

AKUTAN HARBOR

Mooring structure

Sheet pile wave barrier with catwalk

W3

W2

W1



MV TUSTUMENNA



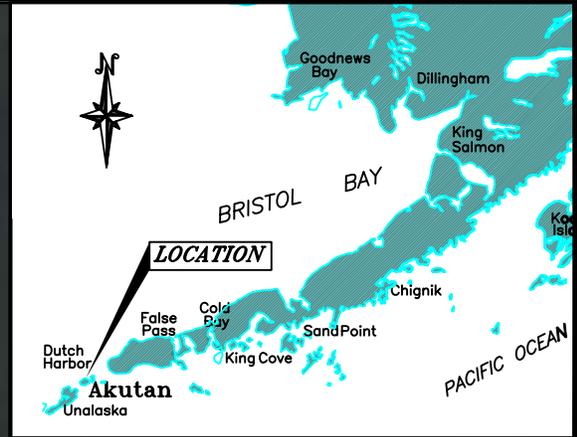
Sheet pile bulkhead wharf

Dock w/ concrete deck on steel pipe piles

E1

Mooring dolphins w/ catwalk access

E2



VICINITY MAP



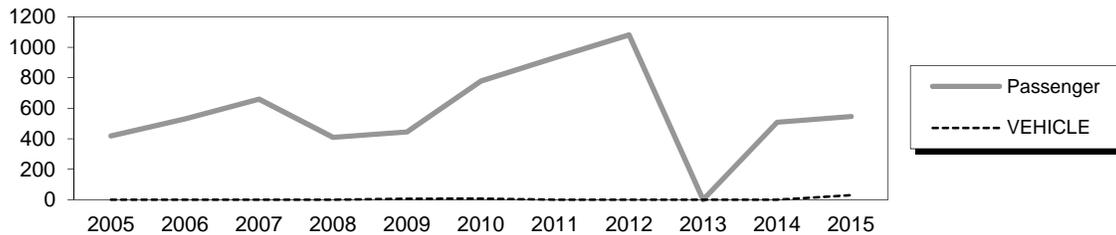
SCALE IN FEET

GENERAL LAYOUT AKUTAN

Akutan City Dock

Owner: Aleutians East Borough
Terminal Manager: 907-381-1366 – Brett Willis, Harbormaster

Terminal Description: The M/V TUSTUMENA docks in Akutan during its May through September Aleutian Chain trips. AMHS has previously discharged only passengers at this facility; however, sailings now include some vehicles. The Akutan City Dock is a platform dock constructed of concrete panels, steel pile caps and steel support piling. Abutting the back of the dock is an earth filled sheet pile bulkhead for the full length of the dock. There are two mooring dolphins with fender units on each side of the dock. In line with the western dolphins is a sheet pile wall that acts as a wave barrier for a small boat harbor, with a 50-foot extension installed in 2005. The past 10 years of total passenger and vehicle traffic at Akutan is shown below. Akutan had no ferry service in summer 2013 while the M/V Tustumena was in the shipyard for repairs.



The most recent above water survey was completed on September 18, 2014. The underwater inspection occurred on July 17, 2014. The most recent fracture critical inspection was on September 18, 2012.

Vessels	
Name	Berthing, Alignment
Tustumena	Port / Starboard

Tidal Data (MLLW=0.0 feet)	
Highest Observed	6.7
MHHW	3.7
MHW	3.4
Lowest Observed	-1.8

Terminal Building
This facility does not have a terminal building.

Generator & Building
This facility does not have a generator on-site.

Utilities @ Dock
There are no utilities at the City Dock.

Uplands	
Short-Term Parking:	N/A
Long-Term Parking:	N/A
Staging Area:	N/A
Paint Striping:	No
Driving Surface:	Ashalt/Gravel

City Dock - #1946	
Type:	35' x 100' Concrete Panels
Year Built:	1982
Support:	16" dia Steel Pipe Piles
Coating:	Coal Tar Epoxy
Fenders:	(21) - 16" dia Steel Pipe Piles
Fender Face:	UHMW wear strips
Anodes:	Yes
Lighting:	Light poles, east and west ends of dock
Condition:	Fair
Load Posting Sign:	N/A
Original Design Load:	Unknown (design plans not on file)

Sheet Pile Bulkheads							
Section	Length	Type	Coating	Anodes	Built	Cond.	Notes
1	90'	Z-Section	None	Yes	2002	Good	
2	100'	Z-Section	None	Yes	2005	Good	This structure has not been inspected yet.

Dolphins							
Dolphin	Dolphin Piles	Fender Support	Fender Face	Anodes	Built	Cond.	Notes
W3	1B, 1V	-	-	No	2005	Good	
W2	1B, 1V	2V	Plastic Rub Strip	No	2002	Good	
W1	2B, 2V	2V	Plastic Rub Strip	No	2002	Good	Rubber Fenders & steel wale are severely damaged.
E1	3B	1H	Rubber donut, vertically mounted	Yes	1993	Fair	
E2	3B	1H	Rubber donut, vertically mounted	Yes	1993	Fair	Red Navlight

Catwalks / Gangways								
#	From Struct.	To Struct.	Length / Style	Built	Safety Chains?	Cond.	Lighting	Notes
C1	W3	W2	45' / Catwalk	2005	No	New	None	Catwalk is integral with sheet pile wave barrier
C2	W2	W1	90' / Catwalk	2002	No	Good	None	Catwalk is integral with sheet pile wave barrier
C3	W1	Dock	90' / Catwalk	2002	No	Good	None	Catwalk is integral with sheet pile wave barrier
C4	Dock	E1	50' / Catwalk	1993	No	Fair	None	
C5	E1	E2	50' / Catwalk	1993	No	Fair	None	

LEGEND

V = Vertical Steel Pipe Piling

B = Battered Steel Pipe Piling

H = Steel H-Pile

C1 = Catwalk

Projects			
Year	Project #	Project Name	Description
1982	N/A	Akutan City Dock	Original construction of the City dock and sheet pile retaining structure. Plans not on file.
1993	N/A	Akutan City Dock Modifications	Install the west dolphins W1 & W2 and catwalks C3 & C4
2002	N/A	Akutan City Dock Modifications	Installed section 1 of the east sheet pile bulkhead, dolphins E1 & E2, and catwalk C2.
2005	N/A	Akutan City Dock Modifications	Installed section 2 of the east sheet pile bulkhead, dolphin E3 and catwalk C1.

Observations

1. The precast concrete panels of the deck are in fair/poor condition. The top surfaces are showing signs of degradation from weathering. Roughly 25% of the panels have drain holes drilled through the deck and soffit on 12" centers. Several panels have fine cracks radiating transverse to the span direction and distributed along the longitudinal panel edges. In some panels the grout in the closure pour has eroded and the aggregate is loose. A chain drag test over the deck indicated

Observations (continued)

that approximately 10 percent of the panels have some areas of delaminated or porous concrete.

The perimeter of the deck is sealed with a 12" wide strip of cast-in-place concrete. The concrete that surrounds the bollards in the corners of the dock is cracked and spalled, exposing the steel reinforcement underneath. The shoreward bollards in the corners of the bulkhead are surrounded with a concrete apron. These bollards have been heavily loaded and the concrete is cracked. Primary loads on the dock are from freight transfer and storage by the City.

The most recent Fracture Critical inspection report found several locations of moderate cracking, spalling, and delamination on the underside of the precast deck panels with exposed pre-stressing strands. The piles were reported in fair condition, though they typically exhibit 1/32" pitting and 1/8" laminar rust. All of the piles supporting pier cap 3 are misaligned by roughly 2". Piles B and C are misaligned at pier cap 5 by roughly 1".

A single fender pile, second from the east corner, is missing. The pile is broken off at elevation – 8'. Two fender piles on the western end of the dock have missing or loose facing. During some high tides, the sponson of the M/V TUSTUMENA, and likely other freight vessels, rises above the top of the fender piling. Top plates on fender piles are bent from sponson over-riding. Overall, the fender energy absorbing system is marginal for the ferry berthing loads.

Several UHMW rub strips are missing on dock fender piles. The exposed rub strip mounting bolts present a hazard to vessel sponsons during mooring. Bolts have sheared off at splices in the upper wales of the dock fender structure.

The underside of the dock framing (steel caps and piles) all exhibit failed coatings and extensive rust and scaling.

2. The western dolphin piles, the sheet pile wave barrier, and the sheet pile bulkhead are uncoated and do not have anodes. These steel elements may be thicker than necessary to permit a long-term corrosion loss. If this steel is not cathodically protected in the future, the sheet pile walls must be electrically isolated from the dock substructure. Accidentally bonding this large area of submerged steel to the dock piles or caps will cause rapid consumption of the dock anodes.
3. The rubber fender & steel wale on dolphin W1 were severely damaged by a hard vessel impact several years ago. No backup cushioning is available in this dolphin. The seaward railing on the catwalk between the dock and dolphin W1 is also damaged.
4. There are sacrificial anodes fastened to many of the piling with a bolt-on bracelet system. The bracelets use a setscrew to provide electrical contact with the pile. Several of the bracelets are missing setscrews and the anodes are not functioning. At the time of the 2009 underwater inspection, the anodes had 60 to 70 percent material remaining. In the splash and atmospheric zones, approximately 50 percent of the epoxy coating on the piling has failed. There is widespread corrosion of the upper segment of the piles, along the edges of the pile cap flanges and on all surfaces of the bearing plates.
5. The dolphins and catwalks on the east side of the dock were originally coated with epoxy. Only 15 percent of the coating remains and the flanges of the catwalk stringers are freely corroding. The stringers are bolted to the dolphins using a single plate shear connection. The connection restricts the longitudinal movement between the dolphin and catwalk. Lateral loads from the dolphins have buckled the plates and weakened the connection. Failure of these connections will lead to collapse of the catwalks.
6. The moveable bull rail section has been removed from the dock front and set off to the side. The break in the rail along the dock face is a safety hazard.
7. On August 8, 2010 the Tustumena damaged a 3-foot section of the ship's rub rail while docking at Akutan. After inspecting the facility with the Akutan Harbormaster, the source was discovered to be a bent/crumpled fendering unit on the corner of the dock that was recently damaged by a fuel barge.

Inspection Summary		
Structure	Priority	Recommendations
<i>Category I - Safety Issues</i>		
Movable bull rail	1	Replace the movable bull rail to proper working order.
Dock Fender System	2	Upgrade the fender system by installing a raised panel, or fender pile extensions, to contact the vessel sponsons through all tidal-ranges. Remove and replace the broken fender pile. Replace the missing UHMW rub strips on dock fender piles. Replace bolts that have sheared off at splices in the upper wales of the dock fender structure.
<i>Category II - Rehabilitation Work</i>		
Dock - Concrete Deck Panels	3	Seal the deck panels with a concrete topping lift and repair the cast-in-place concrete at the corner bollards.
West Dolphin Anodes	4	Install anodes on the western dolphin piles, the sheet pile wave barrier, and the sheet pile bulkhead.
Dock Support Piles	5	Weld all anode bracelets to the support piles to provide electrical contact. Program a project to re-coat the piling.
Catwalk connections & Overall coating repairs	6	Construct a new sliding plate bearing that allows lateral movement of the catwalk. Install safety cables/chains on each catwalk bearing. Program a project to re-coat the catwalks and dolphins, and maintain anodes.
West dolphins / catwalks	7	Repair the rubber fender & steel wale on dolphin W1. Also repair the seaward railing on the catwalk between the dock and dolphing W1.
<i>Category III - Upgrades Needed</i>		
AMHS Coordination	8	AMHS is working on a 5-year MOA for prioritized use of the dock for normal ferry operations.
Dock	9	Load rate existing pile supported dock to verify adequacy/capacity for vehicle traffic.

Akutan Dock Improvements:

The City of Akutan received a Denali Commission Grant in 2011 to make improvements to the existing dock facility that would enhance City and AMHS use. This project will extend the height of the existing fender system, install a new mooring dolphin on the east side and make other miscellaneous repairs. The project has been awarded to Turnagain Marine Construction. Project completion date is October 1, 2015.