

This strategy stimulated a broad range of industries beyond the shipyards, such as Goldie & McCulloch of Galt, Ontario. Established in 1844 as a foundry and machine shop, it specialised in stationary engines and boilers (although the boiler shop had closed to forge shells).³⁹ Norcross's orders created new opportunities that included larger and more complicated castings, heavier forgings, and linkages to other systems such as air handling and bilge pumps. The company produced forty compound expansion engines for the drifters "complete from main stop valve to propeller," as well as two trawler engines.⁴⁰ This experience put Goldie & McCulloch in a position to build engines for steam barges ordered by the French government, as well as triple expansion engines for three freighters in the Canadian Government Merchant Marine. Known for the quality of its work and the stability of its long-serving workforce, the trawler and drifter program stimulated the company's diversification. The downside to Norcross's decision to distribute orders across a wide area, however, was that it depended upon railways throughout Canada and the United States to transport many of the engines, boilers, and machinery to shipyards for installation. Shortages of rolling stock frequently led to delays in the delivery of steel to manufacturers and components to shipbuilders, adding another obstacle to efforts to complete the vessels in time to join coastal patrols.

The division of production by components was reflected in a bifurcated approach to negotiating the terms of contracts. Suppliers of engines and boilers were given a fixed price that varied from vendor to vendor, based on the best possible deal that could be negotiated by Norcross (see the appendix for the considerable range in unit prices by manufacturer). Shipbuilders were given a more fluid arrangement. Since the Naval Service was providing most of the material required to build trawlers, Norcross used a variable surcharge on labour to cover a shipyard's overhead: forty percent for drifter hulls, 55 percent for trawler hulls, and 65 percent for trawlers delivered with boilers, engines, and machinery installed by the builder. A profit of 10 percent was then applied to the total of labour and overhead.⁴¹ Cost plus overhead plus a percentage for profit was the formula recommended by Norcross in his report to the Ministry of Munitions in December 1916, the "most satisfactory and cheapest scheme for the Government to adopt, as shipbuilders in this country have had so little experience in the building of ocean ships, and combined with uncertainty of labour they feel price must be high enough to cover all possible contingencies."⁴²

³⁹ LAC, RG 24, vol. 5605, N.S.S. 29-16-1, part 6, A.A. Wright to G.J. Desbarats, 18 September 1918.

⁴⁰ T.H. Fenner, "Developing the Marine Engine and Auxiliary," *Marine Engineering of Canada*, 9:12 (December 1919), 379-381.

⁴¹ LAC, RG 24, vol. 5604, N.S.S. 29-16-1, part 1, "Contracts for construction of trawlers and drifters for Imperial Government," n.d.

⁴² LAC, MG 26 H, reel C-4318, vol. 76, 39492, J.W. Flavelle to Ministry of Munitions, 28 December 1916.