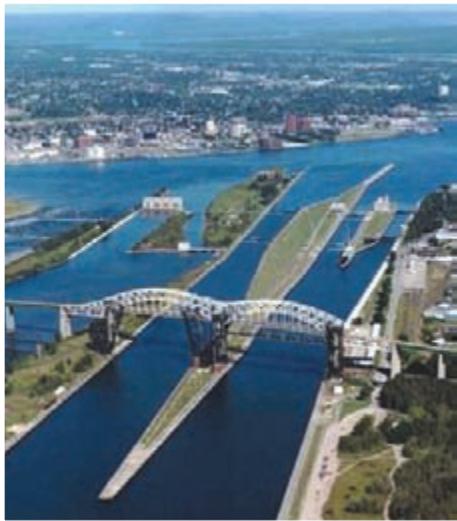


Computerized rendering showing placement of new Poe-sized lock at Sault Ste. Marie.



## New Soo lock could leave drawing board

Appropriations is the final step before beginning construction

After more than two decades of studies and reviews, a new lock is an appropriation away. The estimated \$341 million price tag for the second Poe-sized lock at Sault Ste. Marie has been determined to fall under federal responsibility, according to the Water Resources Development Act of 2007.

Construction of the lock would provide a second option for the system's largest lakers, which are currently limited to using the Poe Lock. The new lock will be constructed where two smaller, older locks are located: the Davis and Sabin.

In September, 2008, a short-term malfunction of the Poe Lock emphasized the pressing need for a second large lock. Although vessels were only delayed for a few hours, a long-term shutdown would cease transportation of crucial cargo—in particular low-sulfur coal and iron ore—between Lake Superior and the lower Great Lakes. The Poe is nearly 40 years old and has been the sole source of lock transit for the U.S.-flag fleets 1,000 footers since their construction.

The locks handle more than 80 million tons of iron ore, coal, grain and other cargoes each year. About 70 percent of the U.S. steelmaking capacity is "home-ported" in the Great Lakes basin, according to the Great Lakes Maritime Task Force, which impacts about 70 percent of the country's auto production and more than half of its heavy manufacturing.

In addition to impacting the nation in terms of manufacturing, the shipping transiting the Soo Locks is estimated to annually save customers \$3.6 billion in transportation costs that would be incurred if the cargo was moved on land.

The new lock has been authorized at full federal expense and groundbreaking could begin immediately. Construction of a Poe-sized lock could take 10 years to complete, making the one large lock nearly 50 years old before the new lock comes online. ■



# Significant and long-lasting benefits

*Infrastructure investment in the Seaway has brought 2.3 billion tons of cargo worth \$350 billion in the last 50 years*

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The modern history of marine infrastructure development in the Great Lakes St. Seaway system, the world's longest commercially navigable waterway, traditionally begins with Seaway construction in the 1950s. The Eisenhower-era "billion dollar project" dwarfed previous North American infrastructure improvements like the Erie and Soo Canal projects of the 19<sup>th</sup> Century. Along with the construction of the Welland Canal in the first third of the 20<sup>th</sup> Century, the St. Lawrence River portion of the Seaway linked the continent's interior directly to global markets.

The 50<sup>th</sup> Anniversary of the opening of the Seaway to international navigation is an ideal moment to review the significant changes that the waterway has delivered. Marine infrastructure investments—ports, terminals (passenger ferries, general cargo, containers, break-bulk, intermodal etc.), locks, bridges, tunnels, shipyards, vessels (lakers, salties, barges), cranes and heavy equipment—share one common characteristic: they are expensive. Moreover, they are built to last and therefore require long-term maintenance investments.

Yet, the infrastructure investment in the Seaway has produced significant and long-lasting economic benefits: more than 2.3 billion tons of freight imports and exports worth roughly \$350 billion have moved through its locks over the last five decades. Compared to pre-1959 figures, the Seaway allowed for an annual five-fold increase in cargo tonnage into and out of the Great Lakes. This floodtide of trade has served as a catalyst for marine infrastructure investment.

Most Seaway marine infrastructure construction was completed from the summer of 1954 to spring of 1959. This included the construction of a massive binational power project as well, culminating in the Moses-Saunders Power Dam. Not all of the infrastructure, however, was completed by June of 1959. Dredging would continue in several sections of the system, including the St. Clair River and the Welland Canal, for several more years. Yet, when the official opening festivities were broadcast to the world from Montreal on June 26, 1959, Queen Elizabeth and President Eisenhower unveiled an inland waterway ready to fulfill a centuries-old dream—a deep-draft waterway connecting the continent's interior with world markets.

**Larger vessels, deeper draft.** Prior to the opening of the seven Montreal-Lake Ontario Seaway locks, the only commercial ships capable of trading in the Great Lakes were small canals. At that time, 21 Canadian locks permitted these 2,000-3,000 dwt ships to bypass Lachine Rapids through 14-foot deep channels. That all changed in 1959, as Seaway-ship size roughly quadrupled thanks to the new locks built to the dimensions at the Welland.

When the Seaway opened, permissible navigable draft in the Montreal-Lake Ontario (MLO) section was 25 feet; for the Welland it was 25 feet, 6 inches. Since 1959, draft

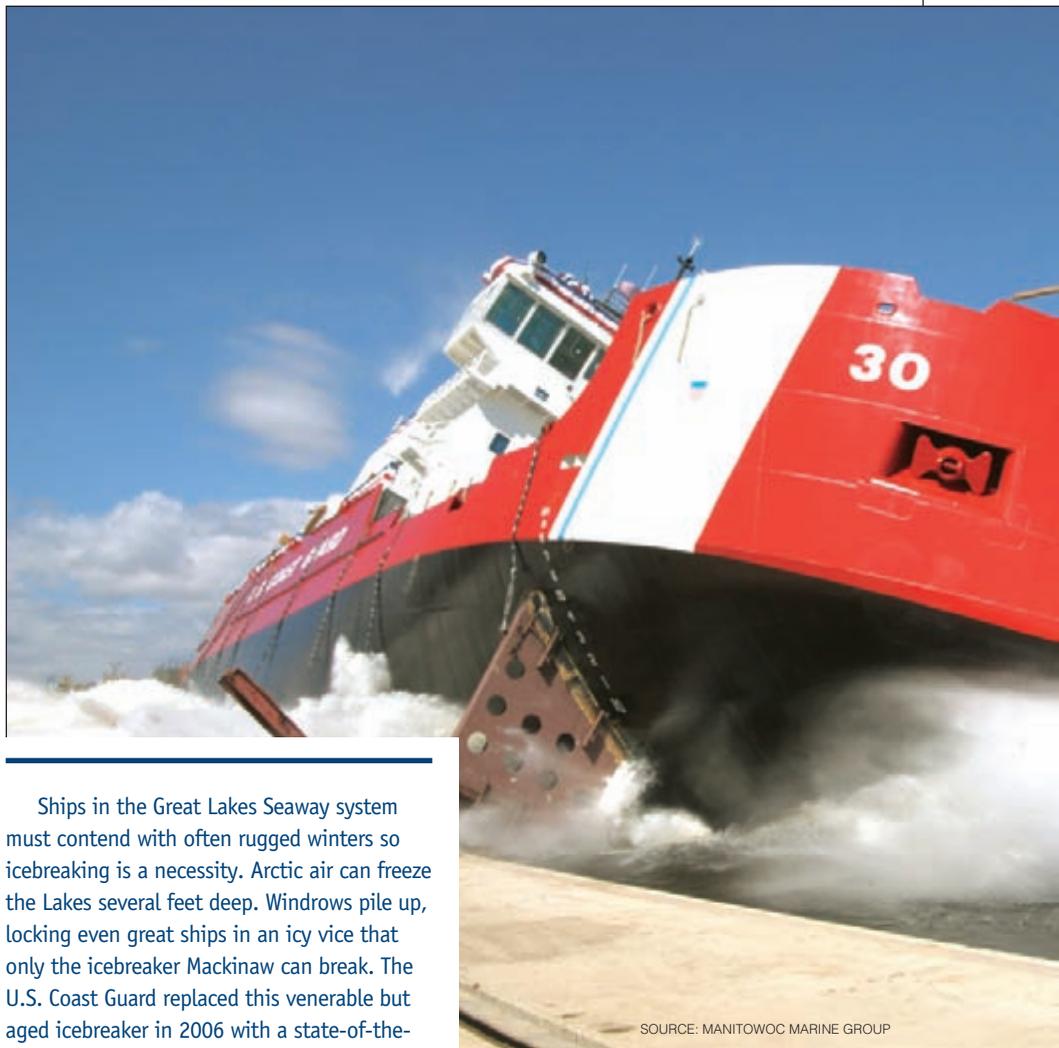
has been regularly increased, most recently in 2004 to 26 feet 6 inches. For beam dimensions, it has been the same story, with beam dimensions increasing from 75 feet in 1959 to 78 feet today. Moreover, permissible ship length has increased from 730 feet to 740 feet. Improved ship-handling procedures and technology has allowed for these increases within the dimensions of the existing infrastructure. As the Seaway enters its next 50 years, plans are to continue this trend by increasing the permissible navigable draft beyond 26 feet 6 inches.

Larger Seaway vessels meant not only deeper water draft, but also increased air draft clearance of at least 120 feet. While the older Ambassador Bridge connecting Detroit-Windsor and the International Peace Bridge across Buffalo-Fort Erie met this requirement, 11 bridges had to be either constructed or rebuilt to meet the vertical clearance standard. The Jacques Cartier Bridge had to be raised 50 feet. Two new border-crossing bridges were built over the St. Lawrence: the Ogdensburg-Prescott International Bridge and the Seaway International Bridge between Cornwall, Ontario and Massena, New York. In addition, new tunnels under the navigation channel were built in Canada and the U.S.

**Cutting-edge technology.** Traditional marine navigation safety infrastructure has long been a hallmark of this part of the world, as witnessed by the numerous lighthouses that dot the Great Lakes and lower Laurentian shores. With the opening of the Seaway, lighted navigation aids and Loran-communications heralded further improvements. In 2002, the Seaway ushered in the GPS-based Automatic Identification Technology (AIS) as part of its binational vessel traffic management system. The final cost was under \$2 million. Once its AIS was fully operational in 2003, the Seaway became the largest inland waterway in the world to implement this cutting-edge technology, which has now been adopted by the U.S. Coast Guard and vessel traffic managers around the globe.

**Poe Lock and self-unloaders.** In 1968, the U.S. Army Corps of Engineers constructed the Poe Lock. The “mighty Poe,” which allows the U.S. domestic fleet of 1,000-foot long ships to carry cargo between Lake Superior and Lake Huron, has been a boon to the efficient transportation of essential raw materials. The tonnage of a typical 1,000-foot “superlaker” is more than double that of Canadian laker vessels and the ocean-going salties that transit the Seaway locks.

The opening of a 3.5 million ton stor-



Ships in the Great Lakes Seaway system must contend with often rugged winters so icebreaking is a necessity. Arctic air can freeze the Lakes several feet deep. Windrows pile up, locking even great ships in an icy vice that only the icebreaker Mackinaw can break. The U.S. Coast Guard replaced this venerable but aged icebreaker in 2006 with a state-of-the-art replacement aptly bearing the same name.

SOURCE: MANITOWOC MARINE GROUP

age yard by the Midwest Energy Resources Company (MERC) in Superior, Wisconsin, in 1976 put the superlakers to work. Unit trains of 123 cars unload 14,500 tons of the coveted low sulfur Powder River Basin coal via a single car rotary unloader. Coal is loaded onto the domestic fleet’s ships at up to 9,000 tons per hour and heads to Detroit Edison’s St. Clair power plant in Michigan. A small but increasing fraction of the more than 20 million tons of coal handled annually at the MERC facility moves through the Seaway.

In the 1970s and early 1980s, 31 self-unloaders were built at Sturgeon Bay, Wisconsin and Lorain, Ohio. This was the heyday for the conversion of straight deckers into self-unloaders, an important part of the system’s floating infrastructure.

**Icebreaking, passenger cruising.** Ships in the Great Lakes Seaway system must contend with often rugged winters so icebreaking is a necessity. Arctic air can freeze the Lakes several feet deep. Windrows pile up, locking even great ships in an icy vice that only the icebreaker *Mackinaw* can break. The U.S. Coast Guard replaced this venerable but aged icebreaker in 2006 with a state-of-the-art replacement aptly bearing the same name. The second 25 years of the Seaway navigation season has increased substantially in length over the number of days posted in the first quarter century of its operations.

Renewed interest in passenger cruising has prompted construction of many passenger ferry terminals in the last decade. Rochester, Milwaukee, Erie and Toronto have invested millions of dollars in new terminals to attract cruise ships to their communities. New passenger terminals are under construction in Thunder Bay and Detroit. Duluth has made upgrades in its ability to receive passengers and Toledo is following suit. Moreover, Kingston and Manitoulin, Ontario are making investments to improve their passengers facilities. Oswego is also vying to join this group.

The Port of Quebec’s position is unrivaled as the destination for cruise enthusiasts. Yearly, thousands of passengers sign up for cruises to the continent’s oldest walled city, a



In the 1970s and early 1980s, 31 self-unloaders were built at Sturgeon Bay, Wisconsin and Lorain, Ohio. This was the heyday for the conversion of straight deckers into self-unloaders.

UNESCO site that celebrated its 400<sup>th</sup> anniversary in 2008. The port's deepwater allows vessels as large as the new *Queen Mary 2* to dock with ease. The growing recognition that cruising is an industry generating substantial revenue (\$22 million in economic benefits in 2006 on the St. Lawrence River alone) has prompted Quebec's provincial government to spend C\$9.8 million for construction of an international cruise terminal in Saguenay.

**Visions of container shipping.** Bulk and general cargo shipping have historically characterized the commercial maritime traffic through all ports in the system with the exception of Montreal. The Port of Montreal's early recognition and embrace of container shipping, along with its unique location, resulted in a thriving container operation at its Bickerdike Terminal. Even two decades ago when the move toward post-Panamax ships was beginning, Montreal officials focused on their ability to service the North American-European markets competitively. Today, they have committed to

improving through-put operations with plans for a \$2.5 billion upgrade designed to triple box capacity handling to 4.5 million TEUs through 2020.

The planned opening of the \$300 million Nova Scotian Melford International Terminal in 2012 promises to impact trade in a way many Great Lakes ports have long hoped for. Melford's ability to service the largest container ships in operation today (more than 12,000 TEUs) and its position as the container port closest to Europe and Suez Canal traffic are enticing marine feedering plans at varied U.S.-Canadian Great Lakes ports. While double-stack rail service via Canadian National is anticipated to attract most of the box service, Great Lakes ports are hoping to act as hubs to handle what promises to be substantial box traffic.

Icebreaking since the 1960s has ensured Quebec's Laurentian ports from Montreal to the Atlantic are open 24-7 throughout the winter months. Providing deepwater service year-round has prompted significant marine development in the lower Laurentian region.

Quebec has become the primary transshipment center in the Ontario-Quebec Corridor. IMMT-Quebec is completing a \$27 million, three-year investment that will increase terminal dry storage capacity by 56 percent. With improved pumping rates, an expanded marshalling yard and new deepwater docking capacity, officials are optimistic for future increased traffic.

The Port of Sept-Iles' Relance Terminal built two decades ago in preparation for Aluminerie Alouette's C\$3 billion aluminum smelting plant continues to attract improvements. In 2008, the port expanded its rail car ferry dock for C\$8.5 million, permitting easy movement of heavy project cargo like General Electric locomotives assembled in Erie, Pennsylvania, used in the Quebec-Labrador mining region by Iron Ore of Canada. They also added a C\$3 million rail link between the port and the Wabush Mines Railway.

**Changing cargoes, infrastructure.** Today the system's hottest cargoes are energy-oriented. They arrive on project cargo ships that come equipped with cranes routinely capable of moving up to 50 tons. Windmills-nacelles, towers, blades and hubs-are oversized and heavy. Lake Superior Warehousing Terminal at Duluth, Federal Marine Terminal in Milwaukee and the ports of Oswego, Ogdensburg, Toronto and Windsor have all handled multiple shipments in this fast-growing industry.

Toledo's Midwest International Terminal has become the focal point for oil and gas pipe imports. Its Liebherr material

handler with vacuum equipment speeds up loading times. Despite a huge drop in crude oil prices late last year from a high of \$145 barrel, most industry experts believe that the long-term prognosis for pipeline growth is excellent.

Duluth/Superior and Thunder Bay are vital ports handling the influx of upgraders essential in tar sands projects totaling well over \$150 billion. Both ports possess excellent intermodal connections and have invested in efficient movement of outsized cargoes. Thunder Bay's Keefer Terminal welcomed the 2008 season's second shipload of reactors (four of them, each weighing 550 tons) for Fort McMurray in November and anticipates additional improvements to accommodate water-rail (CN) traffic next year.

**Asset Renewal Plan (ARP).** The St. Lawrence Seaway Development Corporation (SLSDC) detailed the first half of a 10-year ARP to Congress in 2008. The ARP addresses the SLSDC's infrastructure renewal needs to rehabilitate the U.S. Seaway infrastructure for the next 50 years of use. The ARP includes 50 projects for the two U.S. locks and the Seaway International Bridge, including maintenance dredging, modernized operational systems and upgraded facilities and equipment. Estimated to cost \$164.6 million when completed in 2018, almost half of the money is allocated for Seaway lock rehabilitation, with about one-fourth for equipment and the remaining resources divided among navigation channel dredging, facilities, aids to navigation and miscellaneous projects. The SLSDC plans to replicate the improvements already underway at the Welland Canal, such as the changeover to hydraulic mitre gate machinery, the installation of a vessel vacuum mooring system and the deployment of vessel self-spotting technology.

**Welland Bypass.** The most significant change in Seaway infrastructure has occurred in the older Niagara section. In the early 1970s, the Welland Bypass, a new section of canal bypassing the town of Welland, was constructed. The project straightened the canal, removed several lift bridges and added a \$24 million tunnel. The changes streamlined marine movement through the system, reducing costs and improving passenger traffic congestion.

Currently much of the mechanical equipment for the lock gates, valves and ship arrestors are being converted to hydraulic operation. St. Lawrence Seaway Management Corporation (SLSMC) officials expect completion in the Niagara section by year's end, and ultimately long-term maintenance savings and improved reliability

after the changeover. The new equipment will improve efficiency and reduce maintenance expenses.

Marine infrastructure is an essential component of the incomparable binational waterway shared by the United States and Canada. It serves millions daily, providing transportation, jobs and recreation. It helps underpin the technologies that civilization takes for granted—electric power and sanitation. Today, more than ever, waterborne transport offers astounding value. It moves freight farther with less fuel than rail or

truck. It reduces harmful and costly air emissions and surface traffic congestion while decreasing accidents and improving quality of life issues.

Commitment to environmentally sustainable navigation in the system is a priority for the marine industry and the Seaway. The infrastructure improvements underway today and on the drawings boards for tomorrow will help ensure that this waterway remains safe and competitive for the next five decades. That indeed is a legacy well worth celebrating. ■