

## Ship-to-Shore Connectors

Ships remain the most efficient means to transport significant quantities of personnel, supplies, and equipment around the world. However, doing so also requires methods of transferring those items and personnel from the shore to the ship and vice versa. Indeed, vessels seeking to resupply, refuel, or unload or load material do not always have access to port facilities. If, for instance, local port facilities do not exist (such as in much of the Canadian Arctic), or if they have sustained damage due to a disaster or conflict, vessels must rely on alternate means to transport goods and personnel between the ship and shore, called ship-to-shore connectors.

There are a variety of means by which people, vehicles, heavy equipment, and stores can be transferred from ship to shore. In addition to floating pontoon platforms (called Mexeflotes, in the British tradition),<sup>1</sup> there are landing craft that can be launched with a crane off a ship's deck. Some warships can also deploy helicopters to transfer material and people to and from the shore. Other vessels with well decks (a segment of the vessel's lower part that can be intentionally flooded) can use the water to float landing craft on and off the vessel.

A Mexeflote is a system comprising three types of pontoons: a stern, centre, and bow.<sup>2</sup> Its modular construction allows for the pontoons to be joined in whatever arrangement or configuration – for instance, a jetty, powered raft, transfer platoon, etc. – best suits the mission, granting versatility and flexibility. Containing its own limited propulsion capabilities, a Mexeflote can operate independently, although its propulsion system is not designed or equipped for rough seas or extensive distances. Transportable by rail or road, the shallow draft of the pontoons enables operation right to the shore. These Mexeflotes can thus be arranged to allow vehicles to drive directly onto the pontoons from a ship and then thereafter onto shore. They can also transport containers that can be configured into, for instance, water processing/desalination units or medical units. Thus, during combat, in a post-combat situation, or in HADR operations, these Mexeflote pontoons provide an effective means to land personnel, supplies, and vehicles.

Notable uses of the Mexeflote include by the Knight-class vessels of the Royal Navy (RN), which transported two such pontoons outside the vessels to be configured when and as needed. The Royal Fleet Auxiliary's Point-class vessels also carry Mexeflote pontoons on deck, with the ship's crane being used to lower the pontoons into the water, where they are then assembled into powered rafts. These rafts can transport up to 60 tonnes of supplies between the ship and shore in a singular trip. Such Mexeflote pontoons were an indispensable component of the RN's HADR response to the Haiti earthquake in 2010.

Another key ship-to-shore connector is the landing craft or small boats (zodiacs) that all warships carry. Launched over the side of the vessel via crane, and returned to the vessel in the same manner, these boats fulfill a variety of roles for warships. Some warships also carry helicopters, which can

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<sup>1</sup> The term "Mexeflote" has its origins in the United Kingdom. Specifically, it traces back to 1946, when the Royal Engineers' Experimental Bridging Establishment (EBE) merged with numerous other organizations to become the Military Engineering Experimental Establishment, or MEXE. This Establishment was responsible for numerous military engineering, logistic, and research projects, one of which was the Mexeflote. "A Trip Down Mexeflote Lane," *Think Defence*, April 3, 2011, <https://thinkdefence.wordpress.com/2011/04/03/a-trip-down-mexeflote-lane/>.

<sup>2</sup> Ibid.

similarly undertake ship-to-shore connection duties. While both helicopters and boats can successfully transfer supplies, people, and equipment to and from the shore, the size and weight of material they are able to accommodate is restricted.

For bigger or heavier items, larger navies like the US Navy and RN have vessels in their fleets with roll-on/roll-off (RO-RO) capability – essentially, vessels that permit vehicles to drive into a large hold on the ship. Upon the vessel’s arrival to its destination, the vehicles can thus simply drive off the ship, if there are sufficient port facilities, or otherwise use a pontoon system. In the RN, for example, this RO-RO capability comes from its Albion-class Landing Platform Dock. As amphibious warfare vessels, Albion-class ships can accommodate armoured personnel carriers, large trucks, and even tanks within their vehicle decks. The vessels possess eight landing craft to facilitate the disembarkation of vehicles and troops.<sup>3</sup> An Albion-class vessel can also carry four Landing Craft Utility (LCU MK10) boats, each of which is large to transport vehicles as big as a tank, and can be launched by flooding the vessel’s well deck. In addition, the Albion-class has four smaller landing craft, or LCVP MK5, which are lowered into the water by crane and which can each transport two light trucks or 35 people.<sup>4</sup> The US Navy similarly has roll-on/roll-off capabilities. Its fleet boasts numerous ship-to-shore connectors, for differing and numerous purposes. For instance, the San Antonio-class amphibious assault force ships serves specifically to transport equipment, supplies, and personnel ashore.<sup>5</sup>

The RCN does not have vessels with RO-RO capabilities, onto which heavy equipment and vehicles can be driven. Its primary ship-to-shore connectors instead come from its helicopters and small landing craft, both of which were critical in the RCN’s 2010 disaster relief operations in Haiti due to the destruction of the local port facilities and the tenuous onshore situation. However, the vessels that have been and that will be delivered to the RCN under the National Shipbuilding Strategy have their own ship-to-shore connector capabilities. The new Arctic and Offshore Patrol Vessels (AOPVs), for instance, each possess 12-metre landing craft. Designed to transport equipment and personnel to shore in areas with limited or no port facilities available, the landing craft are placed into the water and loaded with the ship’s crane.<sup>6</sup> However, since each landing craft has a capacity of only four tonnes, they are not capable of transporting heavy shipping containers or equipment and are instead restricted to small vehicles (such as ATVs), cargo, and personnel.

The two large Joint Support Ships (JSSs) or Protecteur-class vessels contracted under the National Shipbuilding Strategy will provide the RCN with enhanced ship-to-shore connector capabilities. These ships carry ship-to-shore connectors similar to the Mexeflote, allowing the vessels to resupply and refuel warships at sea, which is their primary mission. The fall of 2021 saw the completion of an in-water Factory Acceptance Test for the first of the JSSs’ four Sea-to-Shore Connector Systems. Comprised of modular pontoon barges that are assembled in the water and able to transport goods ranging from shipping containers to vehicles, the connectors will be capable

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<sup>3</sup> “Albion class Landing Platform Dock,” Seaforces.online, n.d., <https://www.seaforces.org/marint/Royal-Navy/Amphibious-Ship/Albion-class.htm>.

<sup>4</sup> Each ship is also equipped with a 52-ton beach recovery vehicle to aid in landing craft recoveries, as well as two tractors. “Albion class Landing Platform Dock.”

<sup>5</sup> “Amphibious Transport Dock - LPD,” America’s Navy, January 21, 2021, <https://www.navy.mil/DesktopModules/ArticleCS/Print.aspx?PortalId=1&ModuleId=724&Article=2222713>.

<sup>6</sup> “AOPS Landing Craft Ready for Action,” Irving Shipbuilding, Inc., October 14, 2019, <https://shipsforcanada.ca/our-stories/aops-landing-craft-ready-for-action>.

of transporting 50 tonnes of cargo at five knots in sheltered harbours in which the ships cannot go alongside. The connectors moreover will possess beaching capabilities with ramps, allowing vehicles to be driven off the vessels. In granting the JSSs container-landing capabilities,<sup>7</sup> these connectors will elevate the ability of the JSSs – and the RCN – to conduct and support both HADR operations as well as onshore amphibious joint operations. Until these vessels are delivered, the RCN’s at-sea replenishment support will remain with MV *Asterix*, an interim supply ship that was designed to fulfill the Navy’s replenishment needs until the JSSs are commissioned. With two deck cranes and a container bay, and designed to carry Mexeflote pontoons, *Asterix* is Mexeflote-capable and regularly deploys helicopters and craft to transport supplies and people to and from the shore.

For modern navies, ship-to-shore connectors are indispensable assets. From the RCN’s recurring use of Mexeflotes to deliver food, water, medical facilities, and building supplies in hurricane responses in the Caribbean, to the Royal Australian Navy’s 2017 use during Exercise *Talisman Sabre* of a Mexeflote to transport a 57-tonne tank from HMAS *Choules* to shore, ship-to-shore connectors facilitate a wide range of operations and missions. Indeed, from conflict, to HADR operations, to rescue responses (for instance, like responding to a sinking cruise ship), ship-to-shore connector capabilities can expedite the evacuation of people and aid in the delivery of supplies and material. The RCN is in the process of enhancing its ship-to-shore connector capabilities and versatility with the commissioning of the AOPVs and JSSs, which will grant Canada’s Navy access to effective landing craft and Mexeflote technology.

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<sup>7</sup> “AOR Replacement PMO Attend Connector Acceptance Trials,” *Maple Leaf Navy Magazine*, November 25, 2021.