

Freight Rail & Climate Resiliency

Key Takeaway: With safety always a top priority, freight railroads are strengthening their infrastructure and operations to build a more resilient network that can withstand climate-related hazards while continuing to deliver for America in a future shaped by climate change.

Railroads operate an expansive, outdoor, 24/7 nationwide network that often put trains in the path of natural disasters. Railroads have always monitored weather closely and coordinated directly with customers and emergency agencies, taking the necessary precautions to protect employees, rail infrastructure and shipments from natural disasters.

Today, the rail industry — as are many other industries — is facing an increasing frequency of climate-driven natural disasters, such as floods, wildfires, droughts, storms and unpredictable temperature shifts. Freight railroads are proactively strengthening their infrastructure and operations to build a more resilient network that can withstand climate-related hazards while continuing to deliver for America in a future shaped by climate change.

No matter the type of disruption, railroads work together to fully restore network operations as quickly and safely as possible.

Railroads invest billions annually in network improvements, garnering top grades from the American Society of Civil Engineers for their infrastructure. To fortify against climate-related hazards, railroads undertake various measures: mapping vulnerable areas, implementing fire prevention programs, deploying specialized firefighting trains, and installing detectors for seismic, wind, and water threats. They replace wooden structures with more resilient materials, elevate tracks to mitigate flood risks, and adjust maintenance schedules to prevent heat-induced track buckling.

With 24/7 command centers and weather monitoring, railroads swiftly respond to disruptions, executing detailed contingency plans and collaborating with emergency agencies for safety assessments and repairs. Coordinated efforts ensure prompt restoration of network operations while maintaining customer communication.

- **Customer Communications:** As a weather threat emerges, railroads will begin customer communications — which will last until service is fully restored — and hold traffic if necessary.

- **Operational Changes:** Railroads will reroute trains, relocate business personnel, and move equipment, locomotives, railcars and cargo out of areas likely to be affected. They may stockpile construction equipment to repair tracks/bridges; generators and fuel to restore signals/grade crossings; and ballast for tracks. Positioning civil engineers, signal maintainers, track maintenance workers, inspectors and other critical personnel helps speed up recovery as soon as it is safe.
- **Damage Assessment:** Railroads will examine track damage and remove small debris where possible as well as inspect bridges, including deploying divers to look at underwater infrastructure. For more dangerous areas of the network, they may use drones and helicopters to keep employees safe and speed up assessments.
- **Infrastructure Repair:** Railroads will use a multitude of tools, including cranes, bulldozers, chainsaws and other equipment, to remove large debris from rail infrastructure, such as downed trees. They will replace track, add ballast and re-install or install new ties as well as repair damaged bridges and remove obstructions. After close inspection, railroads will repair damaged trains and grade crossing signals. They will also coordinate with local utilities to restore electrical power and telephone communications.
- **Restarting Operations:** Once it is safe to do so, railroads will coordinate with customers to determine and prioritize which locations are ready to receive and dispatch traffic. They may start traffic at reduced speeds where necessary while workers continue making repairs before then fully restoring network operations. After recovery and relief efforts end, the rail industry modifies its natural disaster contingency plans to make a safe network even safer.
- **Community Support:** Railroads care deeply about the communities they serve and often have employees living in affected areas. As part of relief efforts, railroads work with state, local and federal organizations to move critical supplies such as food, water, temporary shelter, fuel and lumber into communities and large debris out of disaster zones to help people begin rebuilding their lives. Railroads also often support the important efforts of relief organizations.

Temperature Shifts

[Heat](#) can negatively affect steel tracks. Railroads are applying infrastructure strategies they use in hotter areas of the country to those that are becoming hotter to ensure their networks remain resilient and safe. Multiple strategies have helped reduce track buckling-caused accidents on Class I mainline tracks by 52% between 2010 and 2021.

Flooding

[High waters](#) from hurricanes, tropical storms, flash floods and persistent heavy rains are one of the most prominent weather-related concerns railroads face – and climate change is increasing the frequency of these events. From high-water detection technology to drone bridge inspections, railroads safeguard the network against extreme water.

Winter

Current research shows that climate change is causing [winter storms](#) to happen more often, including “big bomb cyclones.” Railroads prepare for winter year-round to ensure trains continue safely moving through freezing temperatures.