

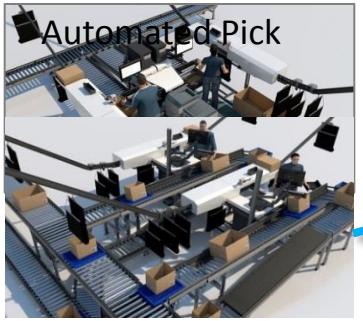
Super Tote

Batch Tote

Manual Storage

Automated Storage

Manual Pick



Automated Pick

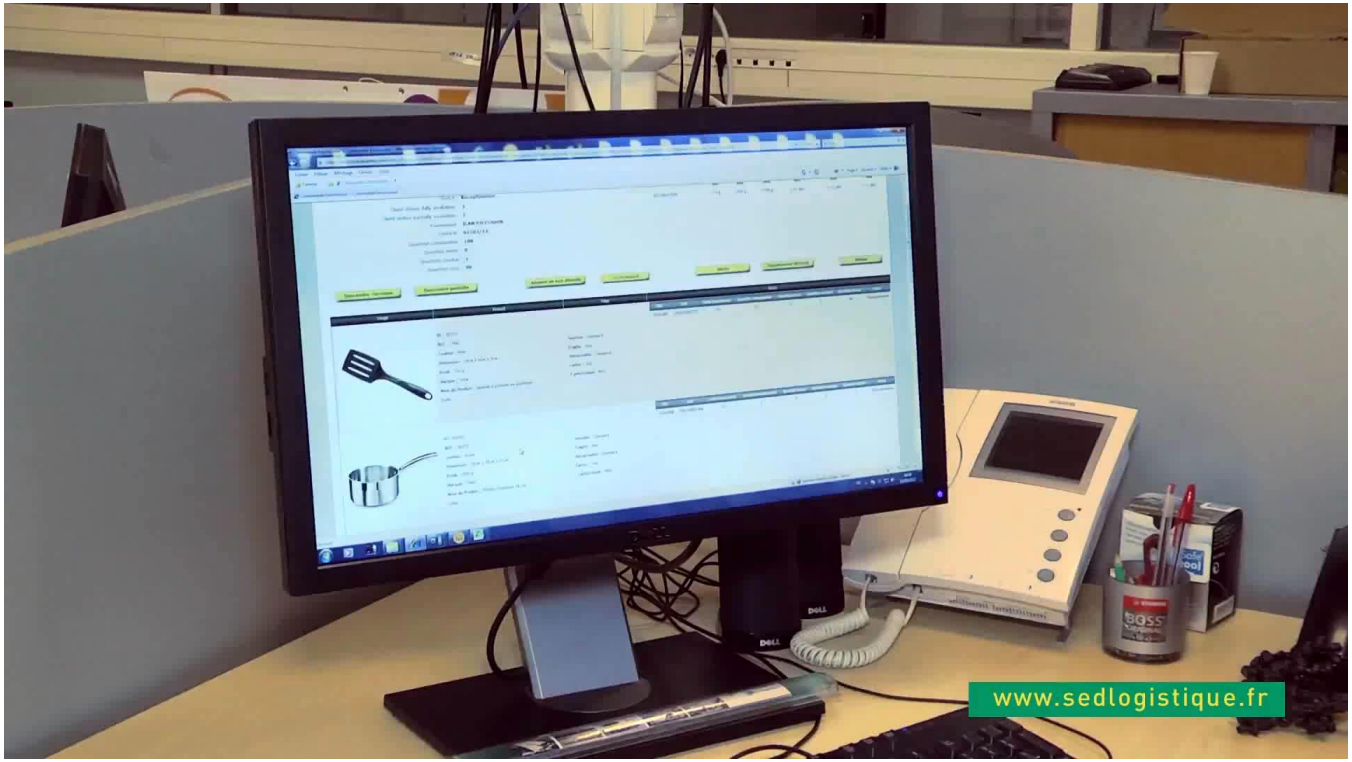
Direct to packing

Pocket Induction

Batch Picking & Sequencing

- Low cost form of storage automation (picking may be manual)
- Improved picking efficiency due to an equal batch size
- Zero defect fulfillment & cost effective sequencing
- Store friendly delivery and family grouping, incl. reverse handling (backward sequencing) is a standard feature
- No limitation in order structures→ perfect for Omni channel fulfillment
- Automated "Push" feeding of the packing operation
- Flexible and scalable for future business changes
- Buffering and automated retrieval is a standard feature
- GoH + returns handling and order consolidation is fully integrated
- Concept well established and state of the art in Europe

How does Batch Picking & Sequencing with a Pocket Sorter work?

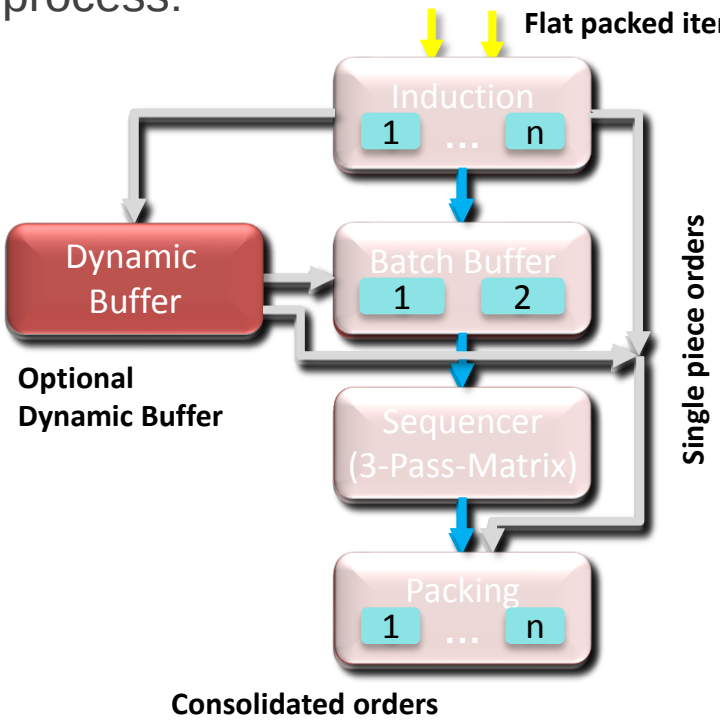


Process comparison

Process description	Batch Picking & Sortation	Goods-To-Person & Pick+Pack	Batch Picking & Sequencing
Receiving (qualtity & quantity check)	✓	✓	✓
Transfer to pallet storage (if required)	✓	✓	✓
De-Canting / carton opening	✓	✓	✓
Carton storage (shelf racking or Shuttle)	✓	✓	✓
Batch-Picking (Person to Goods) PTG	✓	×	✓
Batch-Picking (Goods to Person) GTP	×	×	✓
Pick & Pack at GTP-Workstations	×	✓	×
Sorter/Pocket Induction Flat Sorter	✓	×	✓
Discharging Chutes (Multi orders/Chute)	✓	×	×
Transfer to packing stations	✓	×	×
Order consolidation	✓	×	×
Order packing	✓	×	✓
Total process "steps"	**10**	**5**	**8**

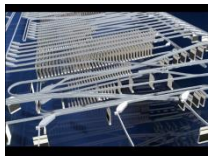
Pocket Sorter

A new approach to Apparel & Omni-Channel general merchandise fulfillment - General process:

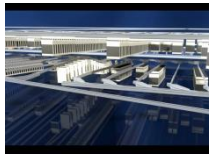


Induction

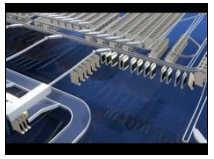
Batch Buffer



Sequencer
(3-Pass-Matrix)



Packing



Dynamic Buffer

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Design Parameters

Design Data:

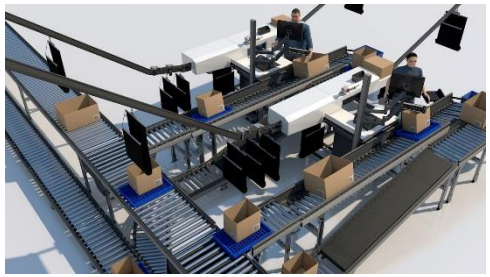
- Ø 30,000 order per day => 750 u/h SPO, 2,700 u/h MPO
- Peak 150,000 order per day => 2,500 u/h SPO, 7,500 u/h MPO
- 40% SPO and 60% MPO
- 2-3 units per order => Ø 2.4
- 1-3 order lines per order
- Ø 2 shift 16 hour operation per day Monday - Friday
- Peak 3 shift 24 hour operation per day Monday - Sunday
- *Pocket Induction (tote to pocket) rate 800-1,000 units/h/man*
- *Packing rate MPO 60 order/h/man*
- *Packing Rate SPO 600-800 order/h/line (auto bagging)*

Design Approach

Ø Day (16h):
2,700 MPO u/h & 700 SPO u/h

- 4 x Induction WS
- 1 x 3D MATRIX Module
- 19 x MPO Packing WS
  1 x SPO Bagging Line

=> 24 FTE's for 55,000 u/day



Peak Day (24h):
9,000 MPO u/h & 2,500 SPO u/h

- 13 x Induction WS
- 1 x 3D MATRIX Module
- 62 x MPO Packing WS
  4 x SPO Bagging Lines

=> 79 FTE's for 276,000 u/day

Case Study 1 - Apparel

Challenges:

E-Commerce fulfillment with:

- Wide variety of products
- Small quantities per order
- Seasonality of the products

Benefits and advantages of the solution:

- System leaves 2/3 of the originally planned floor space available for other operations
- System handles 99.5% of the product range
- Express orders and late cut-off times are easily manageable
- Improved assortment availability and delivery quality
- Reduction of manual tasks
- Flexible process for covering order peak and off-peak periods
- System built in 2 phases to match the business growth

Case Study 2 - Apparel

Challenges:

Omni channel fulfillment for shirt retailer

- Wide range within the order structure
- Very tight cut-off times
- Broad product variety

Benefits and advantages of the solution:

- Requires less floor space than other solutions
- Generates store friendly delivery sequence for franchise and retail customers
- One solution for all products and distribution requirements
- Improved efficiency and ergonomics in all processes
- Reduced workforce by 20%
- Fully integrated with automated storage system
- Expandable for future growth

Case Study 3 - Apparel

Challenges:

E-Commerce fulfillment by a 3-PL provider for an apparel retailer

- High percentage of returns
- Automation of the returns handling process
- Seasonality of the products
- Synchronization with other warehouse operations
- High seasonal peaks
- Integration into an existing building

Case Study 3 - Apparel

Benefits and advantages of the solution:

- Able to use the entire building cube and integrated into the existing building
- Returns processing is automated and fully integrated into the order fulfillment process with 90% of all returns re-used within 72 hrs
- Efficient and cost-effective returns handling
- Handling of out-of-season returns automated
- Quality check and automated shipping process integrated
- System is expandable for future growth

Case Study 4 – General Merchandise

Challenges:

E-Commerce fulfillment by a 3-PL provider

- Fulfillment for multiple retailers
- Small order quantities
- High number of active SKUs

Benefits and advantages of the solution:

- Processes orders from different clients within one batch
- Handles > 97% of product range
- Integrates easily with an automated packing process
- Improved assortment availability and delivery quality
- Fully integrated with an existing manual storage system
- Increased competitiveness = new additional clients for the 3-PL provider

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