

Extreme Freezer Environments Breed Extreme Cash Loss

BY RUSSELL W. GOODMAN

A specialty-foods processor finds that an automated system can mitigate or eliminate some of the challenges of manually operated cold storage warehousing, such as low productivity among personnel, higher rates of damage to equipment and product, and costly energy loss.

If anyone should be able to identify with J.T.M. Food Group's concerns about cold storage warehouses, it's parents of young children. For generations now they've told kids to close the kitchen refrigerator door with a cry something like, "You're letting the cold air out!"

In the case of JTM, a specialty-foods processor based in Harrison, Ohio, energy transfer in its freezer warehouses—or, letting the cold air out—was a very big deal. Energy loss actually occurred several ways, but one of the main culprits was the extra-wide doors needed to allow operators to move forklifts into and out of freezer facilities. With every passage, not only did pallets of product flow out but so did cash in the form of lost energy.

The money hemorrhage didn't stop there, however. Compared to ambient warehouses, cold storage facilities record higher rates of damage to racks and prod-

uct from forklifts, trucks and other human-operated devices. Maintenance costs of equipment, often battery operated, can be higher in below-zero environments. Worker productivity may lag given the breaks from the cold that employees need. And, of course, inventory and order fulfillment may suffer as humans rush to complete a given task.

J.T.M. Food Group, which has a vast array of frozen-food products, had used manually operated freezers since its inception in 1960 as a butcher shop in Cincinnati. Its focus eventually evolved into food processing, and as business grew, so did its need for additional cold storage. Such buildings are very costly to put up, according to Joe Maas Sr., vice president of operations. But that was the model JTM followed until a business associate suggested that Maas consider an automated storage and retrieval system.

There was a certain irony there, given that the tip came from a manufacturer of mezzanines and stairways rather than someone in the food business. But Maas took his advice, looked into the computer-controlled systems for depositing, inventorying and retrieving loads, and ultimately struck a deal with Grand Rapids, Mich.-based Dematic North America. The green-field project, built on the parking lot of the JTM manufacturing plant, rises 85 feet, and Maas says the benefits are just as impressive. Inventory and order fulfillment accuracy are nearly 100 percent, warehouse labor has been reduced by 75 percent, product and warehouse damage are bad memories from the past, and energy usage has been cut drastically—anywhere from 50 percent to 66 percent, depending on a number of factors.

That's the "after" picture. "Before" wasn't so rosy except to the extent that the need

for more warehousing stemmed from terrific sales. “My company has enjoyed double-digit growth, remarkable growth years,” Maas says. “So every three or four years, I was building a new freezer, but it’s terribly expensive to build and operate.”

Maas compares his world to that of businesses that use ambient warehousing and is acutely aware of the cost difference. “With ambient, you can build 100,000 square feet of storage and it doesn’t really cost you that much more than a 30,000-square-foot facility because it’s just light, maybe some ventilation fans. Freezers are a different story.”

Labor is one of the big differences, he says, “People really don’t like working in freezers all day long. I don’t know that I had a tremendous amount of turnover, but all in all people just don’t like going in the freezer. So, whenever possible, they tended to not be in there.

“With that in mind, when they were

working in there, they may have been a bit rushed. And working with forklifts, that lends itself to damage in that kind of environment.”

Still another problem with manual systems was the amount of “lost” product. Items simply got placed out of sight because JTM used push-back racking, Maas says. Ideally, the oldest pallet should be picked when fulfilling an order, and that’s what occurs now with the Dematic ASRS. But under the old system, employees working in extreme-temperature environments often picked the pallet that was in front of them rather than the one on top and in the back. Maas says he understands that process all too well, “human nature being what it is.”

The same phenomenon was partly responsible for order fulfillment inaccuracies. A person might go into the warehouse to get a certain SKU, but hurriedly grabs the

wrong item. Unfortunately, that’s what got shipped—and that’s what got returned.

“I know these things happen in ambient as well,” Maas says, “because there are certain human limitations that exist everywhere. But these were our challenges: We had FIFO [first-in, first out] issues, order fulfillment issues, inventory issues, and people issues—finding people willing to work in the environment.”

In making the switch, the \$3m that JTM probably would have spent on another manual warehouse went toward the Dematic system. Maas says the automatic set-up cost approximately \$3.25m. There was never a question of retrofitting another building, Maas notes. Number one, there was no existing structure next to his processing plant that could be used; secondly, the automated systems are too specialized for such a building. “That just doesn’t happen,” says Maas.



The entire project approached \$8m, says Maas. Return on investment? "It's terribly hard to put a number like that on paper, but it's probably 12 to 14 years."

Becoming a sort of 3PL is one way J.T.M. Food Group is recouping some of that money outlay. The new freezer is so large that JTM rents space to another client. "I ended up building a much larger facility than I anticipated for my needs," Maas says. "But the business strategy and justification for this freezer was in renting a part of it out and trying to make it a profit center in itself."

Of course, that client, an ice-cube manufacturer, uses the ASRS also, says Mike Khodl, director of supply chain services for Dematic North America.

JTM simply has to take care that its warehouse management system bills that client properly, Khodl says. "For us, it's just another lot and pallet that we're tracking through the system. All we're doing is tracking SKU ID numbers and inventory."

As long as a facility has enough physical space to accommodate other clients, the ASRS system can meet their needs as well, says Khodl. He says he can point to other Dematic customers who are "co-oped" and may have five or six companies using the same storage and retrieval system.

For all the attention paid to energy loss through doors, two other areas are equally critical: moisture infiltration and roofs. The former is important because power is consumed in defrosting the refrigeration system, the latter because energy is lost directly through roofs.

The new ASRS system has minimized moisture infiltration, Maas says, but eliminating it entirely isn't possible. Nevertheless, where daily defrosting was the norm with manual warehouse systems, that's no longer the case now.

"Because you have 8-foot by 10-foot-wide doors for forklifts to go in and out all day, you have a lot of moisture," Maas says. "And my people aren't always perfect at keeping doors shut, so moisture gets in and vapor pressure builds up. Moisture freezes on the coils, especially in the summer months, and that's not free to get rid of. You have to produce the heat to get rid of it, and secondly, now you're fanning heat into a freezer, so that's never good."

The ASRS doors are much smaller and only open when product comes through, then immediately close. "You just don't get the moisture infiltration that you would get

with a standard set-up."

With manual systems, operators generally have to refrigerate their docks to combat moisture buildup. Maas says he finds that no longer necessary.

As for the roof, size is critical. The smaller, the better in terms of energy savings. "You want the smallest square footage of roof per cubic foot possible," Maas says, "and you're definitely getting that with an ASRS simply because you can build tall. The ratio you

J.T.M. Food Group at a Glance

The company: J.T.M. Food Group is a family-owned specialty processor producing such products as meat balls, sausage links, pork chorizo, steak ranchero, beef stroganoff, chili verde, turkey a la king, cream of broccoli soup and Angus beef chili. All of the company's products are frozen, and are cooked, packaged and distributed from its own plant.

Headquarters: Harrison, Ohio, near Cincinnati.

Financial results: Sales exceeded \$72m in 2007.

Operations: Since 1960, when the company first operated as a modest retail meat shop in downtown Cincinnati, it has grown into a food-processing company that runs a kettle cooking line, a grind-and-form line and a bakery line within its facility. It distributes more than 1,000 items in 42 states. Half of its product line goes to school lunch programs. It also sells to restaurants, supermarkets and the military.

Supply chain challenge: Its manual cold storage warehouse was inefficient and costly to operate.

Supply chain partner: Dematic North America.

want is minimal roof per cubic foot."

JTM's new freezer is 85 feet in height now versus 24 feet formerly. The old configuration would have required three and a half times the footprint of the new warehouse. In that standard freezer configura-

tion, two or more aisles 12 feet in width were needed to accommodate forklifts or other wheeled vehicles. That's compared to one 5-foot aisle in the new set-up. Aisles, of course, are dead but costly space: they contain no product, but you pay to cool them anyway.

Deep-lane storage makes the single aisle possible. "Now, my entire freezer is the width of what would be the width of just the aisles alone if you went with the standard technology," Maas says.

In addition, since no humans enter the warehouse, the retrieval system ensures that first-in product is first to be pulled off shelves for shipment.

Dematic breaks the food industry into two segments: food and beverage, which deals with finished goods, like what J.T.M. Food Group distributes, and the grocery industry, which involves retailers.

The former group may store many products, but they move multiple pallets of the same SKU, says Khodl, whereas retailers move pallets with multiple products on them. It's a distinction with a major difference because those elements drive completely different levels of automation and the type of systems implemented.

In its business, Dematic is quite familiar with the needs and challenges of companies in the food and beverage sector, and the systems required to meet them.

Speaking of labor generally, Khodl says it's not uncommon for employees to spend 20 minutes of every hour outside freezers. Often this is because of state laws, but the result is a loss in productivity.

He can speak to other issues raised by Maas as well, such as order accuracy and property damage. "Order accuracy is a key driver because in a manual system you tend not to pick as accurately as you need, especially in a freezer environment.

"Also, if I produce 20 pallets of patties and store them, I can't guarantee that someone will pick the first produced in a manual environment. With an automatic system I can ensure that. I bring out the first pallet I produced, pick off that first, and then work myself back from that."

Damage? "When you have lots of high-low traffic and motorized hand trucks driving around every day, you're often hitting the rack structure and making it less efficient. Joe eliminated 100 percent of that traffic. He now has no rack and equipment damage. He also pulled out of all his battery equipment. Bat-

tery wear on vehicles, due to extremely low temperature, is no longer a productivity issue in operating that freezer.”

So much for the benefits. Here’s how the system works.

Product coming off a manufacturing line is placed on a pallet and brought to the freezer. There it is unloaded and placed on pallet conveyor system at ambient temperature. “We scan a label associated with that pallet, put it in our inventory control database, then send it to a station that determines if it’s the size and weight it’s supposed to be,” Khodl says. “It’s rejected there if, for example, cases are missing.”

Then the product is routed directly into the freezer, and on to a pick point for the storage retrieval system. Carrying two pallets at a time, the retrieval system delivers the product into the deep-lane storage operation.

Khodl says that while Dematic has designed two-load handling devices for companies in Europe, where space limitation often is a major concern for manufacturers, the system built for JTM is a first in North America.

“On one side of the aisle, JTM can store four pallets deep, and on the other side, it stores eight. It’s architected that way because JTM runs large volumes of the same SKU.”

The inventory control system for the ASRS—what Dematic calls Staging Director—is then notified where the pallets are, and given all lot, product type or other information.

When fulfilling orders, the inventory control system is directed to the oldest product in the freezer, retrieves it, brings it to a pick station, where it meets up with the conveyor system, and is routed out of the freezer to an assigned work station.

“From our standpoint, it’s all about the cost to operate a high-density storage freezer versus a manually operated conventional storage freezer,” Khodl says. And among the cost savings an automated system can bring is labor, Khodl says. “We’ve eliminated the need for anyone but a maintenance person to ever go in that freezer.”

No more refrigerator doors left open. ○

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Reduce the Footprint, Reduce the Energy Bill

High-bay accessibility is a major benefit for a company switching from a manual to an ASRS cold storage facility. In a typical cold storage warehouse where forklifts are used, the lift’s maximum reach is 14 to 16 feet, allowing about four vertical pallet positions for a maximum 20-foot rack height. With an ASRS facility, it is common to have as many as 12 vertical pallet positions on 50-foot racks. In a non-freezer warehouse this is an important efficiency factor in footprint consolidation. In a cold storage warehouse, the footprint reduction becomes an absolutely critical factor in energy savings, according to Mike Khodl, director of supply chain services for Dematic North America.

In effect, cold storage warehouses are giant insulated freezers which extract heat to produce a cold environment. The removal of heat is expensive—significantly more than what it takes to put heat into a space. But just like heating a space, where the majority of heat is lost through the roof, the same is true with freezers, but here it is the cold that is lost. So, the smaller the footprint, the more efficient the energy use. A cold storage facility with an ASRS could reduce energy costs to one-third of that needed for a manual facility, according to Dematic officials.

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