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Ventilation of Electric Locomotives for Tunnel Service



New Cascade Tunnel--- Great Northern Railway



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THE New Cascade Tunnel cut through the Cascade Mountain Range in the State of Washington between the little hamlets of Berne and Scenic, opened a new door to the West Coast, via Seattle.

This tunnel, just short of eight miles in length and straight as an arrow, was built by the Great Northern Railway at great expense to obtain: (a) Permanent protection from snow-slides; (b) Elimination of high snowshed maintenance expense; (c) Shorter train travel over the Cascade Range; (d) Reduction in road curvature; and (e) Lower summit elevation of trains.

On January 12, 1929, the tunnel was christened and opened to traffic. The event was celebrated by an elab-

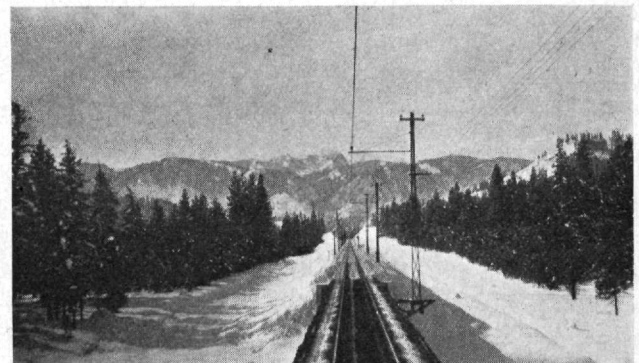
orate program, which was broadcast over a nation-wide hook-up.

Electric locomotives are used exclusively to haul both freight and passenger trains through the tunnel. A main transformer, a motor-generator set, and other auxiliary equipment, are housed within the locomotive cab to supply power to the traction motors. Blowers furnish air-blast for cooling. Cooling air at the rate of 45,000 cubic feet per minute is drawn into the locomotive cab through four louver, is forced through the cooling ducts of the equipment, and out through the roof of the cab.

In winter, the cooling air drawn into the locomotive may be at zero degrees F. or below, and the temperature of many metallic parts of the equipment thus be down well below the freezing point. Since even in winter, the temperature of the air within the tunnel is uniformly warm and moist with the relative humidity at nearly 100%, a locomotive on entering the tunnel would receive this moist warm air which when striking the chilled metal and insulation of the equipment would cause the moisture of the air to be condensed and deposited upon the cold equipment as frost and water. As the temperature of the equipment rose quickly in the warm tunnel, the frost would melt and fairly saturate the equipment with water. Grounds and winding failures in the electrical equipment would be quite likely to occur and the moisture would be of no benefit to the insulation.

To avoid these destructive effects, a new and novel system is used, "Re-Circulation of Cooling Air Within the Locomotive Cab." On approaching the tunnel in winter, the supply of cold outside air is withdrawn and the air within the cab is used over and over until the temperatures of all parts of the equipment approximate that of the air within the tunnel. As the locomotive enters the tunnel portal, the tunnel air may be drawn into the locomotive, if desired, without any danger of moisture being condensed on the equipment.

All locomotives are designed and equipped at the factory with operating dampers so that the change to or from air "Re-Circulation" may be accomplished easily and quickly.



Approach to Cascade Tunnel