

Just as Actuarial Life Expectancy Tables can predict the chances of a given population to live or die with each following year, the lifespan of machinery is so predictable that industry schedules maintenance and replacements far in advance. It is an exact science using Risk/Reward labels rather than Life/Death. These plot as cute rainbow curves instead of dipping lines.

There are about 1200 passenger ferries in the US and Europe. The industry has long helped establish laws, guidelines and regulations as to the economically prudent and useful lifespan of their vessels. The standard predicted lifespan is 35 years, with smaller boats such as the Chief sooner, at 30 years

In 1994 there was a move to replace The Whatcom Chief. It was time then. It happened again in 2008. Now, in 2016, there are no plans and no money to do so. The boat is presently at 170% of its service life and we are almost without options as we head toward catastrophic failure.

The following documents illustrate the means to create a minimum of 15 years of operational savings which is adequate to fund a new boat replacement reserve program. In this manner we may have a vessel at least midway capitalized so to properly plan and execute the construction of a new boat. Also, it removes huge liability issues immediately.

Take a good look at this. These are accurate numbers which lead to a viable solution.

About the accuracy of the numbers: This data was compiled by an ex-industrial engineer who started out life as a mathematician but ended up self-employed inventing products and starting a number of businesses. He has commuted daily from Lummi Island for over 38 years and contracts all the UPS and Fed-Ex services on the island. He is familiar with all the people and commerce involved. He is familiar with balance sheets and is irresistibly drawn to analyzing relevant financial issues pertaining to private enterprises or governmental services.

This data was compiled not from discrete data points derived from balance sheets, but from head counts, reasonable estimates, and reasonable projections. Errors are likely within 1/2 standard deviation within each of the 5 data streams with summation averaging down to half with a confidence level of 90%. That puts the sum total most likely accurate within plus or minus 10%. Consider that data with a known error range is vastly better than no data at all.

Data Base: Larger Boat Revenue (Below) - Whatcom Chief (2015)

Reference A

2 nd Quarter	3 rd Quarter (Less 21.5 days drydock)
32,158 Car and drivers	28,467 car and drivers
48,764 passengers	53,823 passengers

(Calculated: Car + driver @ \$ 11, Passengers @ \$ 5)

Larger Boat: Extra legal capacity @ peak times - (35%) & Shorter Wait Lines - More Revenue

1st Qtr. add. marginal revenue, captured at 1%	\$ 6 K *
2 nd Qtr. add. marginal revenue, captured at 6%	\$ 36 K *
3 rd Qtr. add. marginal revenue, captured at 10%	\$ 60 K *
4 th Qtr. add. marginal revenue, captured at 2%	\$ 12 K *

Savings with HIYU (Maintenance intervals: 2 Years.)

Capitalizing on Peak Load Revenue	\$ 114 K	Reference A
2 Years Annualized Dry-Dock maintenance savings	\$ 182 K	Reference B
2 Years Annualized Toll Charges not lost	\$ 75 K	Reference C
2 Years Annualized Dry-Dock Infrastructure not Required	\$ 100 K	Reference D
Lummi Island Savings (County Portion 2 Years Annualized) Net	\$ 70 K	Reference E
2 Years (Annualized) Savings	\$ 541 K	
This number doubles if we bring in substitute drydock vessel. (Prorated if smaller.)	\$ 1.08 M	

Ferry Boat Service Life

Reference F

The marine industry with millions of boat-year experience has long helped to establish laws, regulations and guidelines as to useful and economically prudent lifespan of all kinds of saltwater vessels.

Smaller types, especially public, as the Whatcom Chief are super critical in as much that some areas are almost impossible to access for inspection or maintenance. An example being several years ago when a propeller stern tube came apart and the boat would have sunk if not saved by the USCG. This was a total surprise with no doubt more coming. Ferry mishaps do not happen just in the third world.

The predicted useful life of the Chief by all convention is 35 years. It is now 54. It did not have a total midlife rebuild which would have added an additional 25 years. That rebuild would have discovered and attended to issues that needed attention then and now are huge issues that can take it out of service with almost no notice. Now each year the boat is seeing increasingly deferred maintenance as it is becoming scrap. There comes a point where no amount of money is going to fix things. Our public roadway is our ferry and it is a breach of fiduciary duty if there is not even a reserve replacement fund and the boat it is at the end of its life. Furthermore the liabilities resulting

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from operating illegally overloaded where ingress and egress is limited during a medical emergency (during heart attack), or car fire, and there is a fatality, will certainly result in an inquiry and negligence suit that will go all the way up the chain. Keep in mind that hand-held fire extinguishers are not adequate for a gasoline car fires, especially when the gas tank a the car in front ignites from the engine fire of a car so close behind.

Reference G

Solution: The HIYU would be buying us a minimum of 15 years of operational savings which is adequate to fund a new boat replacement reserve program so that we may have a vessel at least midway capitalized as we properly pain and execute the construction of a new boat and, it removes a huge liability issue immediately.

Estimated New Ferry Fund (Annual Contribution) :**\$ 400 K *****

* Marginal Revenue is almost pure profit and most expenses have already been met.

** Only large moving vehicle in Whatcom County without a replacement fund.

*** The drydock savings alone will fund a new boat.

Corresponding Data for the Whatcom Chief and the HIYU

Whatcom Chief HIYU

Boat Length	99 Feet	162 Feet
Service Life	35 Years (19 YEARS PAST SERVICE LIFE)	60 Years (Had Midlife Rebuild) (GREATER THAN 15 YEARS SERVICE LIFE LEFT)
Replacement Cost	\$ 9 M	\$ 18.4 M
Capacity	18 Cars - Not Legal (Captain can lose license.) (If cited, could be cut down to 2 lanes only - 12 cars)	34 Cars or large trucks.
Trip Cycle (Rt.)	20 Minutes	30 Minutes
Fire Safety	Hand Held Fire Extinguishers	Full Fire Suppression Equipment. (Greater than L.I. Fire Department For Car Fires)
Engines	275 Hp @ 1800 Max RPM	575 Hp @ 1200 Max RPM
Cruise Throttle Setting / RPM	90% & 90% / 1750 & 1750 RPM	71% & 40% / 1100 & 850 RPM **
Engines Life Cycle	7th Set of Engines	Original Engines
Next Set Engines Due	Est: 6 Yrs.	Will Outlive Useful Life of Boat Reference F
Hours Since Rebuild	14,500 Hrs. & 24,400 Hrs.	Recent: 959 Hrs. & 1746 Hrs.
Est. Next Rebuild	2016 or 2017	2027
Fuel Usage	The HIYU has more efficient hull. It burns slightly less fuel than the Chief and due to greater capacity, would make fewer runs. (For perspective, the foot passenger drydock boat burns 30% more fuel than the Chief per run.)	

Drydock Costs (Annual Incl. Engines)

2016	Unknown	Est. \$ 185 K (Been in Storage)		
2015	\$ 464 K	None Required		
2014	\$ 334 K (Ave.)	\$ 340 K (Ave.)		
2013	\$ 334 K (Ave.)	None Required		
2012	\$ 334 K (Ave.)	\$ 340 K (Ave.)		
2011	\$ 334 K (Ave.)	None Required		
2010	\$ 334 K (Ave.)	\$ 340 K (Ave.)		
2009	\$ 334 K (Ave.)	None Required		
2008	No Data	\$ 340 K (Ave.)		
2007	No Data	None Required		
2006	No Data	\$ 340 K (Ave.)		
Drydock Costs (Annual Ave.)	\$ 352.6 K	\$ 182.6 K (DIFFERENTIAL)	\$ 170.0 K	Reference B
Painting Costs	\$ 35 K (Done by Crew every drydock)	\$ 95 K (Professional - Every 5 Years)		
Annual	\$ 35 K	\$10 K Non slip surfaces, lane stripes, touchups & accents		
Annual Ave.Cost	\$ 35 K	\$ 29 K		
Annual Comp Totals:	\$ 387.6 K	\$ 201.5 K (DIFFERENTIAL)	\$ 201.5 K	

** Low throttle load settings, low RPM's on the HIYU allow for up to 400% longer maintenance intervals than the Whatcom Chief. Fuel economy is also optimized at these levels and the longer less boxy hull has a slipperier effect which also helps. For reference, a ferry gets less than 1/4 the wear on the engines at idle than at cruise. Fuel consumption at idle is almost nothing, because, when under throttle, it is the equivalent of always going uphill.

Lost Ferry Ticket Revenue to County During 2015 Drydocking

The loss of \$ 150k reimbursed 55% by Lummi Islanders). Below is the

data available to us which will require some interpolation:

Reference C
Reference D

(Toll Charges Not Lost)

- September drydock length = 21.5 days
- Balance of the 3rd quarter = 70.5 days
- 3rd Quarter car and drivers = 28,467
- Average auto traffic per day = 404
- Lost auto toll revenue = 404 x 21.5 days = 8686 (cars and drivers)
- Lost toll revenue passengers - we'll use an adjusted ratio from 2nd Qtr. with complete data
- 2nd Quarter car and drivers = 32,158, Passengers = 48,764 - (Ratio =1.52)
- 3rd Quarter tourist traffic, add 12% additional passengers = Ratio of 1.7 for accuracy
- 1.7 passengers per lost auto toll = 14,766 lost car passengers during drydock
- At \$ 11 per car and \$ 5 per passenger the tolls lost are over \$ 169 K. **
- The revenue gained during these 21.5 days on the lightly loaded pedestrian charter boat running a diminished schedule is certainly no more than one half the number of drivers who would have crossed.
- This works out to \$ 21.7 K in revenue offsetting some of the loss

<u>Adding this all up:</u>	
8686 (cars and drivers lost) @ \$ 11 per = \$ 95.5 K	
14766 (passengers lost) @ \$ 5 PER = \$ 73.8 K	
4343 (revenue drydock passengers = \$ 21.7 K	
<u>Net Loss Drydock Toll Revenue = \$ 147.6 K</u>	

Reference C

2015 drydock parking was the worst ever on the mainland. There were many reports of people turning around before 9 pm and going back to town for lack of parking. In all likelihood the actual loss exceeds \$150k. Consistent rounding down of numbers in the math also had an effect. We'll use **[\$150k as an approximation]** with the caveat that the estimate could be +/-10%. These are important issues and we must look at them the best we can.

** We do not know the actual tolls collected - We do know that mid tourist season is the largest percentage of cash fares collected and this number could be low. We have poor data here.

Other drydock expenses incurred are: (For reference and covered elsewhere)

Reference D

Charter boat rental and expenses	> \$ 75 K
Drydock infrastructure; Floats, Assy., Signage Shuttle bus, Paint striping etc.	> \$ 125 K

Drydock costs to Islanders: (Half of this is out of area dollars not spent here which is a loss to the whole area, not just Lummi Island) \$ 270 K

Reference E

Dry-Dock Costs to Islanders

Assembled early May 2016

Store-the Islander	\$25,000*
Vacation Home Rentals	\$25,000*
Second homes (visited, not included above)	\$40,000*
30 Trade Vans Daily (85% work deferred-15% lost)	\$25,000
Construction-Home building	\$15,000*
Construction-Home Building, local trades	\$10,000
Timber Harvest, logging	\$50,000
Hospitality-Restaurants	\$35,000*
Hospitality-Restaurants, locals	\$ 5,000
Reef Netters	\$ 5,000
Parking Rentals, Willow's lot	\$10,000
Parking Rentals, Private Yards@ \$125/3 wks	<u>\$25,000</u>
Total	<u>\$270,000</u>

*Outside Dollars not spent here **\$140,000**

A great deal of the \$270,000 which would have been spent locally would have a multiplier effect. The sad fact is that ½ would have come from tourists from Seattle and further. This money would have had a profound effect on the local economy, here on Lummi Island and county wide.

Whatcom County Ferry Liability Profile

May 6, 2016

United States Coast Guard safety rules mandate that all vehicle occupants shall be able to exit the vehicles and get to safety equipment without restriction (46 CFR 185.340). On the Whatcom Chief Ferry this is often impossible as the lanes are too narrow, doors cannot be opened, passengers cannot walk between cars as they are parked bumper to bumper. Often crew members have to climb on bumpers to get across vehicle lanes

The result of an injury or fatal accident will be a Coast Guard Inquiry and likely Civil Lawsuit, the boat may be tied up for the duration. Coast Guard Citations may be limited to the Ferry Crew, but, the Civil Lawsuit will cite everyone connected to the operation of the Ferry.

Disclaimer: The authors of this document are not legal professionals; they are concerned citizens with an amount of experience with the legal system. The order of liability may not be the same as listed.

Likely Order of Liability

Non Injury Accident or Rule Violation resulting from non-compliance with CFR 185.340	Injury(s) or Fatality(s) incident resulting from non-compliance with CFR 185.340
Coast Guard Actions; a. Warnings and/or Citations	Coast Guard Actions; - Inquiry - Warnings and/or Citations
1. Master-In Charge at incident 2. County Ferry Captain 3. Deckhands at time of incident 4. Other Masters- especially with ongoing violations 5. Other Deckhands- especially with ongoing violations	1. Master-In Charge at incident 2. County Ferry Captain 3. Deckhands at time of incident 4. Other Masters- especially with ongoing violations 5. Other Deckhands- especially with ongoing violations
Civil Actions	Civil Actions/Lawsuits
Likely none	1. County Public Works Director 2. County Ferry Director 3. County Executive 4. County Ferry Office Staff 5. Members of County Council 6. Members of Lummi Island Ferry Advisory Committee (LIFAC)

The Whatcom Chief was built as a 16 car Ferry in 1962, currently it is being loaded to up 20-22 cars. All older ferries we know of have had their automobile capacity decreased over the years, we know of no case where an unmodified Ferry has had an official increase of vehicle capacity. Legal capacity for the Whatcom Chief would likely be about 10-12 vehicles. This overloading, which occurs about 30 times a day, has been repeatedly brought to the attention of the County Boards and Officials. This needs to stop before there is an accident.

The Safety Rule:

[CFR](#) › [Title 46](#) › [Chapter I](#) › [Subchapter T](#) › [Part 185](#) › [Subpart C](#) › Section 185.340

46 CFR 185.340 - Vessels carrying vehicles.

§ 185.340 Vessels carrying vehicles.

(a) Automobiles or other vehicles must be stowed in such a manner as to permit both passengers and crew to get out and away from the vehicles freely in the event of fire or other disaster. The decks, where necessary, must be distinctly marked with painted lines to indicate the vehicle runways and the aisle spaces.

(b) The master shall take any necessary precautions to see that automobiles or other vehicles have their motors turned off and their emergency brakes set when the vessel is underway, and that the motors are not started until the vessel is secured to the landing. In addition, a vehicle at each end of a line of vehicles or next to a loading ramp must have its wheels securely blocked, while the vessel is being navigated.

(c) The master shall have appropriate "NO SMOKING" signs posted and shall take all necessary precautions to prevent smoking or carrying of lighted or smoldering pipes, cigars, cigarettes, or similar items in the deck area assigned to automobiles or other vehicles.

(d) The master shall, prior to getting underway, ensure that vehicles are properly distributed consistent with the guidance in the vessel's stability letter and Certificate of Inspection, if applicable.
