

PART 1 - GENERAL

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| <u>1.1 RELATED SECTIONS</u> | .1 | Section 01 33 00 - Submittal Procedures. |
| | .2 | Section 31 53 16 - Structural Timber. |
| | .3 | Section 35 59 29 - Mooring Devices. |
| <u>1.2 REFERENCES</u> | .1 | Latest edition of CAN3-S157 Strength Design in Aluminum. |
| | .2 | Latest edition of AWS D1.2 Structural Welding Code - Aluminum. |
| | .3 | Canadian Standards Association (CSA International)
.1 Latest edition of CAN/CSA-S6 Canadian Highway Bridge Design Code.
.2 Latest edition of CSA W47.2 Certification of Companies for Fusion Welding of Aluminum.
.3 Latest edition of CSA W59.2 Welded Aluminum Construction. |
| | .4 | Latest edition of The Aluminum Association - Aluminum Design Manual. |
| | .5 | Latest edition of AASHTO - LRFD Guide Specifications for the Design of Pedestrian Bridges. |
| <u>1.3 SUBMITTALS</u> | .1 | Shop Drawings
.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures. All shop drawings shall be stamped by a Professional Engineer licensed to practice in the province of Newfoundland and Labrador.
.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, gangway |

reactions, reinforcement, details,
and accessories.

.2 Company and Welder Certifications and
Welding Procedures

.1 Submit proof of company W47.2
certification at with shop drawings.

.2 Submit welder performance
qualification within a minimum of two
weeks prior to starting welding.

.3 Before preparation and submission of
detailed shop drawings as described
in 1.3.1, submit for approval concept
drawings illustrating the proposed
upper connection of the gangway to
the timber crib and the proposed
lower connection of the gangway to
the floating dock. The concept
drawings shall be in the form of
isometric drawings, photographs of
similar connections previously
supplied, two dimensional drawings,
or any other method that illustrates
the concept of the proposed
connection.

1.4 QUALIFIED
SUPPLIERS

.1 Suppliers for the aluminum gangway
must demonstrate at least three years
of experience fabricating these types
of structures. Submit evidence of
required experience to the
Departmental Representative.

1.5 DELIVERY, STORAGE, .1
AND HANDLING

Packing, Shipping, Handling and
Unloading:

.1 Deliver, store, handle and
protect materials in accordance with
Section 01 61 00 - Common Product
Requirements.

.2 Protect gangway from damage
until completion of the work. Any
damage to the gangway shall be
repaired by the Contractor.

1.6 MEASUREMENT FOR PAYMENT .1 Supply and installation of the aluminum gangway shall be measured as a lump sum item. Contractor to provide all plant, equipment, material, and labour including connection of the gangway to both the timber crib and to the floating dock.

1.7 WARRANTY .1 The gangway manufacturer shall warrant their structure to be free of corrosion, design, material and workmanship defects for a period of three years from the date of project completion.

PART 2 - PRODUCTS

2.1 MATERIALS .1 Gangway shall be constructed of aluminum structural shapes, tubing, plates and bars of CSA aluminum alloy number GS11N (Alcan alloy 6061-T6) or have an equivalent yield strength of 240 MPa in the pre-welded condition and 110 MPa in the heat affected zone. Gangway design shall compensate for all effects on mechanical properties produced by the welding process. The minimum thickness of all structural members shall be 3.0 mm.

.2 Aluminum decking shall be serrated bar grating type or 38 mm by 200 mm triple I beam slip resistant self mating extruded aluminum planks with no gaps. Minimum walking surface coefficient of friction shall be 0.93.

2.2 DESIGN REQUIREMENTS .1 Gangway span shall be 5.5 m (straight line dimension parallel to floating dock) and shall be measured from the edge of the crib wharf to the centre

of bearing of the gangway on the floating dock.

- .2 Gangway shall have a clear width of 1.2 m between structural elements.

- .3 The gangway structural system shall consist of two edge HSS members at each side of the gangway. The aluminum decking shall span between the edge members or between floor beam structural members running between the edge members. Alternatively, the gangway structural system shall consist of a truss composed of HSS members. The deck shall be supported on floor beams that span between panels points along the bottom chord of the truss. If the truss is intended to act as a safety barrier the top of the top chord of the truss shall be not less than 1.37 m above the high point of the deck surface. A truss system intended to act as a safety barrier shall be designed to withstand the simultaneously applied lateral and vertical loads as indicated by CSA-S6. These barrier loads shall be applied simultaneously with all other loads on the truss including dead loads, live loads, and environmental loads.

- .4 Safety Barrier:
 - .1 If a truss system is not used and designed to act as a safety barrier, a separate safety barrier along each side of gangway shall be shop installed to meet CSA-S6 requirements for pedestrian barriers. The barrier shall be located on both sides of the gangway up to a height of 1.37 m.
 - .2 The barrier shall consist of HSS aluminum members.

- .3 The barrier shall be designed to withstand the simultaneously applied lateral and vertical loads as indicated by CSA-S6.
 - .4 The barrier system shall include a 38 mm diameter round HSS handrail on each side of the gangway.
- .5 Toe Plate:
 - .1 The gangway shall be installed complete with aluminum toe plates measuring 6.4 mm x 102 mm which shall run the full length of the gangway.
- .5 Elevation Difference:
 - .1 The upper support shall be at the wharf deck elevation of +3.0 m. The top surface of the gangway deck at the upper end shall be flush with the top surface of concrete deck and timber coping.
 - .2 The lower support will vary with the tides from 0.00 low normal tide to extreme high tide elevation of +1.8 m.
- .6 Design shall be done by a qualified Professional Engineer licensed to practice in Newfoundland and Labrador. Design shall be done in accordance with CAN/CSA-S6 and CSA S157.
- .7 Design Loads:
 - .1 All design loads, factors, load combinations and limit states required by the Canadian Highway Design Bridge Code shall be considered and evaluated. Design shall also be in accordance with the pertinent sections of CAN3-S157 where applicable, with the code having more stringent requirements taking precedence.

.2 Dead Loads: The gangway structure shall be designed considering its own dead loads.

.3 Environmental Loads: wind and other environmental loads shall be in accordance with the values provided in the Canadian Highway Bridge Design Code for the location nearest the project site as indicated on the drawings. If there are several locations provided in the Canadian Highway Bridge Design Code near the project site than the most critical loads shall be used. The design environmental loads shall be indicated on the drawings.

.4 A uniformly distributed pedestrian live load of 4.8 kPa shall be applied to the gangway deck area.

.5 The gangway shall be designed for torsional stresses resulting from wave action causing the floating dock to roll, therefore losing contact with one of the two supports at the lower end of the gangway. The design shall consider strength and fatigue regarding these torsional stresses.

.8 Upper Connection:

.1 The upper support connection shall be a hinge type connection allowing the gangway to rotate about the connection. The contractor shall design, supply and install the means of connecting the gangway into the timber coping, concrete deck, and timber crib. The upper connection shall be designed so that the upper surface of the gangway deck shall be flush with the upper surface of the concrete deck and timber coping.

.2 The upper connection shall include a hinged plate covering the gap between the gangway and the wharf. The plate shall be aluminum with a

checkered diamond pattern. The plate shall be hinged at the centre of the connection. The portion of plate assembly on the side of the wharf shall be anchored into the wharf. The means of this connection shall be designed by the gangway supplier. The portion of the plate assembly on the side of the gangway shall be left free to slide over the gangway deck with rotation of the gangway caused by the rise and fall of the tide.

.3 Submit detailed shop drawings for the upper connection stamped by an engineer licensed to practice in Newfoundland and Labrador. The shop drawings shall include the means of anchorage into the marginal wharf.

.9 Lower Connection:

.1 The lower support connection shall be designed to allow free movement of the lower end of the gangway along the horizontal surface of the floating dock. This connection shall be either a wheel that rolls along the floating dock or a smooth curved bearing surface that is intended to slide along a corresponding smooth surface provided on the floating dock.

.2 This connection shall include guide rails attached to the floating dock designed to ensure that the lower connection of the gangway remains centred on the floating dock. These guides shall consist of aluminum angles, steel angles with UHMW fender pads on the sides of the angles to ensure no contact between aluminum and steel, or some other method approved in writing by the Departmental Representative. The supplier shall design the attachment of the guides to the floating dock.

.2 The lower connection, including the guide rails, shall be designed to accommodate to full range of movement in the connection that will occur with rise and fall of the tide, plus an additional 300 mm of horizontal movement at each end of the connection as a safety factor.

.3 Submit detailed shop drawings for the lower connection stamped by an engineer licensed to practice in Newfoundland and Labrador. The shop drawings shall include the means of anchorage into the floating dock.

.10 Lifting Lugs:

.1 Provide four lifting lugs for lifting of the gangway, two at each end of the gangway. The lugs shall be accessible by a crane. The lugs and the attachment of the lugs to the structural system of the gangway shall be designed to safely transfer the full weight of the gangway to a crane connected at the four lug locations.

2.3 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Do aluminum welding work in accordance with the latest edition of CSA W59.2 or AWS D1.2.

.3 Companies and individuals doing welding shall be certified under the latest edition of CSA W47.2.

.4 Welds exposed to view shall be continuous and meet the visual acceptance criteria of CSA W59.2.

- .5 Welding electrodes shall be in conformance with ANSI/AWS Standard A5.10, alloy type 5356 and shall be certified by the Canadian Welding Bureau (CWB).

PART 3 - EXECUTION

3.1 ERECTION

- .1 Erect gangway and upper and lower connections to timber crib and floating dock in accordance with approved shop drawings.

END OF SECTION