Spray and full-weather conditions often present rail crews with the challenge of fluctuating temperatures and rapid wetting and drying transition from warm days to cold nights creating a temperature roller coaster that can increase coal load respiratory disease rate.

The ventilation rate applied to cold fans is based on outside weather conditions, namely the ambient air temperature. During winter weather, cold fans are ventilated with an increased volume and speed of fresh air. Conversely, during colder weather, cold fans are ventilated with lower volumes and slower fresh air speeds to prevent a drift.

Ventilation systems that cannot be adjusted in response to changing outside temperatures will have elbows or air venturi. To best cope with the ever-changing spring and full-weather conditions, cold fans management must be able to quickly and easily adjust their ventilation systems to increase or decrease the volume and speed of fresh air throughout the day.

Cold fans are of different ventilation systems with varying degrees of success. However, a good ventilation system must do the following:

1. Provide the correct volume of fresh air based on seasonal requirements by fluctuating volumes during warm weather and decreasing volumes during cold weather.
2. Easily distribute fresh air in the cab.
3. Deliver fresh air at the correct speed based on the season (faster speeds 200 to 400 feet per minute) for warm weather but slower and slower speeds (less than 50 feet per minute) during cold weather.
4. Provide for easy adjustment of fresh air volume and speed in response to the warm days and cold nights of spring and fall.

Boiler is one of the factors that contribute to warm weather ventilation. It is important to run this system in the summer when the boiler is on standby. When the boiler is in use as exhaust in the boiler remains hot and less productive.

During spring and fall, cold fans are progressively opened from the bottom as the weather warms. Variable-speed booster or panel fans can be turned on low to slowly increase air speed as needed. For heat abatement during warm weather, cold fans are opened completely, and the basket or panel fans operate on high to circulate the incoming fresh air at high speeds. Variable-speed booster or panel fans can quickly and easily be manipulated in cold weather to adjust both the volume and speed of fresh air.

Thermoregulators and total weather receptors can completely automate the process.

This type of system is best suited to the open port layout of automatic cabs.

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**Cold-weather tubes**

This system requires multiple positive-pressure tubes, each designed for different seasonal applications (Figure 2). While commonly used in combination with conventional cold fans, this system is not dependent on them because the tube blows in fresh outside air. Consequently, it can be used in solid wall buildings as well.

The system has two types of multiple cold-weather tubes with different capabilities: high-volume airflow and a single cold-weather containing numerous small-diameter tubes for slow, gentle air distribution. The tubes can direct fresh air straight down into a small area, preventing the dry, cold air from blocking the tubes.

**Warm-weather tubes**

This system is designed to provide the correct volume of fresh air, usually through the basket or panel fans, with a dedicated fresh air port.

**Multi-season positive-pressure tubes**

Multi-season tubes combine warm weather and cold-weather positive-pressure tubes into one unit. Each tube contains an internal mechanism that raises the length of it. This mechanism is used to block, maintain, or change direction of air entering the tubes, achieving the desired airflow based on seasonal requirements. These systems are connected to variable-speed fans and have an array of numerous small holes on one side of the tube and fewer, larger holes on the opposite side. When the fan is turned on, air pressure pushes the internal membrane against an inside wall of the tube. The membrane blocks out the fan pattern while exposing the other. This allows air to be discharged outside the small hole pattern or large hole pattern for warm weather (Figure 3).

Like the cold and warm-weather tubes, multi-season tubes can also be used to rapidly and easily adjust fresh-air volume and speed to match the warm days and cold nights of spring and fall.

The multi-season tube is placed over the coal air port, and during warm weather the larger hole pattern is pointed down toward the coal fans. The variable-speed fan is turned on high, increasing the volume of air delivered. The large holes block the cold fans from discharging fresh air into the coal.

When the weather cools, a lower mechanism sends the cold fans into operation. The coal fans can be used to adjust the air in the cab to the fresh holes in the top of the coal fans, away from the cab.

In the winter, the variable-speed fans are turned off, reducing the output. This style of multi-season tube is particularly useful in the retrofit ventilation systems because these fans discharge air at the top of the tube through holes in the coal fans, allowing for better distribution of fresh air.

Multi-season tubes can be used successfully in every type of cab with a port layout, and eliminating the additional expense of warm-weather tubes.

**What is your firm's policy?**

Using a proper ventilation system that keeps your calm and comfortable off the spray and full-weather roller coaster is essential to making healthy breathing habits. Contact our ventilation professionals to help determine your ventilation needs and which system will work best on your operation.

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**Figure 1**

This cab fan uses natural ventilation in conjunction with a cold-weather positive-pressure tube system. This system works on a seasonal basis because the panel fans open on cold fans to draw in fresh outside air during warm weather.

**Figure 2**

This cab fan uses natural ventilation with a central cold-weather tube and two warm-weather tubes. This system works well in solid-sided cabins because the tube fans define fresh outside air.

**Figure 3**

This depiction shows the inner workings of a multi-season tube. The internal mechanism can be overturned by moving the level up or down to adjust airflow rates for warm-weather cold weather. This system works well in solid-sided cabins because the tube fans define fresh outside air.