

Washington State Ferries: Vessel Construction Costs

A performance audit report from the State Auditor's Office

Why we did this audit

Washington State Ferries commissioned and completed construction of six new ferry vessels in the last 20 years, with two more vessels under way. Each ferry is a major capital construction project in itself, and concerns about vessel construction costs and practices have been raised by legislators and local government leaders, as well as ferry riders and concerned citizens.

Our audit answers these questions: What do ferries built for Washington State cost, and how do those costs compare to ferries purchased elsewhere in the United States? What are the most significant cost drivers? How well are the construction contracts managed? And, is there anything more than could be done to reduce the costs of building new ferries in the future?

Comparing vessel construction costs is difficult, as no two ferries are exactly alike. We gathered cost data for as many ferries as possible and constructed a model that would allow us to control for the most significant design characteristics, such as size, horsepower, and whether the hull was constructed of steel or aluminum. We also visited shipyards in Washington and in other states, researched industry leading practices, interviewed Washington State Ferries staff and consulted with independent experts in the maritime industry.

Why does it matter?

The Washington State Ferries (WSF) fleet is aging. The four Steel-Electric class ferries that were suddenly retired in 2007 were 80 years old. Nine other boats in use today are between 40 and 65 years old, and will likely need to be replaced in the next 20 years. WSF's vessels are older than the average age of ferries operating in the United States. The need to replace these ferries presents WSF and the state Legislature with challenges and opportunities. The state must build efficient, safe, and sturdy boats at competitive prices when its budget is already tight and dedicated funding sources for new ferry construction are limited.

What did we find?

It does cost more to construct a ferry when WSF is the purchaser compared to other ferry purchasers, and that certain regulatory requirements – the Build in Washington laws and the Apprenticeship Act – contribute to these higher costs.

The stated purpose of **Build in Washington** laws is to “employ people, help develop a capable workforce, and create a positive economic benefit” in the state. The Legislature has applied this requirement to all WSF ferries constructed in the last 20 years, effectively preventing WSF from soliciting bids from out-of-state shipyards. But while these laws do limit competition to Washington shipyards, they alone do not eliminate competition because the state has more than one yard capable of building a WSF ferry. The requirement that the shipyard have a state-approved apprenticeship program does further restrict competition.

The **Apprenticeship Act** requires state agencies ensure that 15% of work on construction projects worth more than \$2 million – including WSF's new ferry construction projects – be performed by workers enrolled in state-approved apprenticeship programs. The shipyard that has built the last three WSF ferries has one, but officials at two other yards cited this requirement as a primary barrier to their ability to compete for WSF construction contracts. (See pages 32-36.)

Some key facts about WSF

- 22 ferries in the fleet
- serves 20 terminals in eight counties plus British Columbia
- carries 22 million passengers and 10 million vehicles
- considered part of the state's “marine highways” system
- 9 ferries, between 40 and 65 years old, are likely to need replacement in the next 20 years
- in the last 20 years, the agency has completed or is in the process of building eight ferries

Estimated economic impact from constructing WSF vessels in Washington

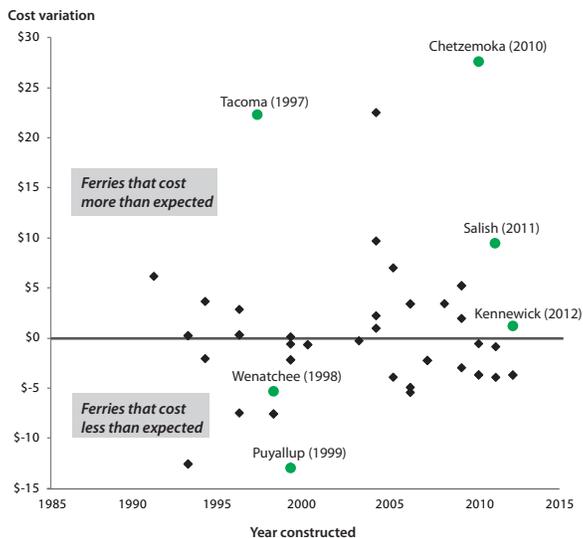
We asked the state's Office of Financial Management (OFM) to help us estimate the impact of hypothetically spending \$150 million to build two ferries over the next two fiscal years.

For each of the two fiscal years, OFM's Input-Output model estimated that \$150 million in spending would support an average of 322 jobs and \$28 million in wages in the shipbuilding industry, with a total economic impact in all sectors of the state's economy of 1,335 jobs and \$90 million in wages. OFM estimated this would contribute 2.5% to the state's employment growth, and less than one percent to the state's earnings growth over the two-year period.

Exhibit 9 - Comparing construction costs of 39 ferries when design characteristics are controlled for in the analysis

Dollars in millions, adjusted to 2011 value.
WSF vessels named (with construction year).

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Source: Analysis of ferry purchaser data.

We also found that there is potential for WSF to reduce its construction costs if it applies additional leading practices in its ferry construction projects. As part of our audit work, we developed a set of 15 leading practices commonly used by shipyards to control construction costs. WSF uses eight of these practices effectively, and five more partially. Of the 15, we believe that four practices, properly used, offer WSF the best potential for cost savings.

Two practices are not currently used by WSF: 1) *Design is complete and reviewed before construction begins*, and 2) *Use an independent owner's representative*. Two practices WSF does use could be strengthened: 3) *Use a fixed price contract appropriately*, and 4) *Place all responsibility on the contractor to deliver project quality*.

Leading practices WSF already uses but could strengthen include: using a formal process to ensure lessons learned activities are completed in a timely way and are effectively used on subsequent projects; developing project budgets based on appropriately estimated project costs and not depending on large contingency amounts; and effectively using the chosen contracting method. (See pages 37-45 of the full report for more on leading practices.)

What did your analysis reveal about cost?

Using data we collected from eight ferry purchasers, including WSF, on 39 vessels, we found that the six ferries purchased by WSF were among the most expensive. This is not entirely surprising, given that the Jumbo Mark IIs are among the largest vessels of the 39 ferries. (See pages 22-23.)

Our analysis takes into account ferry design characteristics

The cost to construct a ferry is largely driven by the design characteristics of the ferry: its size and weight, whether its hull is constructed from steel or aluminum, passenger capacity and amenities, expected service life, and relevant federal safety standards. Our statistical analysis of 39 ferries indicated that WSF's construction costs were higher than most other ferry purchasers even after controlling for vessel design characteristics. (See pages 60-68 for a detailed explanation of our analysis.)

WSF spent more when we compared two ferries with comparable designs

We compared the construction costs of the WSF ferry *Chetzemoka* to the *Island Home*, built three years earlier by the Steamship Authority. For a variety of reasons, the *Chetzemoka* ended up costing almost twice as much as the *Island Home*. The largest difference we identified was in the value of change orders – more than \$10 million for the *Chetzemoka* and just \$624,600 for the *Island Home*. Of the \$10 million in change orders issued by WSF, about \$6.5 million was spent to expedite the construction schedule.

The cost of the third vessel in this class, the *Kennewick*, was much lower, close to the amount the *Island Home*'s construction shipyard told us it would cost them to build that ferry today. This demonstrates the efficiencies gained when building vessels in an uninterrupted series using the same shipyard.

What did we recommend?

The state and WSF have opportunities to reduce the amount spent to construct ferries. We developed our recommendations with guidance from a technical panel of maritime industry experts. We make recommendations to the Legislature that address regulatory barriers to competition for new ferry construction contracts, and recommendations to WSF that will help it continue to improve its vessel construction program by applying more of the 15 leading practices. (See page 14.)