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Winter preparedness is essential for avoiding frozen equipment, malfunctioning cars, service delays or even suspended operations.

COLD COMFORT

BY ANDREW CORSELLI, MANAGING EDITOR



Fail to prepare for winter's harsh conditions and your railroad will be running on ice—literally and figuratively. One railroad that prepares for winter's onslaught is BNSF, which has some of the most rugged territory in North America.

"BNSF can look at this past winter as another 'in the books,' and to sum up overall conditions, the past winter season on BNSF's Northern Tier was just another year as one would expect," spokesperson Gus Melonas says. "Depending geographically, there were heavy rain periods, cold snaps, large snow dumps and frigid temps at times. Preparedness begins in early fall and proactive measures help BNSF get through rough periods, we have come to expect."

"In the Pacific Northwest, in the early

part of the first quarter to start off 2020, BNSF experienced more rainfall than we've seen in years. However, ditching, culvert maintenance, undercutting and general track work in advance helped keep the roadbed strong. Montana, North Dakota and Minnesota prep efforts also helped with switch machine and overall physical plant upkeep. Montana's winter produced less-than-average snowfall conditions, some indicating quite mild.

"There were out-of-the-ordinary events that resulted in interruptions, including the derailment east of Bonners Ferry, Idaho, where a manifest train struck a rockslide along the Kootenai River, causing a 72-hour main line shutdown. Also, above-average rainfall totals dumped several inches of rain in Lower Mainland Canada in less than one

week on more than one occasion this past winter, causing mudslides north of White Rock and suspending passenger operations at times. BNSF's Scenic Sub also experienced heavy wet snowfall in late January, where four feet of snow rapidly dumped, resulting in the freak breaking of more than 600 trees along BNSF right-of-way from Scenic to Skykomish, Wash., causing a 36-hour main line shutdown. Much traffic was diverted via the Columbia River Gorge and Stampede pass routes during this outage.

"Even with the heavy rainfall volumes experienced this past winter in the Puget Sound region, BNSF's construction of Catchment Walls has paid major dividends, as the walls prevented multiple mudslides from impacting freight, passenger and commuter train travel between Seattle

Bruce Kelly

include the freight railroads, transits and industrial facilities, says. Most locations, though, are best suited to heating systems. For locations that typically have a thaw after a storm, elements are often preferred. Further north, into the Midwestern prairies and mountains' hot air systems, gas-fired or electric are preferred. The advantage of these is that they not only melt the snow, they actually evaporate the moisture, so you don't have the icing problem that you can have with the elements.

"What's counterintuitive is that as you go further north, many customers prefer using our high-velocity cold air systems," he says. "When ambient temperatures are very cold, the snow tends to be light and dry, so a curtain of air keeps snow from falling into the switch and sweeps it clear. For example, for northern locations with extreme winter conditions, using heating elements does not provide enough heat and tends to create ice. Melted snow drips into the ballast and then immediately freezes, creating ice buildup. This requires sending maintainers out with picks, shovels and torches to recover the switch. In these conditions many of our customers opt for high-velocity cold air curtains."

Dana Logue, Product Manager, ThermOmegaTech—which works with all of the Class I's as well as OEMs and Class II and III carriers—agrees, and adds that any hindrance could be catastrophic when looking at the big picture.

"Railroads should start prepping before any sort of freeze weather, even if it doesn't seem like it might get that cold—the temperature can get down sooner than people anticipate," she says. "But it really depends on where you're located. So maybe our more Southern clients wouldn't really have to worry about anything until November, but in Canada and maybe even in the Northeast, they might have to worry about that in October. So I would say late summer, early fall is probably the best time to start thinking about getting ready for the upcoming year."

Hotstart—a thermal management company whose "bread and butter is the short line market but also does quite a bit with Class I's, a lot for rebuilders, direct with OEMs, and is big with transit"—Market Manager for Railroad, Casey Hall, echoes Logue's thoughts: "You can't come into the winter without your equipment prepped and

ready, because the minute you start getting those frozen rails or snow, etc., you can't react quick enough and have the downtime on the freight and/or passenger lines.

"Larger railroads, OEMs, transits—those big players are really sound with winter preparation. They're discussing it and planning it and everything's on order now. The short lines will be a little more reactive—waiting until it's closer, more on a cash flow basis to say, 'All right, it's time. We've got to put it in' at a last-minute junction. That's more active on the family operated businesses; they're a little more reactive to the winter. But all the large players in the game are already prepped. Now it's just go-through-the-troubleshooting phases."

CHANGES IN WEATHER, INDUSTRY

Logue says that ThermOmegaTech has been selling freeze protection products since the 1980s. She adds that the most notable change she's seen in winter preparedness has been the maintenance schedule.

"Some of our customers are on a one-year maintenance schedule or some customers are every two years, so it kind of varies," she says. "We've had some that change out our Guru Plug engine block freeze protection valve every four years. So it really kind of depends on the customer. We recommend changing out our valve annually, at the very least every two years."

Thermon's Harris, who has been in the rail industry for 32 years, has also noticed a change in winter preparedness.

"What has really changed is that snow-clearing systems are accepted by railroads as a required piece of equipment," he says. "Historically, it was often left to the maintainers to decide what they needed. In the early days, they really weren't too worried about the schedule. Now with the penalty clauses, it's important to keep goods moving. It used to be, after a big snowstorm crews went out with their picks and shovels and torches to recover the switches—but that could take days. Now, management needs summertime operation year-round. They don't want any delays. The way things have evolved, you have to have switch heating and snow clearing devices, and they have to be reliable."

Texas-based Whitmore Rail, a global provider of rail lubricants and friction modifiers, notes that the biggest changes

and Everett. BNSF installed a 1,500-foot catchment wall at North Woodway in 2019 (11 miles north of Seattle), and installed an additional 1,500-foot catchment wall connection in Spring 2020 in preparation for the upcoming winter. Additionally, BNSF is currently removing numerous hazard trees as a proactive winter measure in Washington State.

"BNSF has been running longer trains (up to 14,000 feet) in the PNW, and weather had little impact on operations. Locomotive positioning has helped with efficiencies."

THE BASICS

Different weather conditions require different methods of snow and ice clearing. Gregor Harris, Business Development Manager-Rail, Thermon, whose clients



The Eglinton Crosstown LRT Maintenance and Service Facility in Toronto uses Thermon Fastrax Hellfire 400 gas-fired switch heaters, shown here installed and operational. 50 of these units are installed in the yard.

it has seen are remote monitoring and the ability to shut down systems during extreme weather conditions, such as extreme cold and periods of heavy rain.

“In addition to the equipment,” the company says, “the product pumping through the equipment has changed from simple greases—which would have a limited range of useful ambient temperature range—to a range of products which have complex thickeners and either a blend of synthetic or pure synthetic base fluids. The new products are far better in low operating temperatures and allow the product to be effective at much higher temperatures.”

THE TOOLS TO PREPARE

Peter Daigler, Power Drives, Inc. (PDI) Vice President of Business Development, notes that winter preparedness saves more than just one kind of green. PDI’s PowerHouse “is a revolutionary U.S. EPA SmartWay-verified idle reduction technology that significantly decreases the energy wasted through idling. It immediately delivers the benefits of increased fuel savings, reduced noise and 90% emission reduction. It heats and circulates water or coolant through the locomotive engine block and cooling system to maintain a temperature of above

100°F, even in the coldest of temperatures. All models—PowerHouse™ 120, PowerHouse™ APU and PowerHouse™ AC-APU—are available with remote monitoring capabilities.”

“People are more aware of the need for winter preparedness now,” Daigler says. “With Powerhouse, there’s a huge fuel cost savings and a positive environmental impact of not running locomotives constantly. Short lines and Class I’s are evaluating all locomotive costs. Fuel is expensive and replacing key systems like starters and injectors before the expected replacement date is very costly too. G&W is our biggest customer on PowerHouse. BNSF uses Powerhouse, with a water separator. OmniTRAX is another PowerHouse customer. We are also working with Union Pacific and Norfolk Southern, but they have not installed any of these products yet.”

PDI also offers its Diesel Dehydrator, which is “applicable all season long,” Daigler says. “Key is that it filters the diesel fuel with an integrated water separator. The water gets pulled away from the diesel fuel so that the locomotive can run more efficiently. The Diesel Dehydrator can help prevent algae bloom in the tank because it is removing water from the system. We have



Hotstart has equipment that can improve AESS systems by keeping coolant and lube oil flowing to maintain operating temperature, enabling fast restarts.

the Diesel Dehydrator on units at BNSF. We also sell the Diesel Dehydrator to rebuilders like NRE. And we have a Diesel Dehydrator that is being integrated to operate with a Cummins QSK50 engine.”

Deepak Kumar, Director of Marketing for New York Air Brake (NYAB)—which provides brake and air supply systems for locomotives and freight cars for all the Class I’s and car and locomotive builders—says that when NYAB designs products, it keeps the harsh winter conditions in mind to “help the operations work efficiently and safely in frigid conditions.”

NYAB’s flagship products include the DB-60 II Control Valve with Brake Cylinder Maintaining (BCM), the LD-1000 Air Dryer and VV1000-T Oil-Free Compressor. BCM continually compensates for changes in brake cylinder leakage, which is made worse by cold temperatures. It maintains brake pressure up to a certain point, restoring any leakage and maintaining braking force.

“Our LD-1000 Air Dryer eliminates moisture from the train’s air supply system,” Kumar notes. “You have an oil-free compressor pumping air, and right in that circuit you have a dryer. Therefore, in cold temperatures it would prevent freeze-ups.

Thermon, Hotstart

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NYAB's DB-60 II with Brake Cylinder Maintaining™ compensates for brake cylinder leakage, improving brake control on long downgrades in frigid temperatures.

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“Our VV1000-T Oil-Free Compressor is a state-of-the-art product, very sophisticated technology. If you compare it to the oil compressor, that oil in cold temperatures freezes up and has major issues with start-up. Railroads have to keep their locomotives running all the time to make sure that there’s enough heat being produced and the compressors stay warm so they can continue to work. This obviously burns a lot of fuel; it’s not efficient.

“Cold weather leads to leakage, which could very easily compromise the safety of

the system if you’re not pumping air reliably. The Oil-Free Compressor is effectively able to provide that capacity in cold weather. It does not need the engine to be running, and because there’s no oil it can start very quickly. To fill a system from empty to full charge, for example, our oil-free compressor takes less than three minutes. With an oil compressor it can take seven to eight minutes.”

ThermOmegaTech’s Guru Plug freeze protection valves sense locomotive cooling system water temperature. When it gets close to freezing, the valve will pop open and drain everything out before any freeze damage can occur.

“We do all sorts of temperature control valves, but for the railroad industry, we do locomotive freeze protection,” Logue says. “We released Guru PC, our passenger car potable water tank freeze protection, about six or seven years ago. This is something that we’re really trying to market in North America. We’ve been working with some of the larger transit agencies here as well as in Europe.”

ZTR Control Systems’ flagship winter preparedness offering is its SmartStart II, which reduces idling. “Instead of guessing when to end ‘manual shutdown’ policy based on weather forecasts and gut feel, the system will automatically maintain engine temperature and keep the battery ready to go,” the company says.

In addition, ZTR has other winter preparedness technology, such as its NEXSYS system, which improves traction in wet and icy conditions. In high-horsepower applications, NEXSYS automatically adjusts engine power to the environmental conditions (temperature, pressure, etc.). ZTR’s KickStart product aims to help with cold-morning engine starts. The AxleGen is designed to reduce accumulation of ice and snow and is a non-contact technology unaffected by extreme temperatures, water ingress or ice build-up. Its snow plow control system automatically adjusts the plow’s power and speed to the snow conditions (wet, packed, fluffy etc.).

Hall says that Hotstart has equipment that can improve AESS (automatic engine start-stop) systems. “We can tap into an AESS and instead of a locomotive running all night, it can actually be shut down,” he says. “Our equipment will keep coolant and lube oil flowing to maintain operating temperature, so the locomotive can be restarted at a moment’s notice.”

Harris says that Thermon last fall, after two years of monitoring and fine tuning, introduced its new ArcticSense snow detector, with improved drifting snow detection. In addition, he says Thermon has “started to get a few more ‘nontraditional applications,’ such as overhead cranes and conveyors for industrial facilities, as well as a project in Newfoundland for a mine application, a radial conveyor stacker for moving mine tailings,” and “a variety of new detectors and scanners being installed by our customers for whom we are designing systems to

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// ANNUAL WINTER PREP REPORT

improve their winter reliability.”

Wabtec’s latest cold-weather-battling systems are its ABDX-CM (Cylinder Maintaining) and ABDX-CMHW (Cylinder Maintaining and Hot Wheel Protection) brake valves, and its Automatic Parking Brake (APB).

“Wabtec’s work on the ABDX Brake Cylinder Pressure Maintaining feature will address leakage out of the brake cylinder air circuit due to leaking rubber seals in the brake cylinder (packing cup and pipe flange gasket), the piping system (pipe flange gaskets) and the control valve or empty-load valve (various rubber seals),” the company says. “Our work on the ABDX Hot Wheel Protection feature will address leakage into brake cylinder from leaking rubber seals in the control valve. Leakage into the brake cylinder can result in overheated wheels (potential wheel damage) and high brake shoe wear. The Brake Cylinder Pressure Maintaining feature is production-ready and can be provided on any ABDX Control Valve. The Hot Wheel Protection feature is

nearly production-ready; we are just waiting on a new die casting, with samples expected before the end of the year.

“Our Automatic Parking Brake (APB) will automatically secure a train on a grade whenever an emergency brake application is made. The APB will retain at least 90% of the emergency application shoe force, even if the brake cylinder air pressure has leaked off completely. We expect to have limited quantities available for field test in 3Q2020.”

Driven by requests to provide a more flexible, precise control of its snow-clearing and ice-melting technologies, Spectrum Inc. recently released a new line of SureStart™ Flex Control Cabinets with Individual Circuit Control. The new design is geared specifically toward energy and cost savings.

“Spectrum’s Flex Individual Circuit Control allows for the precise control of track switch heaters in a multiple circuit cabinet,” the company says. “When tracks are in use or about to be used, only the required track switch heaters need to be

activated by dispatch or local control, thereby, slashing energy costs and increasing the longevity of the flat jacket rods and crib heater elements. Sure Start™ Flex Control Cabinets are currently available in 2-12 circuit designs.”

Whitmore has synthetic-based, all-season flange lubricants as well as solid sticks for flange lubricant and tread friction modifiers the company says “require no changes between summer and winter seasons. If a customer chooses to use mineral oil-based products, the changeover from summer to winter can be done by mixing our summer and winter products, which are fully compatible, and this eliminates the need to empty reservoirs. The timeframe to changeover from summer to winter grades is quite long in most places. The changeover should occur when the ambient temperatures average below 85°F and above 25°F. This would give you a window of a few months in the fall to switch products.”

To paraphrase a wise man, failing to prepare for winter is preparing to fail. //

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