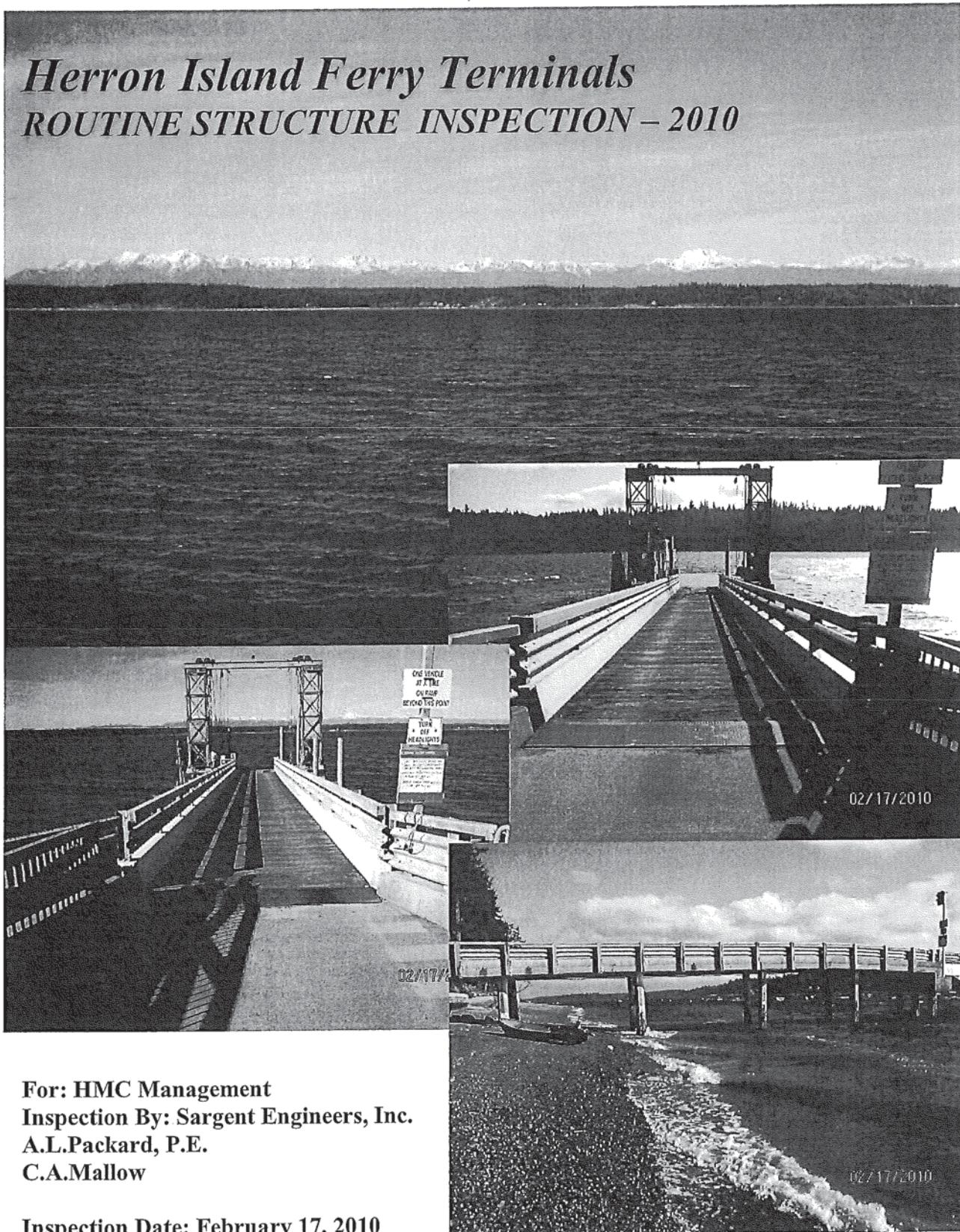


SARGENT CO.

Herron Island Ferry Terminals

ROUTINE STRUCTURE INSPECTION – 2010



For: HMC Management
Inspection By: Sargent Engineers, Inc.
A.L.Packard, P.E.
C.A.Mallow

Inspection Date: February 17, 2010

SARGENT

INTRODUCTION

BRIDGE DESCRIPTION

The Herron Island Ferry terminals service a single ferry that is the only means for vehicular traffic to and from Herron Island and the mainland. The terminals carry a single lane of traffic that is controlled by signs, lights and ferry crew members. The approach spans leading to the draw span terminals consist of a cast in place reinforced concrete slab superstructure, supported by concrete abutments and reinforced concrete piles. The draw span superstructures consist of a timber plank deck, two painted steel girders with a painted steel stringer and floor beam system, all supported by a reinforced concrete cap and piles at the land side and a steel lift tower, platform, and battered concrete piles at the bay end. The bridge is equipped with steel bridge rails with concrete and steel curbs. The bridge is not currently posted for vehicular loads, but the Heron Island Terminal Access Policy limits vehicle weight to 40,000 pounds. The length wise numbering orientation for both terminals is from the land end to the terminal end and for side to side, left to right.

TIME AND SCOPE OF INSPECTION

The inspection was performed on February 17, 2010. The inspection covered those structural elements of each terminal that were above the water line at the time of the inspection. Areas inspected included the concrete approach spans, steel lift spans, steel counter-weight towers and mechanical equipment within the counterweight towers. Low tide was approximately plus three feet. Access to the Heron Island terminal lift span near the counter-weight tower, and the counter-weight tower above the lowered elevation of the concrete counter-weight, was limited due to high winds. Winds were not an issue at the mainland tower and access was not limited.

Reinforced Concrete Approach Spans

The reinforced concrete approach slabs are integral with the bent caps and piles:

Mainland Terminal

Approaches:

- No deficiencies observed.

Reinforced Concrete Slabs

- No deficiencies observed.

Reinforced Concrete Bent Caps

- No deficiencies observed.

Reinforced or Prestressed Concrete Piles

- No deficiencies observed.

Reinforced Concrete Abutment:

- No deficiencies observed.

Island Terminal

Approaches:

- Some uneven settlement in the asphalt approaches at the bridge end. Settlement causes very little impact to the bridge because of low speed restrictions.

Reinforced Concrete Slab

- Some minor transverse and longitudinal cracking in the deck surface of span 1. Several transverse seal patches are in place. The concrete deck wearing surface is worn to small aggregate.

Reinforced Concrete Bent Caps

- No deficiencies observed.

Reinforced or Pre-stressed concrete piles:

- Minor hairline cracking near tops of several piles. Minor spalls/dings that have been patched.

Timber Abutment: Timber back wall supported by timber piles.

- All timber sounded, no significant decay was observed. Some settlement in rip rap bulk head protection.

Built Up Welded Steel Main Lift Spans

Mainland Terminal

Rail and Curb System:

- No deficiencies were noted.

Timber Deck:

- The deck wearing surface is rutting in the traffic wheel lines. There is checking and splitting in many of the deck planks. Checking and splitting will have to be monitored and planks replaced as necessary. There were no planks observed that need immediate replacement. No significant decay was observed in the planks or the top or bottom side of the planks. The deck attachment clips to the stringers are in good condition.

Painted Steel Stringers:

- The painted steel stringers have rust stains washing down from the seam between stringers and the deck. Vehicle traffic is most likely causing the deck planks to wear the paint from the tops of the stringers. Several stringers have dark rust stains along their welded connections to the floor beams. No significant corrosion was observed in these joints or on the stringers. There are many local paint failures throughout the stringers, allowing surface corrosion.

Painted Steel Floor beams:

- The painted steel floor beams are in a similar condition as the stringers. The floor beam connection to the main girder is welded. The welds are such that they intersect the welds of adjacent lateral bracing gusset plates. When welds like these intersect, they cause a stress concentration. This area can be susceptible to cracking. No cracking was observed in these welds at the time of this inspection. However, this is a location that should be closely looked at during each inspection.

Painted Steel Girders:

- There are two main girders in this span. These girders are considered fracture critical because they are steel and there is no load path redundancy. I.E., if one girder were to fail the entire span would fail. The steel girders appear to receive more salt spray than the stringers and girders, as a result there are several areas of blistering paint and surface corrosion. Most blistering is along the bottom flange of the girders. Several strengthening details have intersecting welds similar to those of the floor beams. No cracking in the girders or welds were observed at the time of this inspection. No deficiencies were noted in the lifting outriggers located near the end of the lift span.

Painted Steel Bearings:

- The movable painted steel bearing at bent 9 appears to be free and in good service condition. There is some paint deterioration and corrosion along the edges of the bearing.

Galvanized Steel Counter-Weight Tower:

- No deficiencies noted in the galvanized steel tower.
- Debris and muck is accumulating on top of the reinforced concrete counterweight at the cable attachment. The cable and connection were observed to be in satisfactory condition. No significant corrosion was observed. Cable pulley bearings are greased. Grease on the cables is weathered. No significant deficiencies were noted in the cables or pulley system within the tower.

Concrete Pier and Piles at Bent 10:

- No deficiencies noted.

Island Terminal

Rail System:

- Similar condition as the mainland terminal.

Timber Deck:

- The deck wearing surface is rutting in the traffic wheel lines. There is checking and splitting in many of the deck planks. Deck repairs are in place near the end of the span. Checking and splitting will have to be monitored and planks replaced as necessary. There were no planks observed that need immediate replacement. No significant decay was observed in the planks on the top or bottom side of the planks. The deck attachment clips to the stringers are in good condition.

Painted Steel Stringers:

- Similar condition as the mainland terminal.

Painted Steel Floor beams:

- Similar condition as the mainland terminal.

Painted Steel Girders:

- Similar condition as the mainland terminal.

Painted Steel Bearings:

- The movable painted steel bearing at bent 6 appears to be free and in good service condition. There is some paint deterioration and corrosion along the edges of the bearing.

Painted Steel Counter-Weight Tower:

- Similar condition as the mainland terminal.

Concrete Pier and Piles at Bent 7:

- No deficiencies noted.

RECOMMENDED MAINTANANCE AND REPAIRS

The following are maintenance and minor repair recommendations that should be performed to keep the bridge elements functioning properly and extend the life of the bridge.

1. Blast clean and spot paint the steel girders in both terminal lift spans.
2. Monitor lift spans paint systems, schedule complete paint system as necessary.
3. Monitor intersecting welds on floor beams and main girders during subsequent inspections.
4. Monitor and replace lift span deck planks as necessary.
5. Periodically clean out cavity on the top side of the reinforced concrete counter weights.
6. Continue cable and grease maintenance schedule.
7. Continue cable replacement schedule.

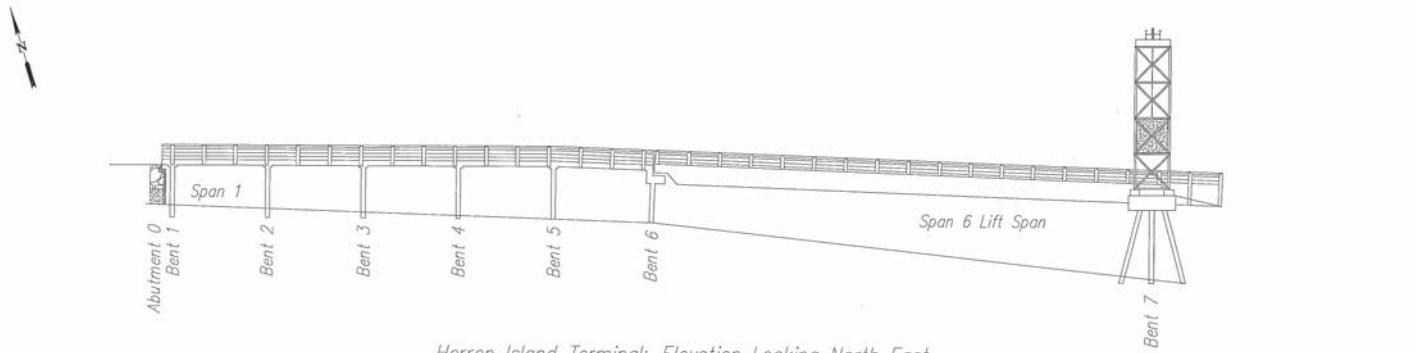
SUMMARY

The concrete approach spans for both terminals appear to be in good structural condition with no significant deficiencies noted. The timber deck planks have typical wheel line and weather wear in them. They should be monitored and replaced as necessary. Salt spray is a continual problem with painted steel structures and the main span lift terminals are no exception. The paint system on the girders is failing and blistering in several locations. A good spot paint and paint maintenance schedule is a necessary effort to control corrosion, and will extend the service life of the steel members for many years. Though no significant surface section loss from corrosion was observed, spot painting should take place fairly soon to ensure it does not start. The cable and mechanical lift systems appear to be well maintained and in good condition. The maintenance and replacement schedule for both appears to be adequate.

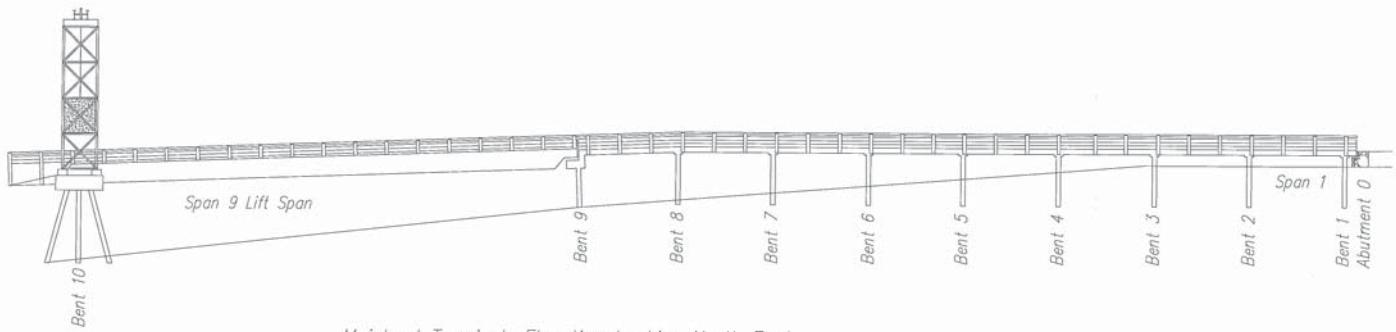
APPENDIX A

*DRAWINGS
AND
PHOTOGRAPHS*

Elevation of Herron Island Ferry Terminals

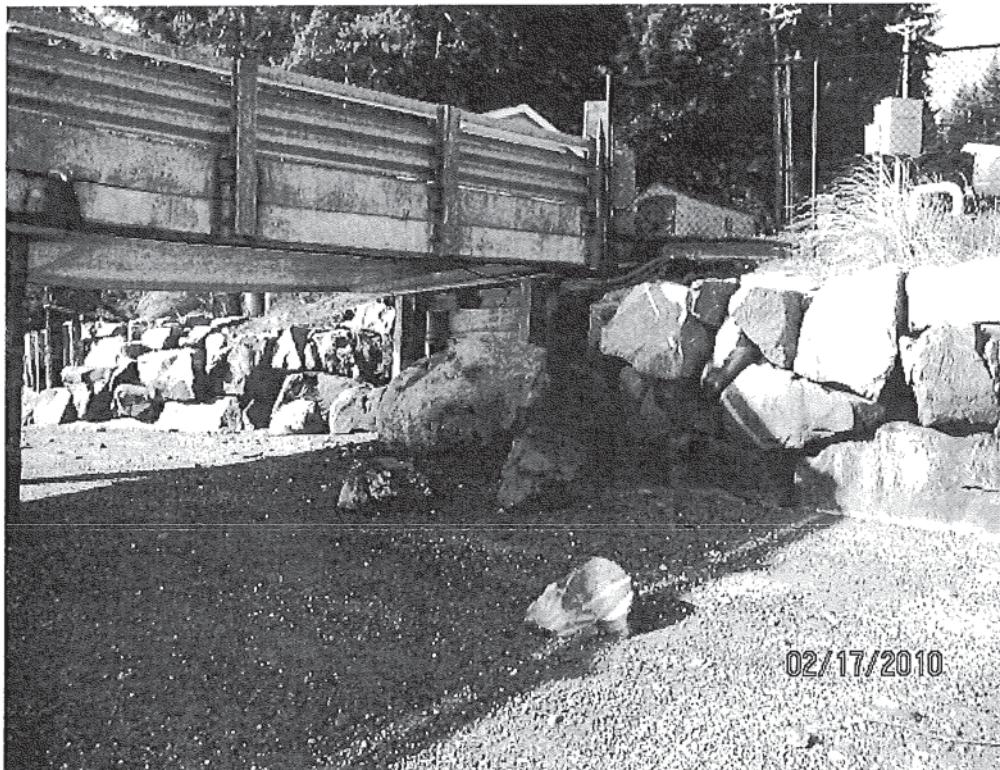


Herron Island Terminal: Elevation Looking North East.

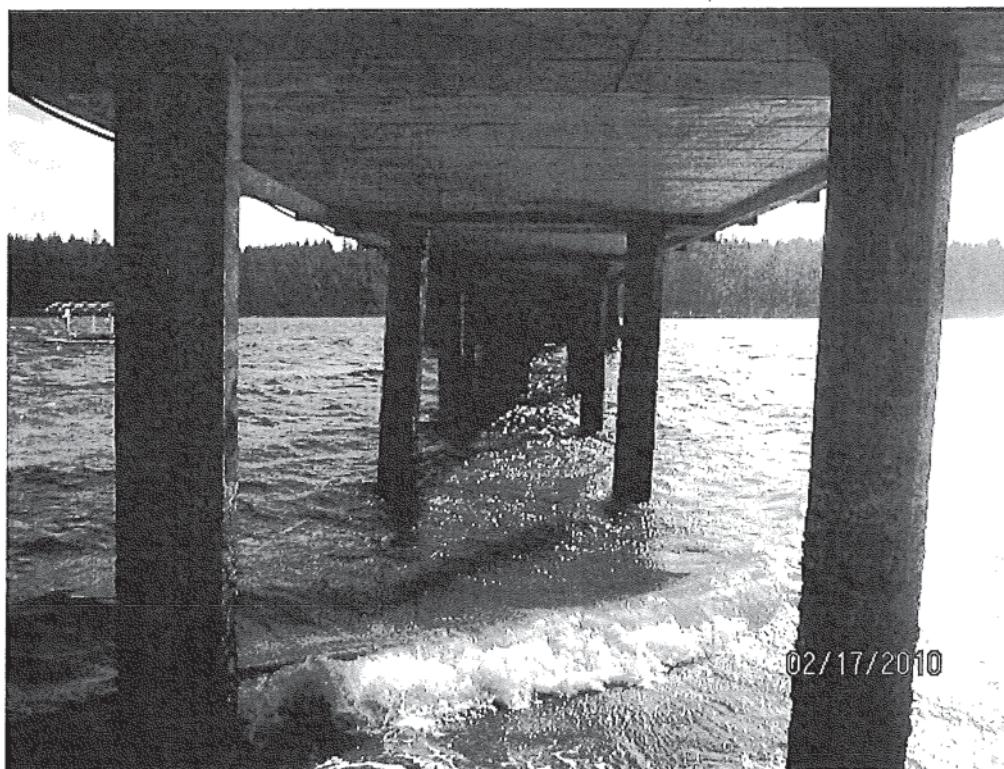


Mainland Terminal: Elevation Looking North East.

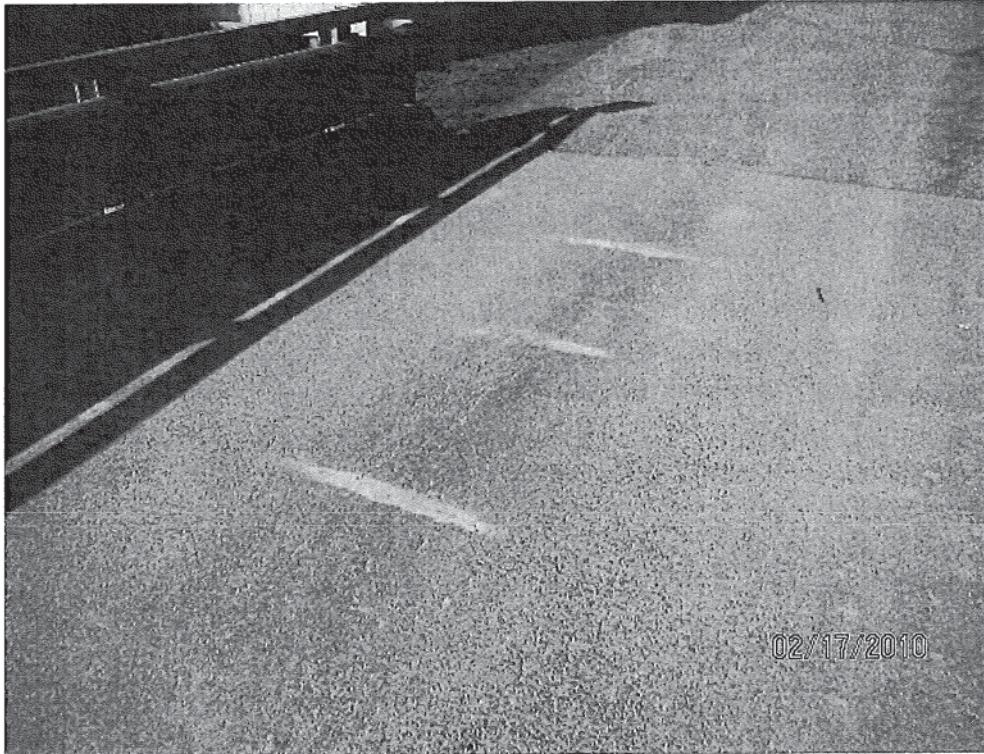
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Picture No. 1 – Island terminal abutment and bulk head.



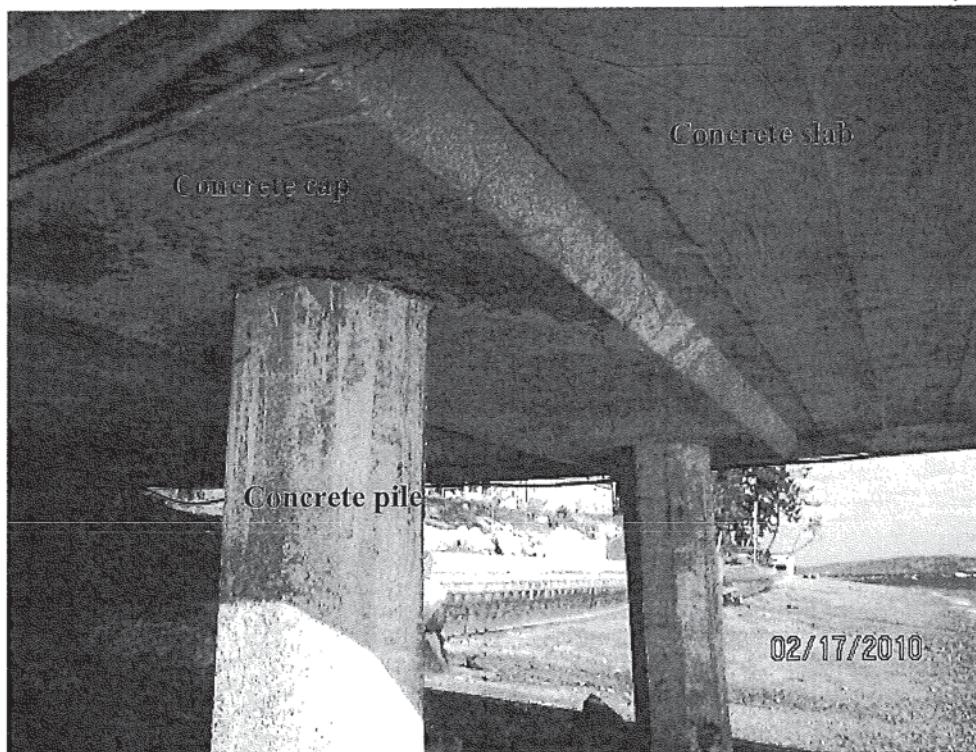
Picture No. 2 - Typical of approach construction



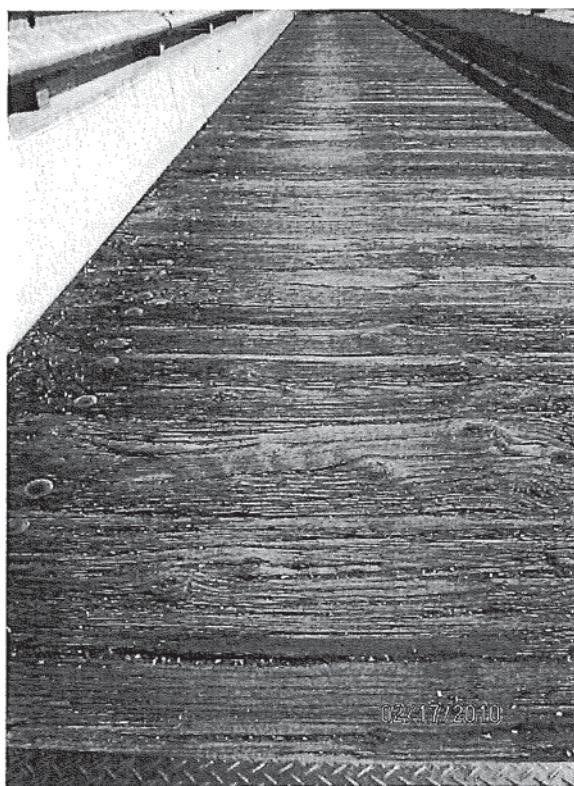
Picture No. 3 - Cracking and seal repair in span 1 of island terminal approach.



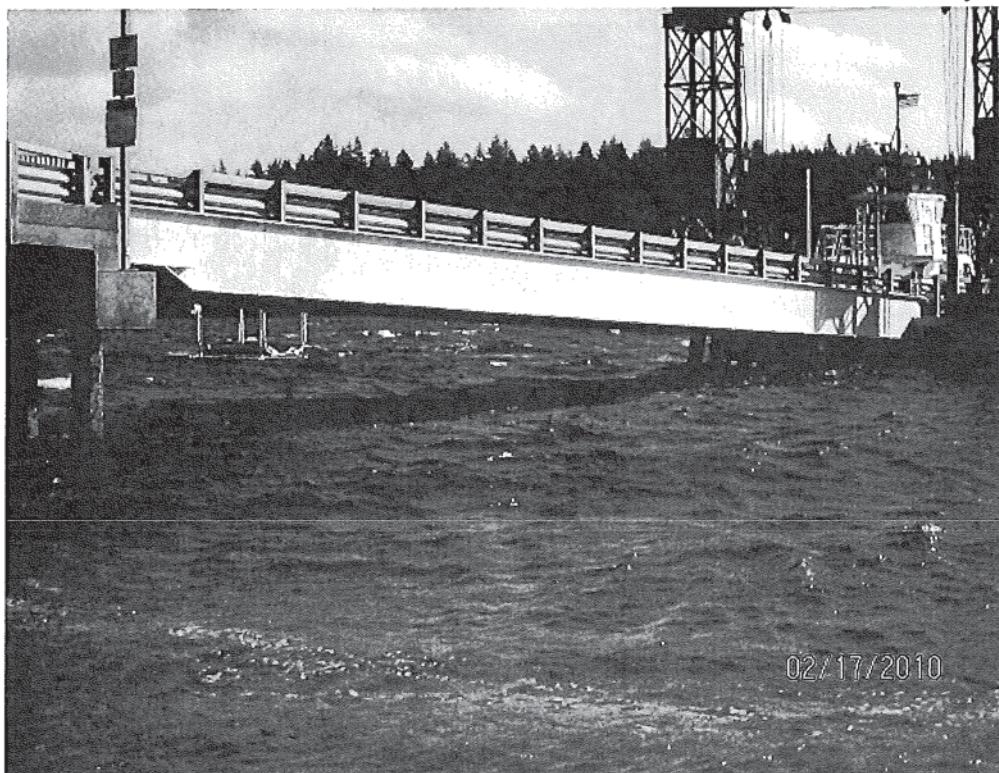
Picture No. 4 - Settlement in asphalt approach at bridge ends of island terminal abutment.



Picture No. 5 - Typical of approach span construction.



Picture No. 6 - Typical of wear, splitting and checking in the timber deck planks.



Picture No. 7 - Typical of painted steel girder lift spans.



Picture No. 8 - Typical of lift span construction.



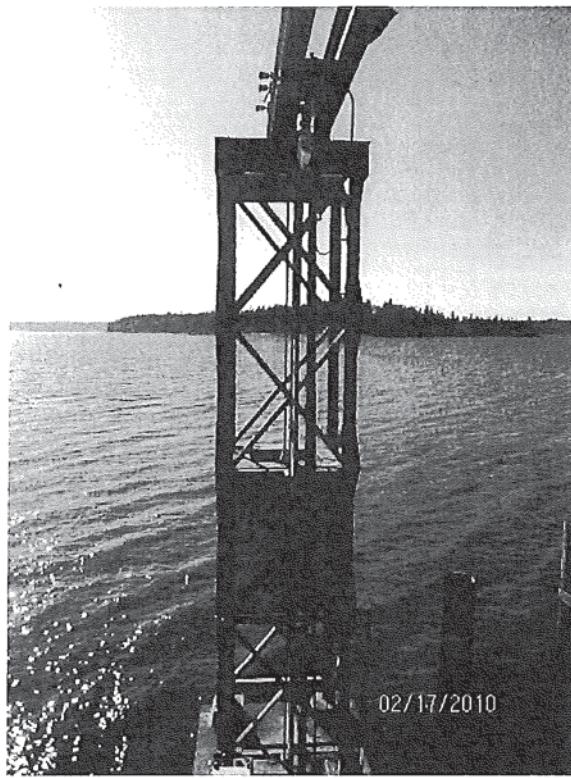
Picture No. 9 - Typical of rust staining washing down stringers and floor beams.



Picture No. 10 - Typical of paint blistering and corrosion on girders. Note corrosion on the lateral bracing weld joint. Note intersecting welds.



Picture No. 11 - Typical condition of the bearings at bent 6 of the island terminal and bent 9 of the mainland terminal.



Picture No. 12 - Typical counter-weight lift tower.



Picture No. 13 - Typical of debris and build up around counter weight/cable attachment point at top of the counter-weights.



Picture No. 13 - Typical of well lubed pulleys, Typical of condition of cable grease.