1. DESIGN USAGE


1.2 VARIATIONS FROM THE STANDARD DESIGN REQUIREMENTS MAY BE ACCEPTABLE IN CERTAIN SPECIAL SITUATIONS. ALL SUCH VARIATIONS SHALL BE DOCUMENTED AND REQUIRE APPROVAL FROM MFR PRIOR TO USE.

1.3 A PROFESSIONAL ENGINEER REGISTERED TO PRACTICE IN THE PROVINCE OF BRITISH COLUMBIA SHALL DESIGN ALL BRIDGE COMPONENTS.

1.4 DEFINITIONS

- STANDARD DRAWINGS ARE A SET OF DRAWINGS PROVIDED TO THE CONTRACTOR TO DESIGN AND SUPPLY THE PRECAST SLAB BRIDGE COMPONENTS.

- DESIGNER IS A PROFESSIONAL ENGINEER REGISTERED TO PRACTICE IN THE PROVINCE OF BRITISH COLUMBIA, WHO IS RESPONSIBLE FOR THE DETAILS STATED IN THE STANDARD DRAWINGS IN CONFORMANCE WITH THESE DRAWINGS.

- MFR IS THE MINISTRY OF FORESTS AND RANGE.

1.5 APPLICABLE BRIDGE LENGTH (OUT-TO-OUT):

- 30 m

1.6 STANDARD DECK WIDTHS

- THE FOLLOWING TABLE SPECIFIES STANDARD DECK WIDTHS FOR THE DESIGNATED DESIGN VEHICLES.

<table>
<thead>
<tr>
<th>Standard Deck Width (m)</th>
<th>Design Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6</td>
<td>BCL625, L100 4268</td>
</tr>
<tr>
<td>4.0</td>
<td>BCL625, L150 4876</td>
</tr>
<tr>
<td>4.6</td>
<td>BCL625, L165 5276</td>
</tr>
</tbody>
</table>

1.7 SUPERSTRUCTURE IDENTIFICATION MARKING:

- EACH BRIDGE SUPERSTRUCTURE SHALL HAVE A CLEARLY STATED OR PERMANENTLY MARKED ON AT LEAST ONE SIDE OF THE SUPERSTRUCTURE:
  - STRUCTURE NUMBER
  - LENGTH (m)
  - PLACE OF MANUFACTURE
  - DATE OF MANUFACTURE
  - MINISTRY OF FORESTS AND RANGE
  - WEIGHT OF THE LETTERING SHALL BE 50 mm MINIMUM

1.8 SLAB - BRIDGE SHEAR PLANE IS PLACED UP TO AN ANGLE OF 30° AS SHOWN ON ORIG.- 03. ADJUST BRIDGE DETAILS ACORDINGLY.

1.9 MAXIMUM SLAB WEIGHT:

- SLAB BRIDGES PRODUCED THROUGH A DESIGN/SUPPLY CONTRACT SHALL HAVE A MAXIMUM COMPONENT WEIGHT OF 1500 kg (33 000 lb) UNLESS SPECIFIED. WHERE THE CONTRACT IS DESIGN/SUPPLY AND INSTALL, COMPONENT WEIGHT SHALL BE AT THE DISCRETION OF THE ENGINEER.

1.10 COMPONENT WEIGHTS:

- PRECAST CONCRETE COMPONENT WEIGHTS (SLABS, CAPS AND FOOTINGS) SHALL BE INCLUDED ON THE DRAWINGS.

2. DESIGN

2.1 DESIGN LIFE:

- BRIDGE DESIGN LIFE: 45 YEARS.

2.2 DESIGN CODE AND MFR REFERENCE STANDARDS:

- CAN/CSA S6-06
- MINISTRY OF FORESTS AND RANGE BRIDGE DESIGN AND CONSTRUCTION MANUAL
- MFR INTERGRATED BRIDGE DESIGN GUIDELINES
- SINGLE SLANE SHEAR-CONNECTED SLAB BRIDGES THAT CONFORM TO THE REQUIREMENTS OF CAN/CSA S6-06 CLAUSES 5.6 AND 5.2 SHALL BE DESIGNED BASED ON THE METHODS OUTLINED IN THE ASSOCIATED ENGINEERING REPORT: DESIGN OF SINGLE SLANE SHEAR-CONNECTED SLAB BRIDGES REV. 1. AVAILABLE ON THE MINISTRY’S WEBSITE (http://www.for.gov.bc.ca/th/myeng/bridges_and_major_projects.html).

2.3 DESIGN VEHICLES

- REFER TO REF Precast Standard Drawings STD-009 to 010-STD-049 06
- THE DESIGN DRAWINGS SHOULD CLEARLY SPECIFY THE DESIGN VEHICLES THAT WAS USED FOR THE BRIDGE DESIGN

2.4 MULTI-LANE LOADING

- WHERE A SLAB IS CAPABLE OF SUSTAINING A SUPPORT MORE THAN ONE LANE OF TRAFFIC, THE DESIGNER SHOULD SEEK CLARIFICATION FROM MFR ON HOW TO ACCOUNT FOR MULTI-LANE LOADING.

2.5 DYNAMIC LOAD ALLOWANCE:

- DYNAMIC LOAD ALLOWANCE SHALL BE APPLIED IN ACCORDANCE WITH CAN/CSA S6-06.

2.6 FATTIGUE DESIGN

- IN ACCORDANCE WITH CAN/CSA S6-06

- WHERE WELDED SHEAR CONNECTORS CONFORM TO THE DETAILS AND SPACING REQUIREMENTS SHOWN ON THE STANDARD DRAWINGS, NO FATTIGUE DESIGN OF THE WELDED SHEAR CONNECTOR OR WELD CONNECTION BETWEEN SLABS IS REQUIRED.

- IF WELDED-SHEAR CONNECTIONS DO NOT CONFORM TO THE DETAILS AND SPACING REQUIREMENTS SHOWN ON THE STANDARD DRAWINGS, THE ENGINEER SHALL COMPLETE THE FATTIGUE DESIGN IN ACCORDANCE WITH CAN/CSA S6-06 AND THE FOLLOWING MODIFICATIONS:

- DESIGN VEHICLE - AS PER PROJECT SPECIFICATIONS

- FATTIGUE DESIGN VEHICLE TO BE CENTERED ON BRIDGE

- FATTIGUE STRESS RANGE

- W

- L = THE CALCULATED STRESS RANGE AT THE DETAIL DUE TO THE PASSAGE OF THE DESIGN VEHICLE

- FATTIGUE STRESS RANGE

- MINIMUM NUMBER OF DESIGN CYCLES

- W RATED FOR SPANS

- W RATED FOR SPANS >12 m

2.7 MAXIMUM LIVE LOAD DEFLECTION:

- BRIDGES MUST BE DESIGNED SO THAT LIVE LOAD DEFLECTION (CALCULATED AS THAT CAUSED BY ONE TRUCK ONLY, PLACED AT THE CENTRELINE OF THE TRAVELLED GROUNDS) DOES NOT EXCEED L/450, WHERE USING THE L65 DESIGN VEHICLE THE DEFLECTION SHALL BE CALCULATED UP TO THE L60 DESIGN VEHICLE.

2.8 SEISMIC DESIGN

- SEISMIC DESIGN MUST NOT BE REQUIRED UNLESS OTHERWISE SPECIFIED.

2.9 WEARING SURFACE:

- AS A MINIMUM, A DESIGN SHALL INCORPORATE AN ALLOWANCE FOR A 30 mm CONCRETE OVERLAY.

2.10 CONSTRUCTION LOAD

- SLAB GRIDER REINFORCEMENT SHALL BE DESIGNED TO ALLOW INSTALLATION BY CANTILEVERED HOOKS OR PINS, IN ACCORDANCE WITH THE MINIMUM CANTELER OF 30% OF THE SLAB LENGTH.

2.11 CONNECTION TO THE ABUTMENT

- INCOORPORATE SUFFICIENT CONNECTION OF THE SLAB TO ABUTMENT (DOWELS) TO RESIST ALL APPLIED LOADS INCLUDING BRAKING LOADS AND EARTH Pressures.

2.12 STANDARD CONCRETE COVER:

- THE FOLLOWING ARE THE STANDARD CONCRETE COVERS:

<table>
<thead>
<tr>
<th>Top of Slab</th>
<th>underside of Slab</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 mm</td>
<td>30 mm</td>
</tr>
</tbody>
</table>

2.13 MINIMUM SLAB DEPTH

- MINIMUM SLAB DEPTH 250 mm

3. MATERIALS AND FABRICATION

3.1 STRUCTURAL STEEL

- TO CAN/CSA G40.21M PLATE AND SECTIONS: GRADE 350A

3.2 WELDING

- ALL WELDS TO BE COMPLETED IN ACCORDANCE WITH CSA WS4-06

3.3 STEEL FABRICATION CERTIFICATION

- FABRICATION OF SHARP CONNECTORS TO BE CERTIFIED IN ACCORDANCE WITH CSA W4-1 DIV 1 OR 3

3.4 FIELD WELDING

- BY COMPANY CERTIFIED TO CSA W4-1 DIVISION 1 OR 3

3.5 STUDS

- SHEAR STUDS SHALL MEET THE REQUIREMENTS OF CSA W5-06 APPENDIX F FOR TYPE A AND B STUDS

- ASTM A191 GRADE 105, 115, 150

3.6 GALVANIZING

- ALL ITEMS SPECIFIED AS GALVANIZED ARE TO BE GALVANIZED TO CSA G164

3.7 REINFORCING STEEL MUST NOT BE WELDED OR TACK WELDED

3.8 PRECAST CONCRETE

- CSA A23.1 EXCEPT COLD WEATHER TYPES

- CONCRETE TO BE FABRICATED IN ACCORDANCE WITH CSA A24.4 AS A PLANT CERTIFIED IN ACCORDANCE WITH CSA A44.4

- FABRICATION TOLERANCES TO CAN/CSA A23.1

- FINISH: TRANVERSE BROOM TO TOP OF DECK, OTHERWISE TO CSA A23.1 AND A44.4

- ALL CORNERS MUST BE EXCLUDED FROM THE APPLICABLE STANDARD DRAWING.

3.9 GRouting:

- GROUT MFR: 85 MPa AT 28 DAYS TO BE INSTALLED ACCORDING TO MANUFACTURERS INSTRUCTIONS

- GROUT FOR SHEAR NO'S SHALL BE TARGET TRAFFIC PATCH WITH CONCRETE AGGREGATE, OR ALTERNATE EQUIVALENT PRODUCT. EQUIVALENT PRODUCTS MUST BE APPROVED BY MFR PRIOR TO USE.

3.10 WEATHERING - WHERE IT IS ANTICIPATED THAT THE TEMPERATURE SHALL DROP BELOW 5°C DURING GROUTING, THE CONTRACTOR SHALL INSTALL COLD WEATHER CONCRETING PROCEDURES IN ACCORDANCE WITH CAN/CSA A44.1 PRIOR TO COMMENCING THE GROUTING OPERATION. THE CONTRACTOR SHALL PROVIDE THE MFR WITH WRITTEN COLD WEATHER CONCRETING PROCEDURES.

3.11 SCAFFOLDING - TO CAN/CSA 06-06: OZONE RESISTANT NATURAL RUBBER, NATURAL POLYISOPRENE

3.12 DURABLE BLOCKOUTS - CARRIAGE METAL, STAY-IN-PLACE BLOCKOUT FORMS

3.13 COUPLERS - COUPLERS SHALL CONFORM TO ASTM A633 GRADE A MINIMUM TENSILE STRENGTH OF 105,000 lb/inch of the ELEMENTS BEING CONNECTED OR AS SPECIFIED ON THE STANDARD DRAWINGS.

4. TRANSPORTATION AND ERECTION OF BRIDGES

4.1 SUPPORT GIRDERS WITHIN 1 METER OF SEPARING LOCATIONS DURING TRANSPORTATION AND STORAGE.

4.2 LIFTING DEVICES

- ALL PRECAST COMPONENTS EXCEPT CONCRETE ROOFSIDE BARRIERS AND UNREINFORCED INTERLOCKING CONCRETE BLOCKS MUST UTILIZE SLINGS (EXCEPT CORRUGATED METAL WITHIN THE APPLICABLE STANDARD DRAWING).

- ALL PRECAST COMPONENTS MUST BE TIE-DOWNED TO THE EQUIPMENT TO WHICH THEY ARE ATTACHED.

- SLINGS/CHAINS.

- WHERE IT IS ANTICIPATED THAT THE TEMPERATURE SHALL DROP BELOW 5°C DURING GROUTING, THE CONTRACTOR SHALL INSTALL COLD WEATHER CONCRETING PROCEDURES IN ACCORDANCE WITH CAN/CSA A44.1 PRIOR TO COMMENCING THE GROUTING OPERATION. THE CONTRACTOR SHALL PROVIDE THE MFR WITH WRITTEN COLD WEATHER CONCRETING PROCEDURES.

5. CERTIFICATION AND QUALITY CONTROL

5.1 PROVIDE CONCRETE TEST RESULTS BY AN APPROVED TESTING LABORATORY FOR ALL PRECAST CONCRETE COMPONENTS.

5.2 FIELD GROUT SAMPLES FOR THE BLOCKOUTS AND DECK JOINTS CAN COMPRASE 50 mm X 50 mm X 200 MM CUBES IN 50 mm X 50 mm AND 100 MM CUBES IN 100 mm.

5.3 CERTIFICATION TO CSA STANDARDS FOR STEEL AND PRECAST CONCRETE MANUFACTURE MUST BE IN EFFECT AT THE TIME OF OPENING THE TENDERS AND ALSO THROUGHOUT THE PERIOD OF MANUFACTURE.

6. SUBMITTAL ITEM

- SUBMITTAL ITEMS SUBMITTED FOR THIS MATERIALS SUBMITTAL ARE TO INCLUDE:

- SPECIFICATIONS

- MATERIAL PROPERTIES

- WORK FACTORS

- MACHINE RENTS

- LABOR RENTS

- MATERIAL RENTS

- FIELD GROUT SAMPLES