Ship-to-Shore Connectors

If you have watched movies about, or seen photos of, the Second World War, you will probably have seen depictions of the D-Day beach landings that Allied forces made in France. These landings involved hundreds of ships offloading thousands of soldiers with their equipment. This is a historic example of the importance of ship-to-shore connectors. In modern times, what if there is a war or a disaster and the Royal Canadian Navy (RCN) is sent to help? How would supplies or Canadian troops or heavy equipment get to shore if port facilities have been damaged or don't exist? What if the RCN is on patrol in the Arctic and needs supplies? What if the supplies are sent by rail to Churchill, Manitoba, and need to get to the ship? How does a ship re-supply, re-fuel or load/unload material in a location without port facilities that allow it to dock?

In situations such as this we begin to realize the importance of having a way to move items from the ship to shore, and vice versa. There are a variety of methods that are used to transfer people, stores, heavy equipment and vehicles. There are:

- floating pontoon platforms (in the British tradition these are referred to as Mexeflotes)[1];
- landing craft that can be launched off the deck of a ship via a crane;
- some warships will have the ability to use helicopters to transfer people and material back and forth from shore; and
- landing craft that can be floated on/off a ship via well deck on the ship (i.e., a section of the lower part of the ship that can be flooded so that landing craft can leave the ship via the water).

This Briefing Note will first discuss these options, and then examine the capabilities of the RCN in this regard.

Let us look at the Mexeflote first. It is a system consisting of pontoons of three types – a bow, centre and stern.[2] The system is versatile, and the modular construction means the pontoons can be joined in configurations that suit the mission – a powered raft, jetty, transfer platform or something else. They can be configured so vehicles can drive directly from a ship on to the pontoons and then to shore. The pontoons can be transported via road or rail, and their shallow draft means that they can operate right up to the shore. The pontoons can transport containers which may be configured into, for example, medical units or desalination/water processing units. A Mexeflote can operate on its own, i.e., it has its own limited propulsion, although this is not designed for long distances or heavy seas. In humanitarian assistance/disaster relief (HADR) operations, combat or post-combat, it can be used to land vehicles, personnel and supplies. The Royal Navy (RN) *Knight*-class ships used to transport two Mexeflote pontoons on the outside of

[1] Where does the word 'Mexeflote' come from? The name can be traced back to the United Kingdom. In 1946 the Experimental Bridging Establishment (EBE) of the Royal Engineers merged with several other organizations to form the Military Engineering Experimental Establishment (MEXE). It was responsible for many innovative research, logistic and military engineering projects, including the Mexeflote. "A Trip Down Mexeflote Lane," *Think Defence*, 3 April 2011, https://www.thinkdefence.co.uk/2011/04/a-trip-down-mexeflote-lane/.

[2] *Ibid*.

ships, and then when they were needed, the pontoons were configured as necessary. And the *Point*-class ships of the Royal Fleet Auxiliary carry Mexeflote pontoons on the deck. The ship's crane lowers the pontoons into the water and they are assembled to form powered rafts, which can transfer up to 60 tonnes of supplies from ship to shore in a single trip. The RN used Mexeflotes extensively in its response to the earthquake in Haiti in 2010.

All warships will have a number of small boats/landing craft (zodiacs) which they use for a variety of missions – and some ships will have helicopters that can be used as ship-to-shore connectors. These boats are launched over the side of the ship via a crane, and recovered in the same way. Both the boats and helicopters are available to transfer people, supplies and equipment to or from shore, but they are limited in the weight and size of material that can be accommodated.

There are other methods of transferring heavy or big items. Large navies, like the RN and the US Navy, have ships that allow vehicles to drive on to the ship into a large hold (roll-on/roll-off (RO-RO) capability). At the end of the trip, the vehicles can drive off the ship, assuming adequate port facilities exist, or using a pontoon system. The *Albion*-class Landing Platform Dock, the RN's newest type of amphibious warfare ship, can fit large trucks, armoured personnel carriers and even battle tanks inside the vehicle deck. To disembark troops and vehicles, the vessels are equipped with eight landing craft.[3] The ship can hold four Landing Craft Utility (LCU MK10), each large enough to carry vehicles up to the size of a tank, which are then launched by flooding the well deck area. The ship also has four smaller landing craft (LCVP MK5), which can carry 35 people or two light trucks, and are lowered to the water via a crane.[4] The US Navy has a variety of ship-to-shore connectors, for various purposes. The whole purpose of the *San Antonio*-class of amphibious assault force ships, for example, is to transport personnel, supplies and equipment ashore.[5]

What about Canada? The RCN has small landing craft and helicopters to provide connections to and from shore. It used both extensively in its disaster relief operations in Haiti in 2010 because of destroyed port facilities and an insecure situation ashore. The RCN does not have ships on to which vehicles and heavy equipment can be driven (RO-RO vessels). But Canada is building ships for the RCN fleet. What kind of ship-to-shore connectors can we expect them to have?

The new Arctic and Offshore Patrol Ships (AOPS) will all have a 12-metre landing craft designed to transfer personnel and equipment to shore in places where there are few or no port facilities. The craft can transport cargo, small vehicles (the size of an ATV) and personnel to shore (a pier or a beach). A crane on the ship is used both to place the landing craft in the water and to load its cargo.[6] With only four tonnes of capacity, however, these landing craft will not be able to transport heavy equipment or shipping containers.

The most suitable RCN ships to have a Mexeflote or a RO-RO capability, would be the

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[3] "Albion class Landing Platform Dock," Seaforces.online, no date, https://www.seaforces.org/marint/Royal-Navy/Amphibious-Ship/Albion-class.htm.

[4] Each ship also carries a 52-ton beach recovery vehicle for assisting with landing craft recovery, and two tractors. "Albion class Landing Platform Dock," Seaforces.online, no date, https://www.seaforces.org/marint/Royal-Navy/Amphibious-Ship/Albion-class.htm.

[5] "Amphibious Transport Dock - LPD," America's Navy, 21 January 2021, https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2222713/amphibious-transport-dock-lpd/.

[6] "AOPS Landing Craft Ready for Action," Irving press release, 14 October 2019, https://shipsforcanada.ca/our-stories/aops-landing-craft-ready-for-action.

largest ships that Canada is building – the *Protecteur*-class Joint Support Ships (JSS). Refueling and re-supply of warships at sea will be the main roles of these ships. They will also have great capacity for HADR operations. As far as we know, none of the ships Canada is building will have a RO-RO capability, but they will have Mexeflote-like capability. MV *Asterix*, the interim supply ship in service while the JSS are being built, was designed to carry Mexeflote pontoons and has a container bay and two deck cranes. *Asterix* is thus Mexeflote-capable, and routinely carries craft and helicopters for transferring people and supplies to shore.

It is planned that both Joint Support Ships currently being built will carry a Mexeflote-like ship-to-shore connector. In the fall of 2021, an in-water Factory Acceptance Test was conducted for the first of four Sea-to-Shore Connector Systems which will give the JSS container-landing capability.[7] The modular pontoon barges are assembled in the water and will be able to load anything from vehicles to shipping containers and transport them to shore. The connectors will be able to carry 50 tonnes of cargo at a speed of five knots in sheltered harbours when the ship is unable to go alongside. The connectors have beaching capabilities with a ramp so that vehicles can be driven off. When the ships are complete, this will provide the RCN with flexibility in supporting HADR and amphibious joint operations ashore.

Conclusion

Ship-to-shore connectors are useful elements of a capable navy. The RN has used Mexeflotes on a regular basis to respond to hurricanes in the Caribbean with building supplies, food, water and medical facilities. In 2017, the Royal Australian Navy used a Mexeflote to transfer a 57-tonne tank from HMAS *Choules* to the beach during Exercise Talisman Sabre. Thus, it is clear that in a conflict, HADR operations or a rescue operation (for example, a sinking cruise ship), a ship-to-shore connector provides added capability. Whether a small landing craft, helicopter, RO-RO or a Mexeflote, the connectors can deliver material and help evacuate people and casualties. The RCN will improve its versatility and operational capabilities with the addition of its new ships incorporating Mexeflote technology and extremely capable landing craft.

[7] "AOR Replacement PMO Attend Connector Acceptance Trials," *Maple Leaf Navy Magazine*, 25 November 2021, https://mapleleafnavy.com/aor-replacement-aor-attend-connector-acceptance-trials/.