Trip Report to the Denali Commission
Tenakee Springs, Alaska
October 27-28, 2011

1) **Participants:** Ken Eisses (CEPOA-EN-CW-HH), Robert Tedrick (CEPOA-EN-CW-HH), Melanie Peterson (CEPOA-PM-ESP), and Kirk Miller (Alaska Department of Transportation)

2) **Logistics:** We traveled to Tenakee Springs, Alaska on October 27, 2011 to conduct a site visit and coordination meeting related to the ferry dock. We travelled on the AMHS ferry MV LeConte from Juneau to Tenakee Springs and met Mr. Kirk Miller, Project Manager, Alaska Department of Transportation, en route. Mr. Miller arranged skiff support and accompanied us on our inspection of the ferry dock facilities. Inspections were conducted from about 1:00pm until 3:00pm on the 27th at high tide, and from about 8:00am until 9:30am on the 28th at low tide. We also met with Tenakee Springs Mayor Don Pegus on the morning of the 28th to discuss the community needs for the dock. The weather during the inspections was generally: overcast with periods of light rain; winds varied from calm to a light breeze; and temperatures were close to 40° F.

3) **Project Location:** Tenakee Springs is located on the east side of Chichagof Island, on the north shore of Tenakee Inlet. It lies 45 miles southwest of Juneau and 50 miles northeast of Sitka. It lies at approximately 57.778° North Latitude and 135.220° West Longitude. (Sec. 21, T047S, R063E, Copper River Meridian.) Tenakee Springs is located in the Sitka Recording District. The area encompasses 13.8 sq. miles of land and 5.3 sq. miles of water.

4) **Pre-Visit Investigation:** Mr. Kirk Miller, Alaska Department of Transportation, provided as-built drawings, photos, and drawings of past projects related to the Tenakee Springs ferry dock. Structural member sizes indicated in this report are generally taken from the as-built drawings with field confirmation only through visually observation; which generally did not include field measurements.

5) **Trip Report:**

   a. **Dock Deck:** The layout is "L" shaped with the approach trestle projecting to the south, perpendicular to the shoreline and the dock extending to the east of the trestle (see Figure 1 and Photo 1). The deck consists of 12" thick, prestressed**,** hollow-core concrete planks. The approach trestle is 10 spans of 24' for a length

of 240’ and the dock has 2 spans of 20’ for a depth of 40’. Nominal plank widths are 4’ with 3 planks making a 12’width for the approach trestle and 13 planks making a dock face of 52’. The deck is in poor condition, especially the near-shore east edge where as much as 10” of the deck has spalled away (see Photo 2). Some repairs have also been completed further from shore on the east side, however the condition of these repairs is unknown as the form boards remain in place (see Photo 3). The surface of the deck is in generally fair condition (see Photo 4) with only minor degradation (see Photo 5). Poor drainage has contributed to the deterioration of the deck (see Photo 6). Numerous holes were observed in the bottom surface of the deck panels (see Photo 7). Considerable efflorescence was observed on the bottom of the deck; a condition that is exacerbated by the poor drainage and cavities present in the hollow-core panels (see Photo 8).

b. Substructure: The substructure consists primarily of HP14x73 cap beams over the piles at the approach trestle and W14x103 cap beams over the piles at the dock. These galvanized cap beams are in good condition with some surface rust near field weld locations (see Photo 9). We also noted that what appear to be HP14x102 “beams” have been installed longitudinally on the approach trestle and along the edges of the dock in this same north-south direction. In general these beams do not appear to support the deck panels as they run parallel to the panels and in many cases are not in contact with the bottom of the deck panels out in the deck panel span. If these beams were in contact with the edges of the approach trestle deck they could provide some support to the deteriorating edges of the deck panels.

c. Piling Supports: Supporting pipe piles are 12 ¾” diameter with 3/8” wall thickness along the approach trestle and 14” diameter with 3/8” wall thickness at the dock. Piles were found to be in fair condition with the atmospheric splash showing considerable corrosion (see Photo 10 and Photo 11). The tidal zone is generally well covered with marine growth and removal of this growth revealed relatively sound pile conditions (see Photo 12). These piles have had passive cathodic protection anodes installed however our inspection revealed that these anodes are spent (see Photo 13). We do not believe that significant loss of cross section has occurred to date, however continued exposure without cathodic protection will decrease the strength of these piles.

6) DOT Concerns and Ideas: Mr. Miller indicated that he believes a deck replacement, most likely via precast, solid concrete panels is generally what is needed in the near future. This is thought to be the lowest priced alternative, with

metal grating likely to be more expensive. Coating repairs for the rusty areas adjacent to field welds should also be considered as well as replacement of the cathodic protection system anodes. Mr. Miller also commented that a guardrail system is likely a required element of any future work on the dock.

7) **City Concerns and Ideas:** Mayor Don Pegus expressed that anything that could be done to improve the dock would be appreciated. Mayor Pegus shared that the city owns a forklift that they do use to help move freight off the dock. The forklift has a 5,000 lbs lift capacity and 50,000 lbs dead weight capacity. The city does plan to replace this forklift with something newer and equivalent to what they have. The Mayor agreed with DOT's suggestion of handrails to help provide public safety. He asked also, if possible, it would be nice to have the dock a little wider. However, he did mention that the dock sits on a 20 foot right-of-way and has about one foot of easement towards the store and two-three feet towards the museum. This may not provide much if any space for widening the dock.

8) **Recommendations:** A new concrete deck over the existing steel substructure would extend the ferry dock life for at least another 25 years. Proceed with a design to: replace the existing concrete deck with a new concrete deck including guard rails; include an option to make coating repairs on the substructure beams where required; and include an option to replace the cathodic protection anodes on the structure.

9) **Supporting Figures & Photographs:**

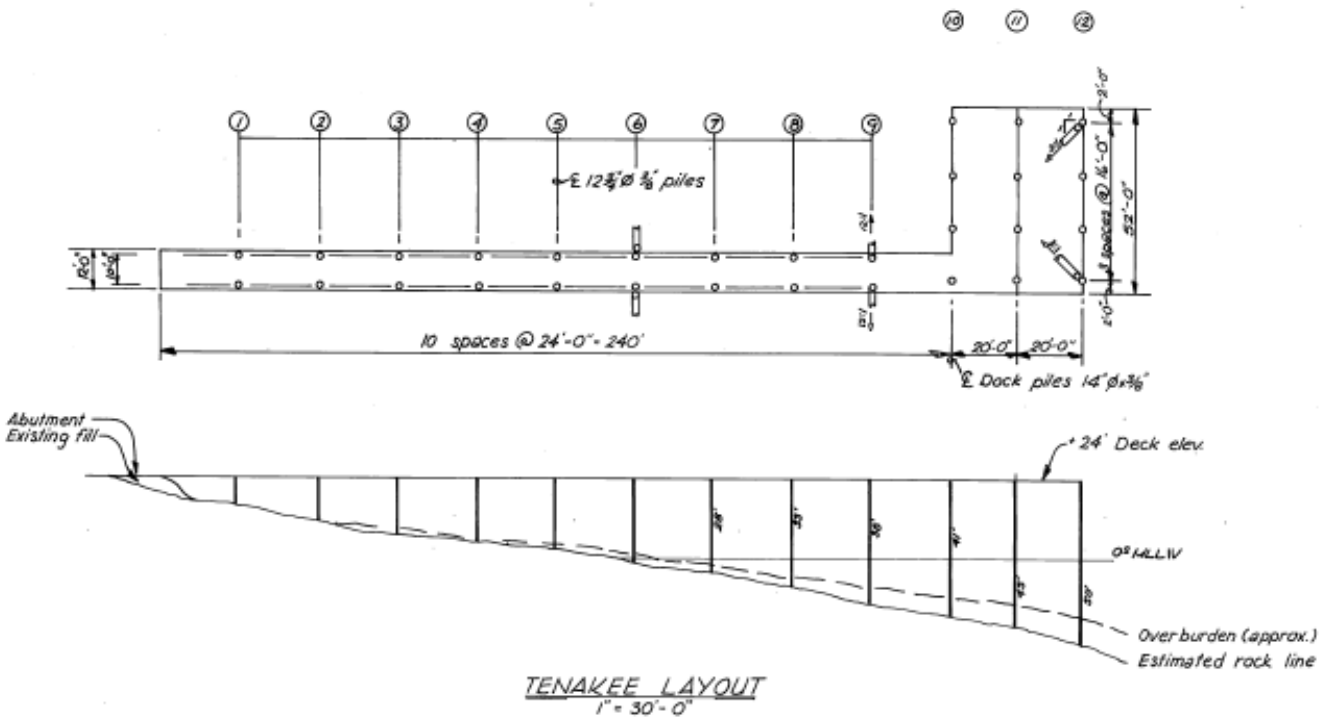

Figure 1: Dock Layout – north is to the left

Photo 1: Ferry dock at Tenakee Springs

Photo 2: Spalled concrete at east side of approach trestle

Photo 3: Repairs on east side of approach trestle with form boards still in place

Photo 4: Deck condition at shoreward, north, end of approach trestle

Photo 5: Hole in deck along approach trestle

Photo 6: Deck surface at dock – note ponding water indicating poor drainage

Photo 7: Hole in bottom surface of deck panel

Photo 8: Efflorescence on the bottom of the deck panels

Photo 9: Cap beam along approach trestle – note minor rust near field welds

Photo 10: Close-up of approach trestle pipe pile – gouge at left exposed sound steel

Photo 11: Approach trestle piles – note corrosion in splash zone

Photo 12: Pipe pile at dock section after removal of marine growth

Photo 13: Spent cathodic protection anode