- ABSTRACT- INLAND NAVIGATION

**St-Lawrence Seaway Modernization**

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ABSTRACT

The St-Lawrence Seaway has undergone a substantial overhaul in how it used to process vessels compared to how it processes them through its locks. The Modernization multi-year program includes the implementation of Vessel Self-Spotting (VSS), Hands Free Mooring (HFM), and Remote Control of its locks.

Vessel Self Spotting has been developed internally and is currently deployed and being used at all deep locks.

Hands Free Mooring has also been developed internally and is currently deployed to all deep locks.

The Traffic Control Centres have been re-designed to enable remote operation of deep locks.  
The topic covered would be titled "Modernization of the St-Lawrence Seaway, an Investment in Sustainability", and would cover the technical development of the tools which are now part of the new Seaway.  
  
The passage of a vessel through a lock normally involves the deployment of four mooring wires from the vessels onto the bollards fixed on the lock walls. Vessels need to be equipped with steel wires and rollers in order to be allowed into the Seaway system. The passage through a lock is labour intensive, slow and hazardous. It is labour intensive because the steel wires are 1.5 inch in diameter, heavy, and difficult to handle. Each vessel requires the handling of four wires over sometimes long distances.

The use of Hands Free Mooring, which uses vacuum technology, only requires the push of buttons in order to secure and detach vessels, without any manual labour. This eliminates the need for vessels to equip themselves with steel wires and rollers in order to come into the Seaway, therefore allowing more vessels into the system without the need for costly conversions.

The handling of mooring wires is not a desirable function in the marine world. Fatalities continue to occur linked to the breaking of mooring wires. In the St-Lawrence Seaway system, it was common to see a mooring wire break every 13 days on average, potentially injuring employees on the lock or on the deck of vessels. Since approximately 3000 transits occur every year, each going through up to 13 locks requiring wires handled by deck personnel and lock personnel, the hazards and frequency of occurrence was very concerning.

The tying up of vessels is time consuming; with the use of HFM, faster mooring times and faster cast-off times have been confirmed.  
  
  
The recent success rate achieved by the fourth generation of equipment in 2013-2014 has led to a substantial investment from Transport Canada (almost $100M CAD) into the Marine Mode of transportation. Since the Marine mode is the most efficient and environmentally-friendly way to move cargo, Canada’s transportation system benefits when cargo is placed on vessels, alleviating congestion and wear and tear causing considerable investments and environmental impacts.   
  
The use of vacuum technology was never considered in a lock environment, until the St-Lawrence Seaway started its development in 2007. The challenges resided in the fact that its locks either raise or lower vessels approximately 14 meters in 8-10 minutes, and the equipment needed to secure the vessels throughout the lockage. This was never done anywhere in the world. The use of vacuum pads secures the vessels very well and prevents the large movements normally witnessed in vessels secured with wires, and has eliminated the incidents where vessels make contact with the lock structures such as the concrete walls or ship arresters.  
  
In addition, a function of warping a vessel forward was designed for moving the vessels to their Final Mooring Positions using the vacuum pads mounted on horizontal hydraulic cylinders, instead of using vessel engines or using the mooring wires for re-positioning the vessels. This allows Captains to bring vessels in the vicinity of their final mooring position, and let the vacuum pads do the final positioning.

The implementation of Vessel Self Spotting and Hands Free Mooring has recently enabled the possibility of executing lockages from a remote location. In Parallel with these improvements (VSS and HFM), the Operation Centres were re-designed as Remote Operations Centres, allowing the control of all aspects of lockages and Bridges to be done remotely. Today, lock and bridge operations are done remotely from the Remote Operations Centres, and the locks and bridges are generally unmanned.  
  
  
Since the approval of the project by Transport Canada in late 2013 early 2014, The St-Lawrence Seaway has received visits from the Panama Canal Authority, the Port of Montreal, BHP Billington, Port of Hamilton, Westshore terminals, and hosted a number of interested parties at our various installations.

The ingenuity has been the focus of numerous interviews, newsclips, and was also presented at the PEO sponsored Oakville Transportation, the World Canal Conference in Rochester, and has received the Organization for Economic Cooperation and Development’s (OECD) 2015 Promising Innovation in Transport award at the International Transport Forum in Leipzig, Germany .

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STATEMENT:

This subject is a great example of how Inland Navigation Systems can leverage technology to enhance safety and reliability, and solidify their sustainability into the future.

I would be presenting this material myself as the subject matter expert. I have presented this material multiple times and have always generated great interest from the audience. With the use of images and videos, I always find the audience engaged and curious to ask questions at the end of the presentations.