



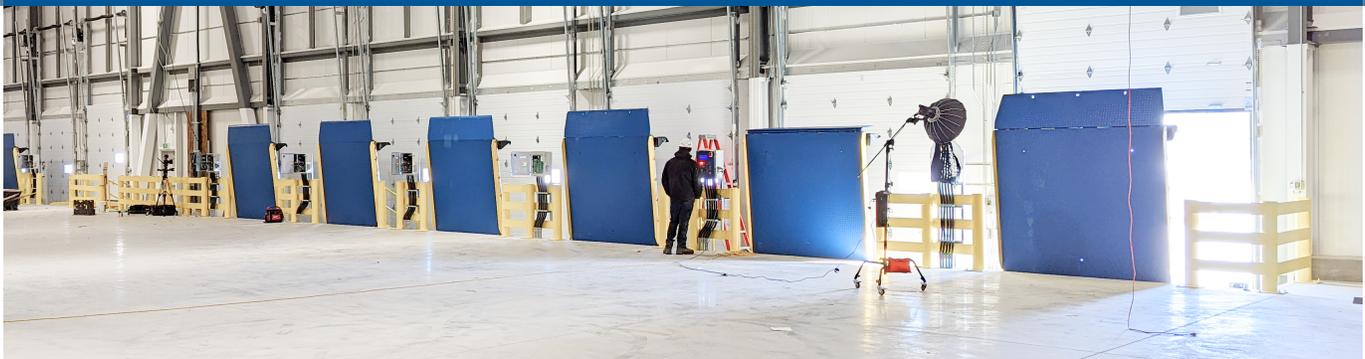
Challenges Facing the Cold Storage Industry

Often Overlooked, How the
Loading Dock Plays a Critical
Role in the Cold-Chain



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Introduction

The cold storage market was valued at \$138.97 billion (USD) in 2022 and is projected to grow at a compound annual growth rate (CAGR) of 17.2% from 2023 to 2030 ([Grand View Research](#)). Cold storage warehousing handles everything from the storing of perishables to the storing of other sensitive goods like food and medicines at a specific temperature range to maintain their integrity, shelf-life, and quality.

Cold storage warehousing generally falls into two categories, dictated by the temperature:

- Refrigerated: with the controlled temperature at 32-50°F (0 to 10°C).
- Frozen: with the controlled temperature at -22-32°F (-30 to 0°C).

When it comes to choosing whether to use a refrigerated or a frozen cold storage facility, it is important to consider the types of goods that will be stored. For example, when the COVID-19 pandemic was at its height, the Pfizer-BioNTech vaccine was the first vaccine in most countries to be approved for public use.

However, concerns arose about how to store and transport the vaccine as it needs to be kept at temperatures of -94°F (-70°C) exactly. In instances such as these, effective and safe cold storage can be the difference between thousands of people receiving a life-saving vaccine or the vaccines becoming spoiled and unusable in transit.

For companies that handle perishable goods that need to be kept at a certain temperature consistently, cold storage is an essential component for keeping consumer products in a safe condition for consumption. While cold storage is an essential storage method for many industries, it can be complicated in practice and creates a unique set of challenges for designers, building operators, and employees in these facilities.

As demand for efficient cold storage real estate increases, companies look to master how to maintain the ideal environmental variables of cold storage facilities. Here, we look at some of the challenges facing the cold storage industry from a warehouse design standpoint, including the ergonomics and safety of employees, and what solutions are available to solve them.



Challenges Facing the Cold Storage Industry

Cold storage is one of the most effective ways to store temperature-sensitive and perishable goods, but it does not come without its challenges. Some of the most significant challenges when it comes to cold storage in a warehouse setting are:

- Temperature Fluctuations
- Energy Usage
- Contamination

Temperature Fluctuations

Fluctuating temperature is a challenge with cold storage because a consistent temperature of 39°F (4°C) for refrigerated cold storage or -0.4°F (-18°C) for frozen cold storage is best. When the temperature begins to rise due to the warmth of the outside air, this puts perishable goods at risk of becoming spoiled and leads to condensation around the dock.

When outfitting cold storage with traditional pit style (horizontal) loading docks, there can be problems with temperature fluctuations. Air infiltration occurs with these types of loading docks due to the steel dock that lies between the industrial storage unit and the truck. Steel is highly conductive, meaning that when the truck begins to unload, heat from the outside seeps along the metal and into the cold storage unit, which can cause a drop in temperature. Additionally, the trailer doors need to open on the drive to approach, which exposes the goods to outside temperatures and humidity.

Energy Usage

When warmer outside air infiltrates the cold storage facility causing the temperature to rise, the Heating, Ventilation, and Air Conditioning (HVAC) system in the unit has to work harder to maintain the required temperature set-point. As a result, companies face substantial energy loss and high bills. By improving the seal around the truck and the loading dock, you can maintain a consistently cold temperature without expending unnecessary energy.



Contamination

Another challenge cold storage companies face is contamination. Traditional pit style loading dock systems have gaps around the pit wall and allow for infiltration, which leaves the unit vulnerable to contamination from small animals, such as insects and rodents, and sunlight (aka white spaces).

Depending on the region, warehouse operators must comply with various cold chain management safety audits at various stages when handling temperature-sensitive goods. In North America and depending on what goods are being stored, these may **include**:

- Good Manufacturing Practices (GMP)
- Good Distribution Practices (GDP)
- Hazard Analysis Critical Control Point (HACCP)
- FDA regulations and CDC guidelines
- Industry-specific standards and guidelines
- Food safety management system standards
- Customer-specific requirements

Audit inspectors dislike seeing sunlight enter cold storage facilities and, obviously, will not tolerate contamination from rodents.

To avoid any risks of contamination, all steps of the cold chain management process should be optimized to prevent contamination from sunlight or small rodents. This helps ensure compliance with all required audits and standards.



Ergonomics and Safety

Another important aspect of cold storage is the ergonomics and safety hazards of operating a cold storage facility. The main challenges with cold storage ergonomics and safety are:

- Loading and Unloading Hazards
- Slip and Fall Hazards

Loading and Unloading Hazards

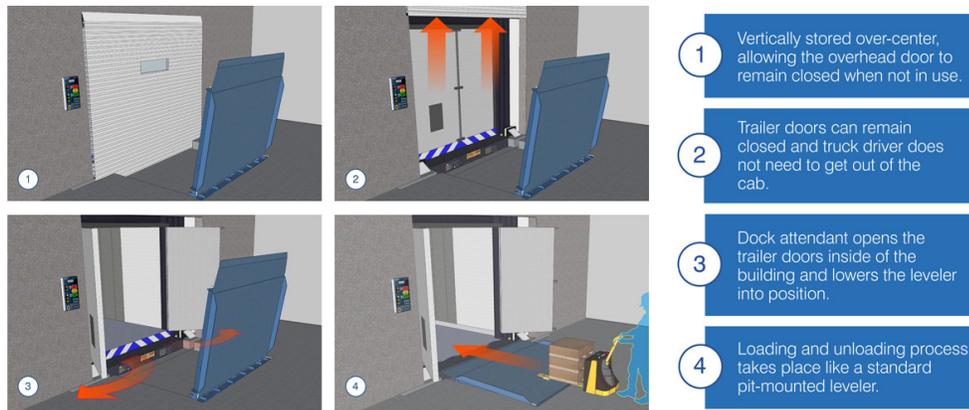
In Canada alone, forklift accidents are responsible for 34,900 serious injuries annually (McCue). When warehouse workers unload shipments from trucks to the warehouse, communication between the forklift driver and the truck driver is essential to prevent injuries.

Furthermore, vehicle restraints - which stop the vehicle from moving when it is being unloaded - should be sufficient and in good repair to ensure employee safety.

Slip and Fall Hazards

A traditional pit style dock leveler has the overhead door close on the dock. This opens up the risk of warm, moist air mixing with the colder temperature inside, leading to condensation. Condensation is not only evidence of temperature fluctuations, but also creates a slip-and-fall hazard for the workers in the warehouse as they load or unload the trucks.

Loading Dock Equipment Solutions for Cold Storage



Vertical Dock Levelers

Many of the challenges faced by those working in cold storage environments can be solved by using a vertical dock leveler instead of a traditional pit style dock leveler. The setup of a loading dock utilizing a vertical dock leveler is designed specifically to maintain temperature control between the interior and exterior effectively.

Vertical dock levelers are stored in a vertical position inside the building, which allows overhead doors to close completely to the pit floor, creating a tight seal that helps prevent energy loss, along with pest and debris entry. Additionally, this style of dock leveler also improves security as the trailer doors can only be opened from within the facility. It also helps maintaining a clean, energy efficient environment.

Vertical dock levelers are more effective than traditional pit style dock levelers when it comes to cold storage applications, as they leave less space for warm air to infiltrate the cold storage unit resulting in more consistent temperatures, eliminating the risk of spoilage and reducing energy loss.

Research from the Thermodynamics Department at the University of Valencia in Spain estimated that vertical storing dock levelers would save the Valencia facilities (49 loading bays) an estimated US\$250,000 per year. It also found that facilities handling frozen products witnessed a total savings of 57.2%, followed by a 19.6% savings at refrigerated products locations over conventional pit levelers.

The tight seal also means that there are no small holes for sunlight or rodent contamination to occur, making vertical dock levelers the solution of choice within the industry.

Additionally, a vertical dock leveler may utilize a drive through approach. This means the truck doors remain closed until the vehicle is fully docked. The trailer doors are then opened from inside the facility, as mentioned above. This reduces warm air infiltration that can lead to condensation, helping increase efficiency, and minimizing energy loss. This approach also improves security while limiting pest and debris entry.



Dock Shelters and Seals

Having adequate dock seals and shelters is a key component of cold storage as they improve energy conservation. Dock shelters and seals help preserve internal temperatures, protect products from outside contaminants, improve energy usage, and prevent condensation buildup. **Inflatable dock shelters** that are interlocked with master control panels create a predictable and safe sequence of operations at the loading dock. Additionally, inflatable shelters accommodate a wide range of truck sizes, tightening the contact area against the trailer to create a more superior climate-controlled facility.

Integrated Vehicle Restraints

When considering the safety precautions of cold storage, or any industrial facility, loading docks with vehicle restraints are an essential component for enabling the safety of the forklift driver and the truck driver. Loading Docks interlocked with vehicle restraints and overhead doors prevent dock levelers and overhead doors from being used until the restraints are properly engaged and have locked the trailers in place. This stops the truck from rolling forward, preventing both the truck driver and the forklift driver from being involved in serious accidents. Accidents can cost employers more than \$1 million in worker's compensation payouts per case. Prioritizing worker safety is invaluable, and is a fundamental responsibility of employers to ensure the well-being of their employees.

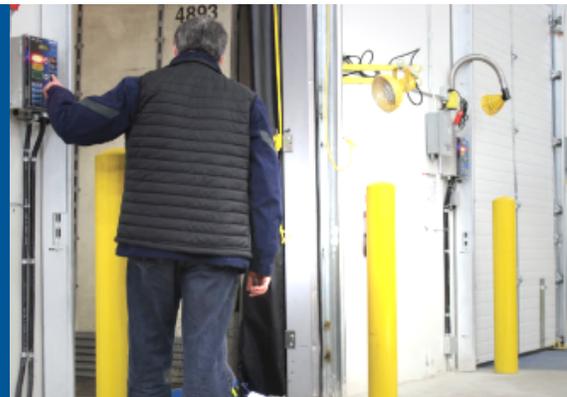


Slip-Resistant Dock and Floor Surfaces

Another important safety component to consider regarding cold storage is slip-resistant deck plates and floor surfaces. A common hazard that occurs with cold storage is condensation, which happens when warm air meets a cooler surface or air mass. The risk of condensation is a safety factor facility managers must keep in mind to protect their workers from slips and falls. Deck plates can be finished with Anti-Slip Powder Coat or Integral Grit Surfacing, while some materials for slip-resistant floors include Epoxy, Post-Consumable Crushed Glass, Urethane Topcoats, and Concrete Paints (ISHN).

Adequate Lighting

This might seem like an obvious safety feature, but since darkness is integral to effective cold storage, installing adequate lighting is often an afterthought. Warehouse managers must enable adequate lighting features to create suitable visibility for warehouse workers to avoid the potential for accidents and injuries. This includes both in the warehouse and around the trailer to dock area.





Blue Giant Offerings

Blue Giant offers fully integrated material handling solutions, including Vertical Dock Levelers, a comprehensive lineup of Seals and Shelters, Vehicle Restraints, Control Panels, and Light Communication Packages. These solutions help ensure regulatory compliance, while prioritizing employee safety, productivity, and ergonomics.

Blue Giant's [Vertical Storing Dock Leveler](#) is the perfect solution for facilities that must maintain strict temperature control. Stored in the vertical position inside the building, overhead doors close completely to the pit floor, preventing energy loss, debris entry and improved security while maintaining a clean, energy-efficient environment.

Blue Giant [Dock Seals and Shelters](#) improve energy conservation, help preserve internal temperatures and protect products from outside contaminants. Many configurations are available, from standard types of compression dock seals, rigid frame dock shelters, to hybrid/foam frame dock shelters, as well as inflatable shelters.

In addition, Blue Giant's [interlocked light communication packages](#) maximize communication between the forklift driver and the truck driver, for added safety at the loading dock. Blue Genius® [Touch Control Panels](#) set the standards for future dock control technology, and are customizable to customer requirements.

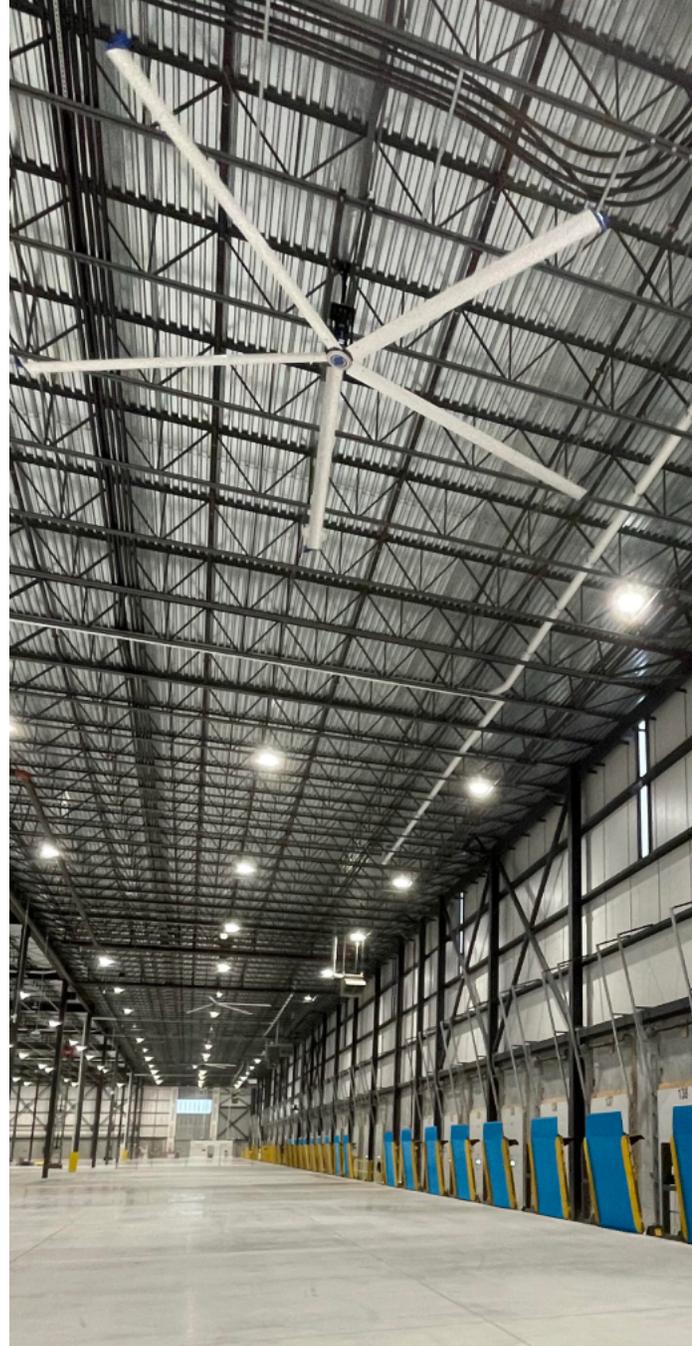
Blue Giant [Vehicle Restraints](#) are user-friendly, meet ANSI MH30.3 standards, and include state of the art Blue Genius Touch Control panels complete with interior and exterior LED communication lights.

Blue Giant products can be combined to create a fully integrated solution unique to each application. With a dedicated commitment to product innovation, Blue Giant will continue to add to its product offering and remain a recognized industry leader.

Blue Giant's National Accounts program, proudly recognized as Nation C.A.R.E.® (Centralized Acquisition of Resources Everywhere) is a consultative sales and project management platform, designed to assist businesses with multiple facilities that require centralized contact and billing and who have also recognized the need to standardize goals for their equipment, safety, and productivity requirements.

If you want an effective and comprehensive solution to your company's cold storage challenges, contact Blue Giant's Nation C.A.R.E.® department to discuss your custom solution.

Building a Team: The Right Attitude and Culture



Contact

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