

# FIVE BEST PRACTICES FOR SHIPPING TEMPERATURE-SENSITIVE FREIGHT

## **MANAGING EXTREME TEMPERATURE SWINGS NOW TOP OF MIND FOR SHIPPERS**

Mother Nature plays no favorites when it comes to freight, packing an equally brutal punch during the sizzling days of summer as she does during the frigid months of winter.

When it comes to the importance of proactively managing temperature swings, shippers only need to think back to the winter of 2013-2014. Supply chain players who endured the Polar Vortex will tell you they had their own version of “Frozen” take center stage as they moved temperature-sensitive freight across North America. Unfortunately, their experience was nothing like a Disney movie, and happily ever after has been difficult to find as freight claims rose into the millions for some and took the better part of a year to settle.

Shippers need to control and plan for what they can more than ever before as supply chain providers move away from offering temperature protection insurance.

This paper summarizes the insights, learnings and best practices of some of the largest manufacturers and distributors of temperature-sensitive food, beverage and liquid cleaning supply industries. Read on to learn how they prepare ahead and how practices apply to both hot and cold temperature extremes.

## **A FRIGID LOOK BACK**

Once the deep freeze melted in 2014, shippers and carriers had an opportunity to step back and take a good, hard look at what Mother Nature left behind. The cold was so severe and so long—22 days with sub-zero temperatures—that every leg of the supply chain, including railroads and trucking companies, felt her icy grip.

Trucks didn't start. Drivers couldn't report to work. The intermodal networks saw levels of congestion not seen before. Desperate to keep freight like beverages, cleaning supplies and wine and spirits from freezing, most shippers converted their freight from the train and put it over the road in dry vans or reefers, increasing their transportation spend by millions of dollars. The reason: Truckload capacity was tight and getting tighter while reefer capacity was even more hard to come by, especially for shippers who were infrequent users. Shippers found that any mode shift added to their transportation cost.

Others deployed different strategies to stay one step ahead of the wicked weather and freight claims. Use of alternate routings was common, with shippers and carriers holding steady on the mode of transit but finding new and different routes to avoid going deep into the Northern Tundra. Shippers found that being off the beaten path brings with it a host of challenges, including increased extra miles and spotty capacity.

Some shippers adjusted shipment schedules, deciding to move freight from warmer versus colder points of origin to minimize the amount of time vulnerable products were exposed to severe temperatures. And some took the drastic step of shutting down production for several days to allow their supply chains to recover and get back in order.

Other techniques cited by shippers with freight prone to freeze included use of blankets, hiring of third-party carriers to warm trailers loaded with product until the time of transit and developing an LTL network to quickly move freight to warmer temperatures for additional routing on to its final destination. Some went the scientific route, becoming more precise with the temperature ranges within which they were comfortable shipping product, and some went high tech, deploying predictive software for visibility to an array of data points and information to enable better and more insightful decision making.

As shippers prepare for future extreme weather, many questions remain:

- What are the railroads and carriers doing to better prepare for extreme weather?
- Are there any new products or processes they could use to ease the pain?
- Will there be access to the capacity they need when they need it?
- Can they count on the railroad schedule to be reliable this year?
- How much swing in temperatures could their product endure until it was no longer safe or usable?
- How long do the freezing and overheating processes actually take?

Our time together provided answers to the most pressing.

### **RAILROADS READY FOR FUTURE EXTREMES**

Intermodal shippers and carriers who felt ill-prepared for what Mother Nature delivered in the winter of 2013-2014 were in recovery mode by late spring. Not to be outdone by the forces of nature a second time, the railroads make significant investments in equipment, people, infrastructure and process to prepare for extreme weather. Additional locomotives (more than 1,000 across the CSX and BNSF lines alone) to facilitate more short-train moves if the weather requires; thousands of new conductors, engineers and others; and changing routing protocols to improve freight flows were all addressed.



### **CARRIERS BULKED UP, TOO**

Intermodal carriers also ramped up in preparation for extreme weather. Double-digit increases in boxes, summer and winter training for new drivers, additional plug-in capabilities for trucks at cold weather locations, and an increased level of support from outside sources to keep equipment running during the extreme highs and lows have all been put into place.

The severity of the season and the associated frozen freight claims were staggering for carriers, moving them to reevaluate their Temperature Protection Services. What was once an established and reasonable liability for carriers has become ineffective and punitive as shippers increasingly load their own freight. In this scenario, carriers have little to no say in how a box is loaded but are left holding the bag when freight is damaged.

Some intermodal carriers will no longer provide Temperature Protection Services, appreciating the fact that shippers exercise the ultimate control in how their freight is loaded as well as the greatest opportunity to protect it from weather extremes. Carriers are also focusing on what they do best in this space: Working on alternate routing of freight when the weather demands, managing blanket programs, and delivering expedited service when needed.

### **BEST PRACTICES HELP SHIPPERS**

Shippers who faced off with Mother Nature and moved temperature-sensitive freight were eager to share what worked and what didn't. The central theme for most: Add control into your processes and plan for what you can, especially as supply chain accountability for protecting freight from weather extremes shifts from carrier to shipper. Develop a plan today for how you will react to extreme temperatures tomorrow. While there are ample low-tech strategies you can take, exploring high-tech solutions (including the use of predictive software) might be worth it based on your company's tolerance for risk.

#### **BEST PRACTICE #1: GET AWAY FROM THE WALL**

Product loaded against a trailer or container wall will be the same temperature as outside the trailer within 24 hours. Conduction (the transfer of heat or cold from one object to another) can wreak havoc on temperature-sensitive cargo. For an unscientific test, place your hand on the outside of a container and then on the inside wall. Unless the trailer is facing direct sunlight, the temperature will be the same. Now slowly move your hand away from the wall. You will notice that as soon as your hand moves away from the wall the temperature changes and will continue to change until you are about four inches from the wall. Center loading of freight away from the walls is strongly recommended to eliminate the impact of temperature — and the further away from the walls, the less the chance of conduction.

1" = 15% heat/cold transfer

2" = 10% heat/cold transfer

4" = <5% heat/cold transfer

Product is loaded tight against the walls in intermodal to prevent load shifts. However, rail providers have approved the use of dunnage to fill voids and maintain a distance of 4" between the sidewall and shippers' products. A variety of options are on the market, from airbags to foil backed fillers, styrofoam panels and folding fillers. Some shippers have also successfully used old pallets as dunnage. Carrier loading engineers can help shippers create a loading pattern that will protect product from damage, temperature and keep product moving via the rails safely. Some shippers maintain two loading patterns, one for times or destinations that do not require temperature protection and one for when it is needed.

### **BEST PRACTICE #2: GET THE PRODUCT OFF THE FLOOR**

Conduction doesn't just happen against the sidewall, it also comes through the floor. The solution is simple: Ensure that pallets are used to create a barrier between the product and floor.

### **BEST PRACTICE #3: USE BLANKETS—OVER AND UNDER PALLETS—TO CREATE A PROTECTIVE BARRIER**

Blankets are effective in slowing the transfer of heat or cold but need to cover the product completely. **Research** simulating temperature changes conducted by the EPA, Protek and Schneider at Texas A&M revealed that blankets or other insulation placed *under* freight, on the floor of the container, are just as critical as having insulation *over* and around the pallet. Doing so reduces the loss of heat/cold through floorboards. The research discovered that contrary to popular belief, heat/cold is not being transferred from the floor to the product when sitting directly on it. Instead, heat/cold is escaping the trailer via the floor and putting the product at risk.

Knowing this, retention and maintenance of optimal temperatures is a must and can extend the life of a shipment by two to three days. Loads tested side by side showed a 12 degree difference when floor product was used.

### **WHAT THE POLAR VORTEX TAUGHT ONE WINE DISTRIBUTOR**

Physical separation of goods from sidewall by 4" provides good protection

Pallets are still the only viable cold temperature alternative to protect against surface conduction

Blankets are a great solution for top side insulation

Setting ambient temperatures and then covering freight with blankets makes a big difference

Use of collapsible bulkheads for dunnage is superior to historical methods (shipper reduced warehouse storage for dunnage by 8 times by converting to a collapsible solution)

#### *Reduce warehouse space*

1 truckload collapsible bulkheads = covers 150 loads

1 truckload standard bulkheads = covers 18.7 loads

#### *Reduce cost*

Collapsible bulkheads are only a minor increase in cost over standard

**BEST PRACTICE #4: RAISE OR LOWER THE TEMPERATURE AT LOADING**

Blankets slow the transfer of heat but timing is everything. Capturing heat in the winter and cold in summer means your product will be protected longer and have more time before exceeding your temperature threshold. Those that have used an engine heater will understand this concept. Plugging in a block heater of a cold engine has no impact. Plugging in an engine heater as soon as a warm engine has been turned off maintains the temperature of the engine so that it will quickly start even in frigid temperatures. By starting at the desired temperature you have made the blanket more effective (on top or bottom of the pallet) and given your product more time before it will exceed its maximum threshold.

**BEST PRACTICE #5: MONITOR THE WEATHER**

Monitoring the weather is complicated: Not only do you need to monitor temperature and conditions at your points of origin and destination, you need to include all of the points in between. Doing so needs to be an additional task on your daily to-do list and can be done manually via the internet or by using a service which monitors the temperature throughout the planned transit.

**AT THE END OF THE MOVIE**

Like any movie, there are learnings that we can use going forward. Shippers looking to improve the protection of temperature-sensitive freight should incorporate the low-tech best practices that are available today, and outlined in this paper, and consider the high-tech solutions (the use of big data, predictive software and new research) that are on the horizon. In addition, make sure to ship with carriers that provide expert loading engineers, temperature control advice and weather updates.