

Hidden ASRS Data Reveals Opportunities

White Paper

Automated storage and retrieval systems offer more than just maximized inventory density and reduced storage footprint. They also contain a trove of specific picking and inventory handling data points that can be leveraged for greater overall operational efficiency.



Introduction: Static Storage vs. ASRS from a Data Point-of-View

Automated storage and retrieval systems (ASRS)—such as [horizontal carousel](#), [vertical carousel](#), [Vertical Lift Modules \(VLMs\)](#) or [Vertical Buffer Modules \(VBMs\)](#)—are often purchased and cost-justified based on the space savings and productivity increases they provide, as illustrated below.

All these benefits help justify the capital expenditure. And, you've likely heard them all before.

However, there's an additional benefit that isn't widely known or understood. A hidden gem that facility managers can leverage to improve efficiencies even more.

That gem is the available data that comes standard with ASRS units is hidden and frequently goes unused. This white paper details what data points are captured, how this data can be accessed and two case studies demonstrating how companies have leveraged this data to increase efficiencies.



Capturing Data

In a manual picking operation with a simplified or homegrown warehouse management system (WMS), or with none at all, the only data points typically captured are a request for goods movement and a confirmation of that movement via manual data entry. To capture intermediate steps—such as each picker's time of arrival at each pick face—data must be recorded by hand, a time-consuming and error-prone process.

Whether a WMS or enterprise resource management (ERP) system is present or not, a smaller facility with one or more ASRS units may not recognize that usable data about every operator login and every stock keeping unit (SKU) retrieved—in addition to capturing pick request and confirmation data—is captured by the storage system in real-time.

A large, WMS- or ERP-directed operation, or one with multi-site reporting, may be overwhelmed by the sheer amount of data available within the entire operation for analysis. Or, the overarching analysis and data reporting may be generalized across an entire operation, area or region—and not site or work cell specific enough to uncover opportunities for improvement or yield significant results.

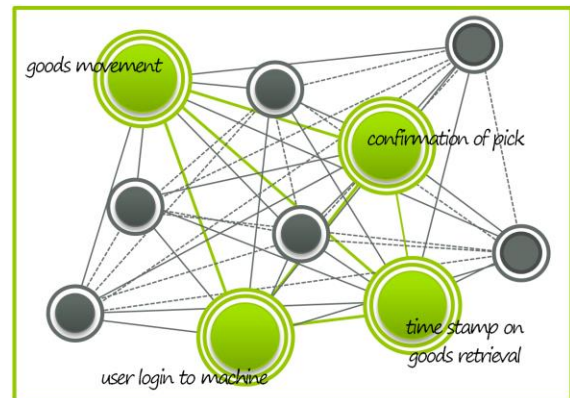


Table 1: Data Points Generally Captured by ASRS

ASRS (Horizontal Carousel, Vertical Carousel, VLM, VBM)
Goods movement request
User login to system
Time stamp on request start
Time stamp on goods retrieval
Automated confirmation of pick
Automated recording of discrepancies
Tracking of other adjustments in real time

Accessing & Interpreting The Data

With the right software solution, data captured within one or more automated horizontal carousels, vertical carousels or vertical lift modules can be extracted for analysis, as shown in Figure 1.

Figure 1: Raw ASRS Data

Supervisor	a2cab7b7-bf4b-413c-9...	300	17587	2	C	1d90919f-b6d0-4d95-8ea0-f36a8e8746af	1	StorageRoom01	2	2017-01-06 10:48:15
Supervisor	460c3c86-ebef0-4ef8-a...	200	17586	2	B	1d90919f-b6d0-4d95-8ea0-f36a8e8746af	3	StorageRoom01	2	2017-01-06 10:47:46
Supervisor	f6cf67bb-5ecc-4e49-93...	100	17585	5	A	1d90919f-b6d0-4d95-8ea0-f36a8e8746af	6	StorageRoom01	5	2017-01-06 10:47:22
Supervisor	3f79eeb6-7c42-47d9-8...	200	17584	3		e7201062-8f45-440d-b4b1-6d78aa6a0dff			3	2016-12-19 14:13:37

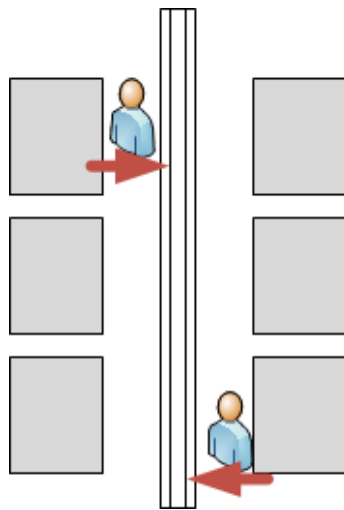
Implementing a targeted software solution that extracts and presents key information—including user identification, item picked in what quantity, and time stamp of the pick— with the push of a button allows quick analysis and understanding, as shown in Figure 2.

Figure 2: ASRS Data Parsed by Software for Easier Analysis, Interpretation

User	Material	Quantity	Σ	Date
Supervisor	300	2		2017-01-06 10:48:15
Supervisor	200	2		2017-01-06 10:47:46
Supervisor	100	5		2017-01-06 10:47:22
Supervisor	200	3		2016-12-19 14:13:37
Supervisor	100	2		2016-12-19 14:12:32

The following two case studies explain how such software was used to extract and evaluate this “hidden” data from ARRS machines. Doing so enables a root cause analysis to determine opportunities for better picking performance, yielding significant productivity and efficiency improvements.

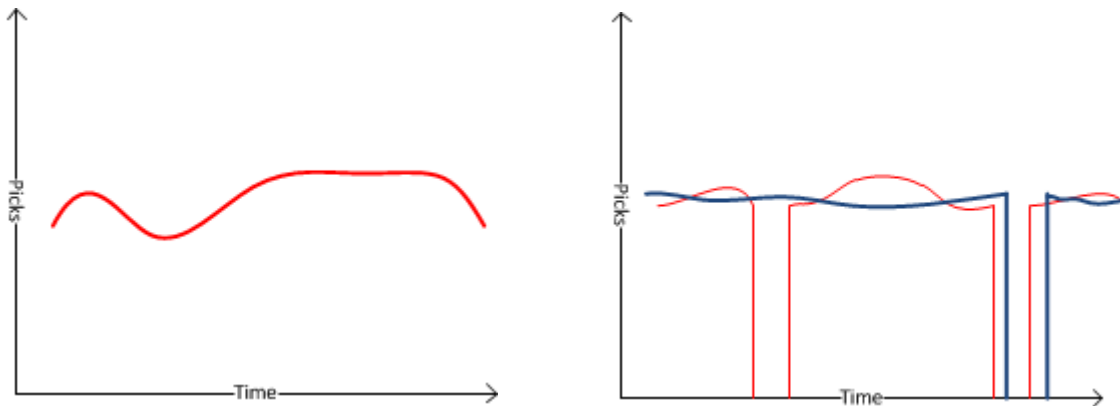
Case Study 1: Explaining “Random” Dips in Productivity



In this operation (illustrated on the left) a work cell, or pod, of six VLMs is served by two associates who pick items simultaneously, then place them on a conveyor for outbound movement. Whether for just-in-time delivery to line-side production in a manufacturing operation, or batched wave delivery to a pack-out area with limited workspace, consistent and continuous delivery of SKUs in a timely manner to their ultimate destination is critical to operational efficiency.

Graphically represented, the picking process should be a continuous, unbroken line, as shown on the left in Figure 3 below. However, in this instance, productivity kept falling off, with the flow of items suddenly stopping at what seemed to be random times during a shift. When physically observing the pickers yielded no answers, data extracted from the VLMs and analyzed by the software showed that pick rates for one or both workers dropping to zero, as shown on the right in Figure 3.

Figure 3: Continuous Picking vs. “Random” Productivity Dips



The data also showed the precise time each picker stopped picking, when each resumed picking, and the duration of the ceased activity. Armed with this knowledge, management realized that the pickers were taking unscheduled breaks, physically stepping away from their tasks. Although they were only gone for a few minutes at a time, their absence impacted the entire operation. In a manual picking operation requiring up to six pickers traveling to static pick faces in order to maintain the same throughput rate, this type of productivity drop would likely have gone unnoticed. But, with an ASRS and the data it captures, a “random” drop in productivity can be identified and rectified.

In this case, management made some scheduling changes to rotate personnel in and out of the area more frequently to accommodate breaks, as well as mandated that at least one operator continues working in the area at all times. Alternately, throughput and productivity incentives could be established, with the data used to determine which workers or shifts meet specified throughput goals.

Case Study 2: When Slotting Negatively Impacts Productivity

In this situation, a distribution operation stores all inventory in a combination of VLMs and horizontal carousels. The facility batches its order profiles and picks during two shifts: first shift picks single-piece orders for domestic shipping, while second shift picks considerably larger orders consisting of multiple quantities of a single SKU for international shipments.

In action, second shift was unable to match the productivity levels of the first shift. Management switched employees between shifts, thinking that certain associates might be picking faster than others, but the results were the same.

Upon closer analysis of the data, however, it was determined that during second shift a larger percentage (38%) of the picks were being made from the VLMs (Figure 4) compared to a smaller percentage (23%) of picks made from the VLM on the second shift (Figure 5). With 15% more picks occurring in the VLMs—which inherently run at slightly slower rates than horizontal carousels—throughput rates decreased.

The solution to this dip in productivity was a reevaluation of SKU slotting. Previous slotting efforts had focused entirely on optimizing the first shift picks.

Instead, SKUs were reslotted with both shifts in consideration. Additionally, because international order profiles called for large quantities of a single item, the facility added static case storage for bulk picks, while storing the same item in single quantities in the AS/RS modules for single pick orders.

The Solution: Software That Leverages Hidden ASRS Data

Whether an operation has a WMS or ERP system in place, or minimal to no inventory management system at all, the data generated by ASRS solutions such as horizontal carousels, vertical carousels and VLMs can provide valuable insights into opportunities for greater productivity and efficiency. To access that data and convert it into usable reports, a solution such as Kardex Remstar's Power Pick Global software is available. The system translates complex ARRS data sets into user-friendly drag-and-drop reporting. Scalable, it draws information from one or more machines, as well as can be used as a stand-alone WMS to direct manual picking in static shelving and pallet rack storage applications. Implementing such a software solution enables users to extract and evaluate "hidden" data to determine opportunities for better picking performance, and ultimately yield significant operational productivity and efficiency improvements.

To learn more about leveraging the hidden data within an ASRS for improved operational productivity with Power Pick Global software, contact your Kardex Remstar representative today.

Figure 4: First Shift Distribution of Total Number of Picks Across All ASRS

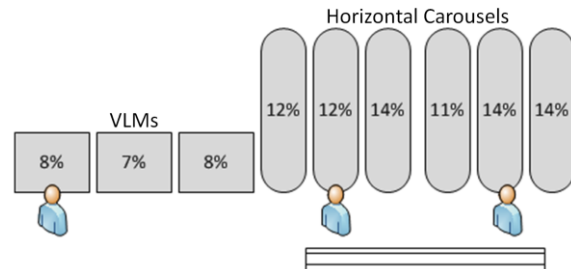
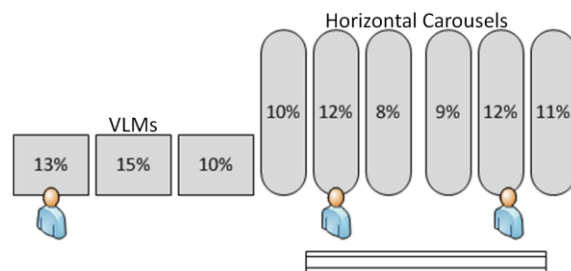


Figure 5: Second Shift Distribution of Total Number of Picks Across All ASRS



Automated Storage and Retrieval Systems Defined

Horizontal Carousels – Consisting of bins mounted on an oval track that rotate horizontally to deliver stored items to an operator. These automated storage and retrieval systems save up to 60% of floor space when compared to standard shelving and rack.



Vertical Carousels – Comprised of a series of shelves that rotate around a track—similar to a Ferris wheel—these automated storage and retrieval systems quickly deliver stored items to an ergonomically positioned work counter at the operator’s command. When compared to static shelving and rack, they save up to 75% of floor space.

Vertical Lift Modules (VLMs) – An enclosed automated storage and retrieval system that incorporates two columns of trays with a central inserter/extractor that automatically locates and retrieves stored trays from both columns, then presents them to the operator at a waist-high pick window. These systems save up to 85% of floor space compared to static shelving and rack.



Vertical Buffer Modules (VBMs) – In the middle of a multi-segment shelving system is an aisle, where a moveable mast with a telescopic gripper operates. The control unit sets the gripper in motion picking a bin and transporting it to a picking station.

About Kardex Remstar

Kardex Remstar, LLC, a company of the Kardex Group, is a leading provider of automated storage and retrieval systems for manufacturing, distribution, warehousing, offices and institutions. For information about the company’s dynamic storage solutions visit www.kardexremstar.com.