

Seize Manufacturing “Reshoring” Opportunities with ASRS Efficiencies

White Paper



The underlying factors for moving manufacturing back to the United States from overseas may finally be trending in favor of U.S. sites. This shift—known as reshoring—is being driven by multiple factors, including rising labor costs overseas.

But the shift away from offshoring is far from a foregone conclusion, nor is it a decision that is determined solely by labor costs. Some of the factors driving the trend, according to Harry Moser, founder and president of the Reshoring Initiative,¹ a non-profit organization which focuses on bringing manufacturing jobs back to U.S. locations, include:

Rising labor costs in countries such as China, which has experienced wage growth of about 18 percent a year over the last decade.

The abundance of shale gas resources for the U.S. market.

A preference among U.S. consumers to buy American.

These megatrends are starting to put U.S. manufacturing on a more even footing. According to Moser, about 10 years ago, when offshoring was in full swing, about 150,000 U.S. manufacturing jobs were being offshored per year, with only about 2,000 to 3,000 being brought back. Today, the numbers are nearly even, with reshoring accounting for about 30,000 jobs per year, and offshoring slowed to about 30,000 to 40,000 jobs. “It’s now close to a one-to-one ratio,” said Moser. “Essentially, we’ve stopped the bleeding.”



Other sources also indicate reshoring momentum. A 2013 survey by Boston Consulting Group (BCG)² found that 54 percent of U.S. manufacturing executives at companies with annual sales greater than \$1 billion are planning to bring back production to the U.S. from China or are actively considering it, up from 37 percent of executives in a similar BCG survey in 2012.

¹ The Reshoring Initiative home page. <http://www.reshorenw.org>

² Boston Consulting Group, press release. <http://www.bcg.com/media/PressReleaseDetails.aspx?id=tcm:12-144944>

Calculating the Cost

To make an informed decision, companies need to assess the total cost of ownership for offshoring versus reshoring. The Reshoring Initiative provides a free online tool for doing this analysis (http://reshorennow.org/TCO_Estimator.cfm). When companies find that the cost difference is very close, it's possible that some lean manufacturing improvements, automation, or training could tip the decision in reshoring's favor.

"If you've done the analysis, and the cost of reshoring is maybe 5 percent higher than offshoring, then it's a good time to call in the lean experts, or work with a Manufacturing Extension Partnership program, and examine what new processes, or automation, or techniques could be used at a U.S. site to close the gap," says Moser.

In essence, reshoring gives North American manufacturers a good reason to re-examine their processes around core issues such as materials management and material flow, labor efficiencies, use of space, all the way up to broader concerns including product design and configure-to-order strategies. Equipment such as automated storage and retrieval systems (ASRS) that streamline materials handling and minimize labor content can help a company achieve the efficiency strategies it deems appropriate.

Closing the Gap with Process Improvements

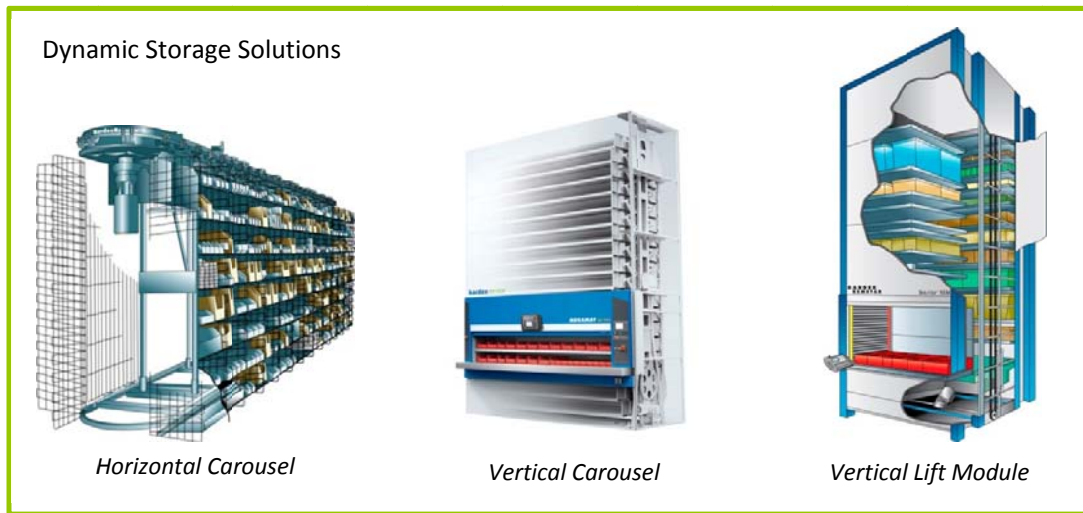
In this paper, you'll learn how ASRS equipment aligns process improvement strategies such as lean. It all comes back to making manufacturing as efficient as possible, with benefits across three key areas:

- Increased Labor Productivity
- Gaining Space And Capacity
- Improved Accuracy And Quality

These benefits have been proven out in the manufacturing industry by users of Kardex Remstar solutions. While included examples were not driven by reshoring, they speak to the type of productivity, space saving, and material flow improvements enabling better times for U.S. manufacturing.

Kardex Remstar's dynamic storage solutions span three categories:

- Horizontal carousels, which use bins mounted on an oval track and rotate horizontally to present goods to a location.
- Vertical carousels, which have shelves that rotate vertically on a track to place goods at an ergonomically positioned work counter.
- Vertical lift modules (VLMs), a type of enclosed ASRS that consist of dual vertical columns of trays with an inserter/extractor device that runs down the center to deliver what is in the trays to a pick window.



Lean & Productive

To become more globally competitive, U.S. manufacturers have widely adopted lean manufacturing methods that seek to manufacture goods on a just-in-time basis and eliminate waste, including wasted space, excess inventory, and wasted motion involved in assembly and materials handling. Some surveys place the adoption of lean practices by U.S. companies at more than 70 percent.³

Lean practices were pioneered by Taiichi Ohno, developer of the Toyota Production System at Toyota Motor Corporation in the post-World War II era. Among those concepts is the elimination of the “Seven Deadly Wastes,” of which excess motion is one, and excess transportation/conveyance is another. To this day, the elimination of waste or “muda”⁴ is seen as a pillar of lean manufacturing. Dynamic storage solutions support lean by reducing



³ Compdata Surveys, 2011 Compensation Data Manufacturing & Distribution, lean practices.
<http://www.compdatasurveys.com/2011/09/01/lean-practices-aid-manufacturers-in-recovery>

⁴ Toyota Production System terms, Toyota Motor Manufacturing, Kentucky.
<http://www.toyotageorgetown.com/terms.asp>

wasted motion in the picking of parts, subassemblies, or finished goods, while reducing the physical footprint required to store goods.

While the features among these product families vary, they all follow a “goods to person” concept in which the dynamic storage quickly and accurately moves goods to an operator. By contrast, a more traditional “person to goods” operation would have a worker walking through aisles of storage racks or shelves to locate goods, perhaps pushing a cart to move parts or bins, and using a pick list and/or scanner to verify the parts being picked. This way of doing things causes waste in the form of travel/motion, search time, and time spent verifying a pick.

Dynamic storage does away with these inefficient processes by automatically bringing goods to the operator. ASRS inventory management software integrates with host systems to accurately fulfill customer orders and replenish the optimal inventory level in the ASRS.

At the operator station itself, dynamic storage may make use of an operator interface panel or an integrated pick to light display to ensure rapid, accurate picking. Additionally, ergonomic hoists and lifting devices can be integrated with an ASRS to speed up operations and eliminate the manual lifting of goods, an especially important consideration in manufacturing work-in-process where heavy parts need to be moved. In some assembly environments, ASRSs may even be paired with materials handling robots to bring a high degree of automation to a manufacturing step.

As a result, dynamic storage can add up to significant productivity gains. Generally, moving from traditional shelving to ASRS can cut the required labor by two-thirds, allowing companies to reassign people to more value-added activities in production or quality assurance. Eliminating wasted motion also results in better throughput.

For example, at Christie,⁵ a manufacturer of projector systems based in Ontario, Canada, two Shuttle VLMs with inventory management software were deployed to improve storage and handling of subassemblies. Previously, to meet the need for rapid customization, Christie kept an inventory of 100 sub-assembled projectors, each stored on a two-foot by three-foot sized cart.

Since the subassemblies look the same, simply finding the right cart previously took 15 to 20 minutes. With the old system, it took four workers to pick and handle the inventory, but with the VLMs, now two workers can achieve the same result. Instead of the long search time, now each subassembly is delivered to the operator in under a minute. Christie is retrieving the projectors over 90 percent faster with half of the labor.

⁵ Christie case study. <http://www.kardexremstar.com/us/storage-picking-optimisation/customer-references-us/christie.html>



Gaining Space & Capacity

Along with productivity improvements, dynamic storage also consumes significantly less space. At Christie, the old cart-based system took up 600-square feet to store 100 subassemblies. Now one VLM can hold that same capacity, but occupies just 180 square feet. This represents a 70-percent floor space savings.

Christie is an example of a North American manufacturer that follows a Kaizen and Lean Manufacturing philosophy, including the 5S principles of “sort, set in order, shine, standardize, and sustain.” Dynamic storage can be seen as supportive of these principles.

Any time a manufacturing site can produce more with less—including less space—it becomes more cost competitive. When you create more useable space, it becomes possible to perform more value-added work out the same facility. With the 70 percent space savings that Christie gained, it was able to expand its production process from six assembly stations to nine assembly stations.

Dynamic storage can achieve this level of space savings because of its efficient, dense use of vertical space, as well as eliminating the aisle space. Carousels, for instance, use dense arrangement of various-sized totes and dividers to efficiently hold the needed mix of inventory. Shuttle VLMs have trays that allow for variable increment storage heights inside the machine, rather than using fixed tray heights that waste space.

VLMs also have height detector sensors that measure the height profile of each storage tray’s content, and instantly determines the best storage location. This function permits storage trays to be placed within 1 inch of each other, providing up to an additional 50 percent storage capacity per unit. By comparison, traditional needs “reach-in space” or empty space within each shelf to allow room to pick. With dynamic storage, reach-in space as well as aisle space is essentially eliminated.

Accurate, Repeatable Processes

Another way that dynamic storage fits in with improved manufacturing practices is by supporting repeatable, accurate processes. With dynamic storage, features such as integrated pick-to-light means less chance for error, along with faster pick processes.

At Plasser,⁶ a manufacturer and distributor of parts and systems for the rail transit industry, the deployment of eight Shuttle VLMs at its Chesapeake, Va., facility has reduced the footprint of its stockroom at by 70 percent, reduced labor needed for picking by 20 percent, and increased pick accuracy from 98 percent to 99.7 percent. The accuracy gain is attributed to the integrated pick-to-light feature of the VLMs along with the labeling process used. When the VLMs present a tray for picking, a pick to light TIC (transaction information center) directs the operator to the exact location of the part, displaying the quantity and part number to be picked.



Increase Efficiencies for Reshoring

While incremental improvements in accuracy through dynamic storage may not seem like game-changers for U.S. manufacturing, when better accuracy can be combined with sizable improvements in labor productivity and space savings, the case for dynamic storage as an enabler of lean efficiencies is clear cut. Reshoring appears to be gaining momentum, but with off-shore locations still having much lower labor costs, North American manufacturing will need to be as lean and efficient as possible to turn the tables on offshoring.

⁶ Plasser case study. <http://www.kardexremstar.com/us/storage-picking-optimisation/customer-references-us/plasser.html>

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, call 800-639-5805 or visit www.KardexRemstar.com.