

Innovative Technology Used to Replace Failing CMP Tunnel with RCP

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A failing 144-inch corrugated metal pipe tunnel in Lewiston, Maine was replaced with a reinforced concrete pipe (RCP) structure using an innovative installation method. The contractor, Diaz Corporation of Jay, Maine, devised the method to avoid having to excavate the existing pipe that runs under existing and proposed streets, highway ramps and a railway line, sometimes at depths of 45 to 55 feet. Diaz had the choice of either pulling (by winch), or pushing the concrete pipe in place

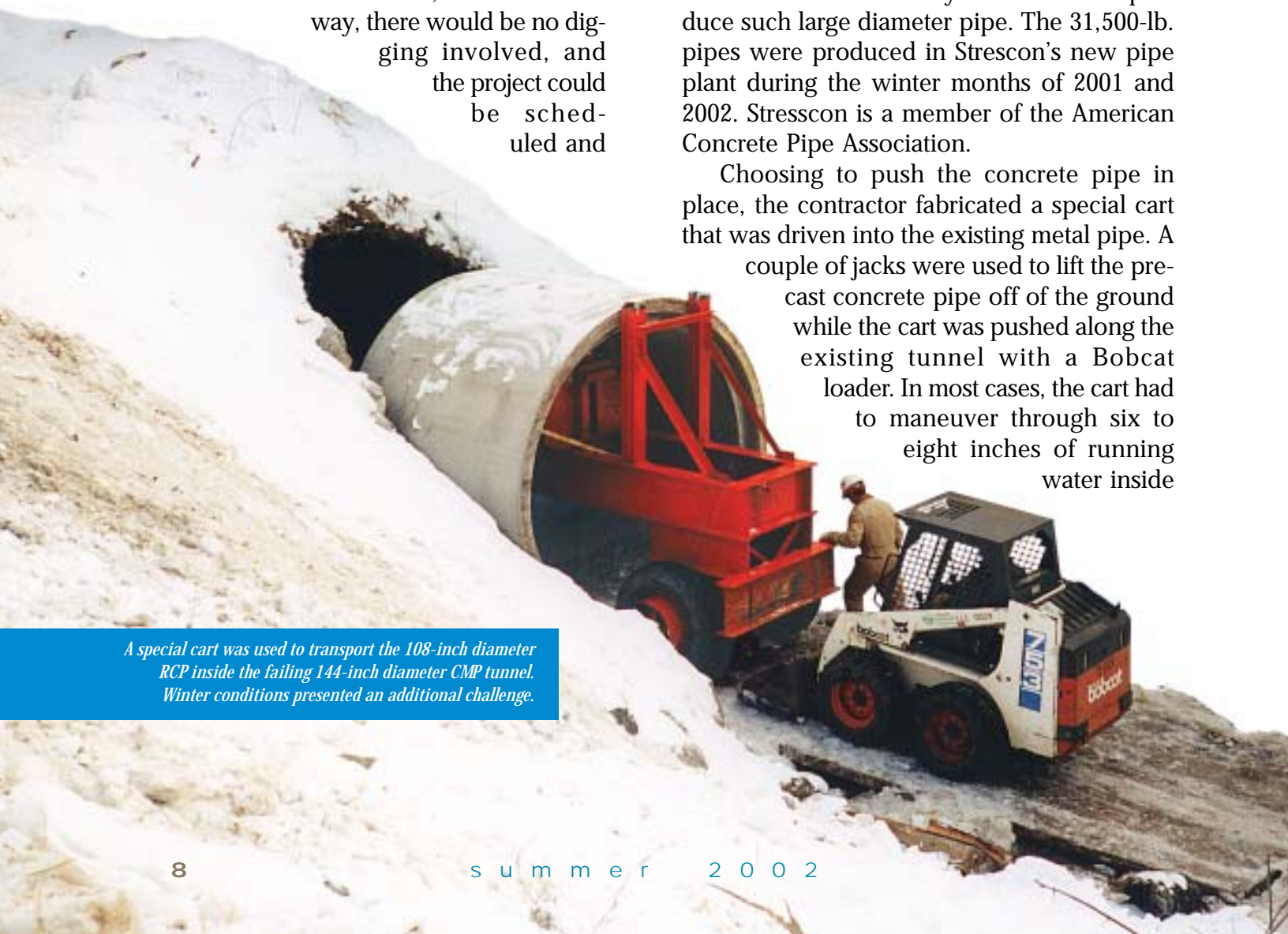
over a distance of 1,048 feet. Either way, there would be no digging involved, and the project could be scheduled and

carried out during winter conditions.

First constructed in 1972, the large diameter metal culvert (tunnel) conveys the flow of Jepson Brook under highway ramps, railway and local roads. Any sign of failure with this major structure had to be addressed immediately. Piece-meal rehabilitation was not an option.

Diaz contacted Strescon Limited of Saint John, New Brunswick, Canada to supply the 108-inch diameter RCP. This was the first time that Strescon used the dry-cast method to produce such large diameter pipe. The 31,500-lb. pipes were produced in Strescon's new pipe plant during the winter months of 2001 and 2002. Strescon is a member of the American Concrete Pipe Association.

Choosing to push the concrete pipe in place, the contractor fabricated a special cart that was driven into the existing metal pipe. A couple of jacks were used to lift the pre-cast concrete pipe off of the ground while the cart was pushed along the existing tunnel with a Bobcat loader. In most cases, the cart had to maneuver through six to eight inches of running water inside



A special cart was used to transport the 108-inch diameter RCP inside the failing 144-inch diameter CMP tunnel. Winter conditions presented an additional challenge.



▲ Driving the RCP inside the CMP
 Two 6-ton come-alongs were ►
 used to home the RCP sections
 inside in the tunnel.

the pipe. As a section of pipe was moved into position, the jacks were lowered and the pipe homed with the previously positioned pipe using two six-ton come-alongs. The come-alongs were anchored in two holes that were later used for pumping grout between the old metal and new concrete pipe. The process was repeated for each unit of pipe by pulling the cart out of the tunnel and loading it with another concrete pipe. No special reinforcement of the bells of the pipe was necessary since the pipe was homed using come-alongs.

With such an overwhelming need for the rehabilitation and upgrade of infrastructure in the United States and Canada, the use of more innovative approaches to installing reinforced concrete pipe are possible. Although most rehabilitation projects are expected to involve routine construction practices, periodically the contractor, owner and consulting engineer will be challenged to come up with an innovative solution. In this case, a viable solution was found to a problem that would have cost a great deal more to correct if the conventional open cut method had been used. Alternate pipe materials do not have the versatility of precast concrete pipe. This case demonstrates that the versatility of reinforced concrete pipe can contribute significantly to improving our buried infrastructure and providing drainage systems that will endure for generations. ☺

Project:	Jepson Brook Culvert Rehabilitation
Owner:	Maine Department of Transport Dennis Dubois, Fabrication Engineer
Designer:	Maine Department of Transport
Contractor:	Diaz Corporation, Jay, Maine Dave Israelson
Quantities:	1,048 feet – 108-inch diameter Class V RCP
Producer:	Strescon Limited Saint John, New Brunswick, Canada Gaetan Vaillancourt, Pipe Division Manager

Strescon Limited began its operations in 1963 by establishing a precast plant in Saint John, New Brunswick. A variety of projects were successfully completed in the company's initial years using both structural and architectural precast concrete products. In 1978, Strescon expanded its operations into Nova Scotia with the opening of a new precast plant in Bedford, Nova Scotia. It has grown to become the largest precast and prestressed concrete products manufacturer in Eastern Canada. The company now manufactures a wide range of precast concrete pipe, prestressed concrete products, manholes and ready mix concrete. Its products are marketed throughout the four Canadian Atlantic Provinces and the New England region of the United States. Strescon is a member of the Ocean Steel Group of Construction Companies.