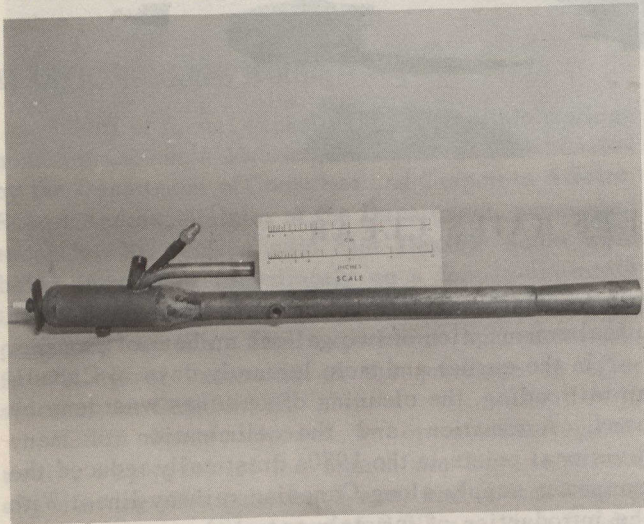


that needed for signal and switch operation. Such heaters could not be used in these locations.

To study the problem under controlled conditions, a Canadian Pacific Railway mainline 22-foot switch was installed in the 50-foot cold chamber of the Low Temperature Laboratory, where temperatures lower than minus 65 degrees Fahrenheit can be obtained with wind speeds up to 40 miles an hour. Snow is manufactured with a set of water-atomizing nozzles.

A target specification for a switch heater was developed from the cold-chamber work. Basic requirements were; (1) thermal capacity, 250,000 BTU an hour; (2) fuel, propane or aviation kerosene; (3) electrical power consumption, 100 watts.

The idea of using a pulsating combustion burner, or a pulse-jet, to drive an air-ejector pump seemed attractive. In this way both the thermal and thrust output of the pulse-jet could be utilized in a device that had no moving parts.



Pulse-jet burner

The pulse-jet as used on the German V-1 was limited in life by the intake valves employed. Pulse-jets could, however, be built without valves. The NRC work was founded on valveless pulse-jet research carried out initially at the U.S. Naval Research Laboratories in the 1950s. Several alternate designs were investigated and a suitable modified version developed with a 250,000-BTU rating using propane as the fuel.

NRC DEVICE IN ACTION

In the NRC system, hot air from the burner is conducted beneath the rails in a circular cross duct located ahead of the switch point. On the top of the duct two short horizontal nozzles located adjacent to the rails blow hot air along the side of the fixed stock rail towards the points of the switch. Adjacent to the short nozzles are two extended nozzles which conduct hot air along the switch and discharge it over the slide plates and between the ties to keep all

of the working parts of the switch free of ice and snow.

This system, in cold chamber tests, has kept a 22-foot switch in satisfactory working condition for as long as five hours at a snowfall rate of three inches an hour with an ambient temperature of zero degrees Fahrenheit and wind velocity of 15 miles an hour.

Currently there are four test track switch installations along CPR lines, two near Perth, Ontario, in the Belleville CPR subdivision and two on the CPR mainline, about 45 miles west of Sudbury. There is a fifth installation at the NRC rail test laboratory in Ottawa, which is used for endurance-testing of the switch heater components. Some parts of the pulse-jet run extremely hot (up to 2,400 degrees Fahrenheit) and only by long-term testing can satisfactory materials be located.

Some indication of the rewards for successful effort can be gleaned from railway statistics that show the existence of some 40,000 track switches. Not all will need automatic switch heating but there is a potential market for thousands of units.

CANADIAN CLOTHING FOR JAPAN

The first substantial Japanese order for Canadian clothing has been completed, according to a recent announcement by Mr. Jean-Luc Pepin, Minister of Industry, Trade and Commerce.

The contract is considered by both the Federal Government and industry as indicative of a significant change in the pattern of Japan's international trade. The Japanese order, a breakthrough for Canadian apparel manufacturers in a potentially important market, is considered by Mr. Pepin as a forerunner of many similar orders. It reflects the combined efforts of the Canadian apparel industry, export-marketing programs implemented by the Department of Industry, Trade and Commerce and the Minister's recent mission to Japan.

"Canada's clothing industry is the nation's fifth-largest employer in the manufacturing sector," Mr. Pepin said. "It has been recently evolving into a viable, internationally competitive industry." According to Statistics Canada, total Canadian clothing exports for 1971 amounted to \$82,791,000, compared to the 1967 figure of \$27,976,000. This rapid rise in the industry is partially attributed to the Department's increased apparel-marketing programs and sponsorship of numerous international clothing shows.

This initial order from Japan strengthens the conviction that a multi-million-dollar market exists there for Canadian clothing manufacturers. Continued marketing activities by both private industry and government are actively trying to make this objective a reality.