

WHITE PAPER

Optimizing Retail Put Systems



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Retail Fulfillment Operations

Production fulfillment requirements often dictate the equipment and processes that are best suited to achieve the best production efficiency. Retail fulfillment, similar to direct-to-consumer distribution, is the delivery of large quantities of goods to a smaller set of destinations, i.e., retail stores. This distinction often best suits the production capabilities of “put-to-store” systems. Traditionally these have been “push” systems. In such systems, the fulfillment process is described as:

- The bulk picking of units to fill the demand of many stores’ orders (stores)
- The routing and distribution of the picked units to the various pack lanes
- Pack lane workers scanning the arriving material
- Systematic direction of the worker to distribute units to stores within the lane
- The possible release of a partially consumed container of goods where there is no demand remaining in the pack lane
- The release of filled outbound containers, as required
- The handling of the residual product

Common Challenges in Put-to-Store Systems

There are a number of common challenges in the operation of a put-to-store system.

- **Keeping like-type goods in the same shipping container.** Packing like-type goods together makes processing the arriving cartons at the store more efficient. Solutions to this challenge may require numerous destinations on the put-to-store systems for each store, where the destinations accept only one merchandise type. This effectively multiplies the store count by the merchandising categories.
- **Variation of demand (work) between various put lanes.** Individual demand for product at each store is not constant and certain lanes may have significantly more or less work than other lanes. This creates a staffing challenge to balance work and keep workers productive.



- **Reslotting to balance lane work.** Where store slots are statically assigned, the reslotting or reassignment of stores to lanes is something that is done to rebalance the lane work to attempt to keep similar volumes of work in each lane.
- **Variation of work rate of workers in the pack lanes.** Individual workers work at their own pace. The difference in work rates can lead to transportation system backups. Arriving material cannot be routed, while existing material is recirculating due to unavailable full lanes.
- **Full utilization of the lane put capacity.** Often multiple workers are assigned to each lane. The work imbalance creates a significant challenge to fully utilizing the capacity.
- **Lane labor management.** When lanes are not fully utilized and manned, it creates a challenge in assigning workers to lanes that will best utilize them.
- **Incorporating receipt goods in the put-to-store operation.** A put-to-store system may simultaneously receive goods destined to stores and goods that need to be picked or pulled for the store. This creates a challenge in controlling how much is required to be picked so the system isn't flooded.
- **Controlling the flow of goods to the lanes.** If the goods pulled for retail exceed the processing capacity of the lanes needing the items, the picked goods must be recirculated. This creates a conveyance issue in the distribution of goods.

Compounding Challenges of Traditional Software

The challenges of operating put-to-store systems are compounded by traditional software that normally drives the system.

- Silo picking
- Predefined use
- Transitioning between merchandising types

Manifestations of the Challenges in Retail Put Systems

- Flooding the retail put system routing conveyor
- Idle workers
- Excess recirculation on retail lane sorter due to full lanes
- Unable to man all put locations, which prevents achieving peak capacity
- Receipt (inbound) conveyor stoppage
- Pick worker unable to release product due to conveyor stoppage
- A seeming need for more work in process buffer
- Unrelated product mix in cartons delivered to stores
- Insufficient put spots



The Benefits of Pull-Driven Operations

A pull-driven distribution operation is a closed-loop system that looks at the output and makes adjustments automatically to achieve the objective. When exceptions occur, they are accounted for in determining what to do next. If outbound processing is reduced, an objective-driven system will reduce the work being released and pull it from inventory. As outbound processing increases—say additional workers are added—the system sees the increase and adjusts the picking to produce more in order

to maintain the objective, similar to how a car's cruise control adjusts when it encounters a hill. The primary objective of COFE® systems is to establish a continual workflow and balance all processing activities to match the total available labor. In other words, COFE® drives work without creating large deviations in the work-in-progress between processing steps. Minimizing work in progress allows the system to quickly respond to changing requirements and available labor.

COFE®'s Retail Fulfillment Features

COFE®'s features for retail-fulfillment put systems include:

- **Pull-driven picking.** Packing lane performance (pull-based system) drives the rate of picking a product. If the pack rate slows, the pick rate will slow. As the pack rate increases, the pick rate will increase.
- **Automatic case pick rollup.** The picking operation is constantly “rolling up” the total demand to optimize the pick process, getting the fullest case pulls possible.
- **Support of intelligent residual storage or quick access residual storage (QARS).** QARS is where the system minimizes the picking of broken case goods by primarily pulling entire cartons of goods, resulting in no initial piece picking. Any residual is routed back to QARS. The QARS units are always consumed first when it encounters new demand. COFE® QARS support includes residual storage using automated storage and retrieval system (ASRS) equipment or manual residual storage.
- **Use of receipt goods to fill retail demand.** Arriving receipt goods may be available to meet current store demand. COFE® automatically uses this material if configured.
- **Automatic compensation for receipt distribution.** If receipt goods are used to fill demand, the picking operation is throttled based on the availability of that receipt material.
- **Controlling the flooding of retail packing by receipt goods.** COFE® automatically limits the release of receipt goods by controlling the receipt conveyor flow.

- **Configurable merchandise category sequencing.** When goods are being picked to fill demand, there is a configuration table allows COFE® to control the sequence of the picking for picked goods by merchandise category.
- **Limiting and controlling the WIP.** COFE® controls the amount of work in progress to prevent packing system flooding.
- **Routing by SKU demand independent of container.** The routing of goods to lanes is based on the SKU in the container, not the container number. Any container of any SKU can be used to fill the demand of any lane.
- **Built-in, full-case use optimization.** COFE® is always looking at the demand and attempts to fill any demand with an entire full case, if possible. Full cases arriving at the packing system that can fill an entire demand are routed to lanes for ship label application.
- **Determines routing when containers arrive at the retail put system sorter.** COFE® decides where to route a container when the container is actually ready to be routed. If a decision is made before arrival, the current state of affairs at the pack system are not taken into consideration.
- **Intelligent routing logic to balance work.** COFE® is continuously examining the amount of backlog in each pack lane and prioritizing the routing to balance the work.
- **Routing compensation for lane demand imbalance.** While COFE®'s work balancing cannot overcome lane demand imbalance, it normalizes the flow to the lanes so that the traffic to the lanes is smooth overtime.
- **Routing compensation for work rate imbalance.** When a lane has faster (or more) workers, it will consume product faster. COFE®'s routing will direct more work to the most consuming lanes.
- **Maximize the consumption of a container in a lane.** This feature minimizes the number of lanes a container will visit. This feature also maximizes the effective work rate in the put system since the put rate is a function of the units put in a lane
- **Dynamic slot assignment to lanes.** When configured, COFE® automatically assigns store merchandise categories to lanes. The assignment process focuses on balancing the work between lanes. More-than-average demand goes to less-than-average lanes, and less-than-average demand goes to more-than-average lanes.

Operational Efficiency: Making Better Decisions

The key to achieving higher efficiencies in any operation is to make better decisions as to what activities to perform and when to perform them. This is called “optimization.” An operational decision is no better than the information upon which it is based. By making real-time decisions, the most current and reliable information is available.

COFE® Makes Better Decisions

Most of COFE®'s benefits stem from technology that allows it to make better decisions. The following affordable technologies allow the incorporation and processing of the most current information to the decision-making process.

Data Accuracy

Making good decisions in a distribution operation is totally dependent on having accurate data. Accurate data is defined as the data matching the reality of the distribution operation. Distribution operations have significant challenges in maintaining accurate data for multiple reasons:

1. The life cycle of the information is long. The needed information may have been collected many months ago.
2. There are many “touches” or “modifications” of the data. Each “touch” of the data is an opportunity for an error.



3. In many instances, a single error is carried forward or propagated for multiple future touches. This is particularly true for inventory data when inventory in a location is replenished. Errors are carried forward until the next cycle count.
4. There are normally many opportunities for error with multiple work resources, and it is near impossible to identify the source of the error.
5. Errors can occur prior to receipt of product and will go undetected for a long time.
6. The cost of validating the accuracy of data is normally immense when compared to living with the inaccuracy created by bad data. For example, counting the unit contents of each arriving container for all containers—when most containers are accurate—is a huge expense when compared to accepting the provided accuracy and recovering when necessary.



Incorporating Latest Information

VARGO® created a term for incorporating the latest information for the decision making process: “Believing the Last Liar.” This term encompasses the concept that all data, new and existing, is suspect or possibly unreliable. All data originates from known imperfect sources. The concept then is expanded to the information system to incorporate the most recent data, continually “scrubbing” the data. Deviations or corrections to the data are recorded for tracking purposes, but the actual data used for the decision process itself is the most recent and most accurate scrubbed data. The information system paradigm is one in which the information system is continually trying to model “what is” rather than driving the operation to match the data.

Conclusions of Retail Fulfillment Optimization

The key to optimization is in making better decisions as to what activities to perform and when to perform them. COFE®’s real-time system architecture—coupled with the collection and incorporation of current information—allows decisions to be made based on the most reliable data.

COFE® uses neural logic in making decisions. This logic may also be called “fuzzy” logic, where the decision is based on the magnitudes of combinations of factors. A great example of this neural logic is how it drives the distribution of retail containers to the pack lines. The neural logic takes into account the current lane fullness, the current lane demand, the arriving container SKU and quantity of that SKU, and the age of the oldest demand in each lane. Neural logic then uses that combined data to decide how to route the container. Driving to a less full lane will help balance the workload; however, routing to that lane may only partially deplete the container, or another less empty lane may have an older demand. The magnitudes of the decision factors are simultaneously considered in choosing the desired location (lane) for the arriving container. The decision process itself is only made at the arrival of the container.

The decision to create additional pick tasks is based on the current work in progress. If there is sufficient work in progress, pulling (picking more) additional units will not be a benefit. At the time when addition picks are needed, the system will select the merchandise to pull based on the sequence for completing work.

All of these examples demonstrate how COFE® can make better decisions as it is evaluating current conditions and yield higher productivity in retail put systems through its optimization methodologies.

To learn more, contact the VARGO® retail distribution experts at thinksmart@vargomail.com or 1-877-876-6384.