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SITE

Hayes Manufacturing, Fife Lake, MI

APPLICATION

Point of use manufacturing, automotive parts manufacturing

EQUIPMENT

Three Shuttle VLMs, FastPic4 inventory management software

SUMMARY

Each Shuttle VLM uses 69 sq. ft. of floor space to replace over 1000 sq. ft. shelving area

Shuttle VLM provides 436 cubic ft. of capacity in a 69 sq. ft. footprint.

Hayes expands internally with Shuttle™ VLM to eliminate walk & search time & triple manufacturing space

As Hayes Manufacturing grew from a job shop to high volume coupling supplier to the automotive and heavy equipment industry, its 26,000 square foot facility began to get crowded. Hayes needed more table-top assembly space to meet steadily rising orders for its core flywheel and drive couplings and its newer line of bell housings. The Fife Lake, Michigan company found the space it needed by relocating the parts shelving area that was taking up half of its building to an automated Shuttle Vertical Lift Module (VLM) made by Remstar, International.

Driving the need for storage space was the intensive backroom assembly required for couplings and bell housings. The engine flywheel couplings, which account for two-thirds of Hayes' business, can weigh up to 20 pounds. They consist of a hardened-steel hub to which a system of bushings and fasteners attach up to eighteen neoprene inserts. Added to this are a variety of other components such as pump mounting plates and grease plugs.

Hayes was assembling such products on some 40 linear feet of table space, consisting of tables ranging in length from eight feet to 18 feet. As each order came in, order processors would create a clipboard containing relevant details and place it in the assembly area. There, assemblers with clipboard in hand would pick the parts they needed from rows of conventional steel shelving.

Once the assemblers brought the parts to the table, the required space and completion time varied with the size of the job. A typical order for 100 housing assemblies, for example, could require 12 linear feet of table-top and involve other tables for various steps in the assembly process. Completion time for such a project would be about four hours, about half hour of which might have been spent locating parts.

"Competition for table space increased with size and volume of orders. It was getting to be a real problem. When a hot job came in, for example, we would have to stop work on a less urgent project, clear the parts, put them away, complete the new job and then set up again for the original project. This was time-consuming and costly and was happening more and more often," says Hayes Manufacturing Vice President, Jim Hayes.

Looking upwards

Hayes figured he needed at least three times more table top space to solve such problems, and knew that, short of building an addition, the parts storage area was the only place to find that space. That storage area occupied most of the northern half of the building's 2600 square feet. Rows of 24" wide steel shelving lined the west and north walls, and ten 4' by 8' shelving units, each with six to eight shelves stood on the floor. Several tables were also used to store parts. Moving assembly operations into that space meant finding a new, easily accessible location for these parts and the only direction available was up toward the 20 foot ceiling.

Weighing the options

An evaluation began for alternative structures that would handle the weight of the product inventory and provide at least the same ease of access that they had before. The first option evaluated was construction of a mezzanine that would be 30 feet deep and would span the entire 38 foot width of the building, rising 10 feet above the existing parts storage area.

"Using a 78 square foot area, including the operator's work area, Hayes was able to replace more than 1000 square feet of shelving area."

The mezzanine would have delivered the needed space, but would have required additional equipment to move product up and down. Two alternatives were looked at. One was a conveyor system, which would snake from the mezzanine to the floor and throughout the assembly table area. In this model, an assembler would go to the mezzanine, pick the parts they needed, place them on the conveyor, walk to the assembly area and pick the parts as they came by.

The other alternative considered was a vertical lift that would have functioned like a conventional elevator. Both the conveyor and the elevator-based solutions, however,

By calculating the cost of building and maintaining alternative equipment it became clear that the Shuttle VLM met their budgetary objectives.

involved costly construction and control systems and would still have required extensive handling to move parts from storage shelves to the belt or lift.

Hayes went back to their original objectives of expanding internally without construction and making parts easier to feed to the assembly workers. When they calculated the cost of building and maintaining conveyors and lifts, it became clear that they could meet these objectives more cost effectively with an automated storage and retrieval system. This would also enable Hayes Manufacturing to move from manual to automated inventory management.

Given the weight of the assembly components - 27,000 pounds of parts needed to be stored - the only feasible automated solution available was Remstar's Shuttle VLM. Shuttle VLMs are modular towers used to automate storage and retrieval of items with a broad range of sizes, ranging from small parts to large or heavy items. The installation at Hayes includes three units, each 17 feet tall, 7.1 feet wide and 9.75 feet deep, providing 436 cubic feet of compact storage area in a 69 square foot footprint.

Items are stored on galvanized trays, each six feet wide, 34 inches deep, and surrounded by 2.8 inches high wall. Each tray can hold up to 900 pounds of parts, tools, or equipment. The Hayes system can support up to 65 tray locations, depending on the height of the objects stored, and is now configured for 35 trays.

Operators access the storage trays through a single window at which parts are located or retrieved from the metal trays. In a storage operation, a mechanical lift in the center of the unit transports metal trays to shelving positions that line the front and back walls. The unit's controls use a microprocessor-driven monitoring system, which automatically counts the total number of available shelving positions, calculates the distance between them, and stores information in memory. When an operator loads items into the tray for storage, a series of photo eyes measure the height of the tray and its load and finds an available location, to maximize the units capacity.

Likewise, when retrieving parts, the software knows the tray on which the part is located, and presents it to the pick window, at the ergonomically positioned "Golden Zone," just about waist high. Once the parts arrive, assemblers move them onto a cart and wheel it to the assembly area.

Smart Storage

Hayes used FastPic™ inventory management software to optimize the storage space. Running on a PC, FastPic software guides users through the process of defining available storage space, entering the dimensions of objects to be stored, determining the heights of the interior storage shelves and choosing the most efficient arrangement of items in the trays.

The strategy of combining automated and manual layout paid off especially for

FastPic inventory management software is used to help optimize the storage space and inventory control.

storage of drive hubs. Drive hubs are small circular parts, an inch to an inch-and-a-half in diameter with a hole in the center. While items of this size might typically be stored in totes or other containers that would then be loaded onto a Shuttle tray, Hayes solved the problem by using rows of spindles on which the hubs are stacked. The spindles stand vertically in the shuttle trays maximizing density.

Mission Accomplished

Within a 78 square foot area, including the operator's work area, Hayes Manufacturing was able to replace more than 1000 square feet of shelving area. This was the result of condensing the stored items into 436 cubic feet of storage space and eliminating the walk and work areas required by the conventional shelving. As a result Hayes Manufacturing boosted its table top assembly space from 40 to 120 linear feet.

"We now have enough space to handle 3-4 hot jobs, without having to break down an existing order. We've also improved access to parts - able to find just about any part in less than 20 seconds and have eliminated manual inventory time. We just print out the report of the contents of the Shuttle VLM and we're done," said Hayes.

REMSTAR

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