**BRIDGE FABRICATION**

**INSPECTION MANUAL**

**Edition 1**

**2020**



1. Prefabrication Meeting Agendas

This Appendix includes (QA) prefabrication meeting agenda templates to support the Consultants development of prefabrication meeting agendas and execution of prefabrication meetings for steel girders, deck joints, precast concrete units, bearings, bridgerail, and overhead sign structures. The prefabrication meeting agenda templates provided in this Appendix include standard requirements and must be carefully reviewed and modified by the Consultant for project specific requirements where necessary. The prefabrication meeting agenda templates are also provided in electronic format on the Department’s website.

* + - * 1. Steel Girders

|  |
| --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE – Steel Girders** |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + **Alberta Transportation:**Project Sponsor/Administrator/Fabrication Specialist;   + **Consultant:** Project Manager, Inspector;   + **Contractor:** Project Manager and all personnel involved in supervision of the work;   **Contractor’s Specialty Staff or Subcontractor:** Fabrication superintendent(s and quality control personnel), independent testing agency representatives, and all personnel involved in supervision of the work. |
|  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions** | | **Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting)** | |
| **1** | **2** | **3** | **4** |
| **Agenda Item** | **Project Specific Agenda Sub-Item** | **Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes** | **Meeting Actions or Decisions, with Identification by Responsible Person** |
| 1. Standards |  | * Fabrication must be in accordance with the following documents: * Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 6, Edition 17, 2020; * AASHTO LRFD Bridge Construction Specifications, 4th Edition 2017; * AASHTO/AWS Bridge Welding Code D1.5M/D1.5; * Alberta Transportation Standard and Typical Detail Drawings as applicable. |  |
| 1. Qualifications |  | * The fabrication facility fabricating steel girders, splice plates, stiffeners, connector plates, and associated materials must be certified by the Canadian Welding Bureau (CWB) to Division I and by the Canadian Institute of Steel Construction (CISC) in the category of complex steel bridges. This certification requirement extends to all subcontractors engaged in the fabrication of structural steel components. * The fabrication facility fabricating steel diaphragms, bracing, and associated materials must be certified by the Canadian Welding Bureau (CWB) to Division I and by the Canadian Institute of Steel Construction (CISC) in the category of complex or simple steel bridges. This certification requirement extends to all subcontractors engaged in the fabrication of structural steel components. * Welders, welding operators and tackers must be CWB certified in the applicable category. A copy of the welder’s current qualification documents must be provided to the Consultant for record purposes. Only qualified welders will be allowed to work on this project. * The fabricator’s quality control plan, including visual inspection and non-destructive testing, must meet, at a minimum, the requirements of AASHTO/American Welding Society (AWS) Bridge Welding Code D1.5M/D1.5 Clause 6 except that the Contractor’s visual quality control welding inspector must be certified by the CWB as a Level 2 or Level 3 inspector in accordance with CSA W178.2. * Contractor QC testing technicians: Third party NDT technicians must be certified to Level 2 in accordance with CAN/CGSB-48.9712 and employed by a testing agency certified to CSA W178.1. Coating testing must be completed and by an independent National Association of Corrosion Engineers (NACE) Level 2 certified coating inspector. * The Consultant’s QA Inspector must be certified as a Level 3 welding inspector in accordance with CSA 178.2 and possess bridge related fabrication experience. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication: * Inspection and Testing Plan (ITP); * List of all fabricators and fabrication shop and all subcontractor certification documentation; * Fabrication sequence and equipment; * Design and independent check notes (if applicable); * Review documentation of any contract modifications (if applicable); * Shop drawings; * CWB approved weld procedure data sheets (WPDS) and processes (WPS); * Valid CWB Welder’s tickets for all welders and the operations they will perform; * Mill test reports for all material. Boron content must not exceed 0.0008% for steel being welded ; * Verification testing results for all steel melted outside of Canada or the United States of America; * Product data sheets for all other materials; * Proposed fabrication sequence for a girder section; and * Fabrication schedule, including the expected completion date of each girder section. Note: the fabrication schedule is required so the Consultant’s QA Inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions.** |  |
| 1. Materials |  | * Material requirements:   + Steel Girders and steel components welded to girders: CSA G40.21M Grade 350AT Cat 3;   + Steel components bolted to girders: CSA G40.21M Grade 350A;   + Bolts, nuts, washers must be ASTM F3125 Grade A325 type 3 heavy hex, ASTM A563 heavy hex, ASTM F436, respectively;   + Shear Stud Connectors: ASTM A108 Grades 1015, 1018 or 1020, inclusive, either semi-killed or killed deoxidation. Only AWS D1.5 Type B studs must be used;   + Testing of boron content must be reported to sufficient accuracy to determine clearly whether the limit of 0.0008% is exceeded or not(for steel being welded); and * All steel from sources outside of Canada or the United States of America must be retested by an independent certified laboratory in Canada. The Canadian laboratory report must clearly state whether the retest values meet the requirements of the specified material standard. |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in Subsection 6.2.8.6.1 of the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector for each girder section. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * The Consultant’s QA Inspector does not provide quality control for the fabricator. The Consultant’s QA Inspector will inspect work that has been reviewed and accepted by the fabricator’s quality control (QC). |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution by imperial material must be reviewed and accepted by the Consultant and the shop drawings must show use of reviewed and accepted imperial material. * All fabrication is to be carried out in an adequately enclosed area, free of drafts, well lit, and maintained at a minimum temperature of 10°C. * All welds must have an approved procedure. The approval must be obtained from CWB and reviewed and accepted by the Consultant. Any substitution to welding procedures will require the review and acceptance of the Consultant prior to welding. Welders must follow the procedure parameters to within the allowable tolerances. * No tack welds will be permitted unless they are completely re-melted and incorporated into the final weld. Tacks, where acceptable, must have a minimum length of four times the weld size. Should any tack welds crack prior to being welded over, they must be completely removed prior to welding over. * Run-off tabs must be used on all welds that terminate at the edge of a member. The thickness and shape of the tabs must replicate the joint detail being welded and must be a minimum of 100 mm long. These are to be removed by flame cutting. Flange splice edges will be inspected using dye penetrant. * All welding equipment must be maintained in good repair (gauges, clamps, connections, etc.). * No splices are allowed unless they are shown on consultant reviewed and accepted shop drawings. The location of any additional splice must be reviewed and accepted by the Consultant prior to splicing. * Arc strikes are not permitted. In the event of an isolated accidental arc strike, a repair procedure must be submitted in accordance with the SSBC Subsection 6.2.5.8. At a minimum, the repair procedure must include the complete grinding out of the crater produced by the arc strike. The repair procedure must also include MPI and hardness testing of the affected area. Hardness of the repaired area must conform to the requirements of the SSBC Subsection 6.2.8.4.1.4. These areas will be examined by the Consultant’s QA Inspector to ensure complete removal of the metal in the affected area. * Mill test reports must be provided for all material used in the structure. Copies of MTRs are to be given to the Consultant’s QA Inspector. * All steel components are to be clearly marked using the mark numbers from drawings. For reporting purposes, additional mark numbers must be used to separately identify individual pieces, which have identical mark numbers on the original shop drawings. * Handling devices must not mark the plates. This must be observed starting at the receiving area and throughout the course of fabrication. * Methods and medium of marking and the location of marks must be accepted by the Consultant. Steel stamps must not be used. The only exception is the match marking of splice plates, which may be steel, stamped using low stress stamps. The stamps and specific locations of such stamps must be shown on the shop drawings and accepted by the Consultant. * Repair procedures must be submitted to the Consultant and the Department for review and acceptance for damaged base metal, defective weldments, and any other defect identified by the Consultant, prior to commencement of the repair work. Any repairs to cut plate edges must use AWS D1.5 criteria in determining whether a flaw can be ground out or if it requires a welded repair. Welded repairs must be preheated. Any repairs accepted for implementation must be authenticated in accordance with APEGA requirements. |  |
| 1. Plate Cutting Prior to Welding |  | * All plate material for main members, splice plates and any material welded to main members must be thermally cut using an automatic cutting machine conforming to SSBC Subsection 6.2.6.3. * Heat numbers are to be transferred to all flange and web plates at the time of cutting. Identification marks to be placed on one end at all times in accordance with fabricator layout and orientation. * If any laminations are found or indicated by torch blow back etc., they must be reported to the Consultant’s QA Inspector. * **Witness Point - Completion of plate cutting prior to any welding.** |  |
| 1. Sub Assembly of Flange Plates |  | * Individual flange plate identification must be completed prior to hardness testing. Spacers must be placed between plates in a stack to facilitate testing. * Edge hardness must be checked by the Contractor’s independent testing agency, on all flange plates at three random locations along each edge (6 per plate). * If the surface roughness is such that the hardness cannot be checked, the entire length must be ground to an acceptable smoothness by grinding or other means and hardness checks then reselected at random. Spot grinding for hardness checks is not allowed. * For straight girders, flange plates must be straight and free of sweep prior to splicing into larger lengths. Maximum out-of-straightness of the flanges on the finished girders must be in accordance with Subsection 3.5 of AWS D1.5. * Flange corners are to be ground to a 2 mm chamfer and any other corners must have a 1 mm chamfer. * All grinding marks must run parallel to the direction of principal stress, generally along the length of the girder. * Minimum preheat of 100°C is required for any weld placed on a flange. The preheat is to be measured on the opposite side of the plate to that on which the heat is applied and 75 mm in advance of the welded point. * All flange groove welds must be made by a semi or fully automatic submerged arc process. * All flange butt welds must be ground flush. Reduction of the section must be kept to a minimum. Transitions in thickness must be carefully ground to assure that the section is not reduced and that the slope is not increased. * The Contractor’s independent testing agency must perform radiographic inspection of all flange shop splice complete joint penetration welds. * **Hold point – Completion of flange plate shop splices.** |  |
| 1. Sub Assembly of Web Plates |  | * Web butt welds and plates must not be damaged during turning of the plates after welding the first side. * No splices are allowed unless they are shown on consultant reviewed and accepted shop drawings. * All web groove welds must be made by a semi or fully automatic submerged arc process. * Web butt welds need not be ground if they meet the weld profile requirements of Subsection 3.6 of AWS D1.5 as determined by the Consultant. Should a repair be required, it must be acceptably blended and the entire weld is to be ground flush on both sides. Grinding one side flush and leaving reinforcement on the other side will not be permitted. * Camber cut in webs must be re-adjusted if weld shrinkage causes change in camber. * Edges of web plates must be smooth and free of nicks or steps to assure a tight fit up to the flange plate. * The fabricator must place the material in a safe accessible location to accommodate radiographic NDT. * The Contractor’s independent testing agency must perform radiographic inspection of all web shop splice complete joint penetration welds. Radiography will be completed after camber is cut so the edge of the web plate can be identified. If the radiography is done prior to cutting the camber of the web plate, the camber must be laid out on the web so the “0” point on the clock tape lies on the final edge of the web plate. * **Hold point – Completion of web plate shop splices.** |  |
| 1. Assembly of Girders |  | * Flanges must be fit tightly to the web and held with acceptable and sufficiently sized and spaced tack welds on both sides. * Flanges must be preheated to a minimum of 100°C prior to welding, the temperature must be measured on the side opposite to the heat source. * All web to flange fillet welds must be made by a fully automatic submerged arc process. * The Contractor’s independent testing agency must perform NDT magnetic particle testing on completed web to flange welds. * SSBC tolerance for flange tilt at mechanical splices is half of the value specified in AWS D1.5. * **Witness point – Inspection of web to flange weld for review and acceptance prior to fitting stiffeners.** |  |
| 1. Fitting and Welding of Stiffeners and Shear studs |  | * Fitted stiffeners must be fit within 1 mm of the flange. * Fit to bear stiffeners must have 75% of the area in contact and the remaining area should not have a clearance in excess of 0.05 mm. * Stiffener fillet welds must terminate 10 mm short of both ends. Tack welds must not be located in these end regions. * Bearings must be located and centred under the bearing stiffeners on an acceptable and flat bearing area of the flange. * Note that requirements for flatness of web plates are more stringent than those specified in AWS. Unacceptable panning and warpage is typically caused by over welding. * Stud welding procedures must be submitted to the Consultant for review and acceptance. The stud welding procedure must be demonstrated on scrap material prior to each use. Sufficient testing for procedure acceptance must be performed on material, other than the girder, in the position intended for application. * Studs must be welded prior to setting the girder segments up for field splicing. * Repair procedures and any repairs to studs must be reviewed and accepted by the Consultant. Stud repair must be executed with preheating. * Camber of individual sections must be checked along the top flange at a minimum of the specified locations along the length of the girder section. This must be completed prior to splicing. Measurement of girder sweep must also be completed prior to splicing. If girder sweep does not meet the specified tolerances, fabrication must be paused until the cause has been determined and addressed by the fabricator to the satisfaction of the Consultant. * **Witness point – Fitting and welding of stiffeners prior to field splice drilling.** |  |
| 1. Field Splice Setup |  | * Assembly for field splice fabrication must be completed in accordance with the reviewed and accepted camber assembly drawing. * Assembly must be in a no load condition. * Only one end of a girder will be permitted to be trimmed prior to set up for splicing. * After setting two girders in acceptable position for camber and offset, the end of one girder segment must be trimmed to match the other. The trimmed amount allows for a highly accurate splice gap and distance between bearings. Running dimension must be maintained from section to section along the entire length of each girder line. * **Witness point – Inspection of splice set-up prior to match drilling field splices.** |  |
| 1. Splice Drilling |  | * Shop fit up must be verified by the Consultant’s QA Inspector prior to the commencement of any drilling. One splice plate must be sub-drilled for each joint. This will be used as a template to drill through the solid material in the flange or web and the splice plate on the far side. Plates must be temporarily bolted in their final position in the structure. * Sufficient pins and bolts must be placed in the splice as the first holes are drilled to preclude any movement or separation of the plates relative to the girder. * All holes must be round, to specified diameter, and perpendicular to the plates. * Punching of full size holes is not allowed on any portion of the girder or in any item welded to a girder. * No plug welds will be permitted. * Splice plates must be match marked with low stress stamps, removed, deburred and blast cleaned. A match-marking diagram that details a method and location of marking that will only allow the plates to be installed in one position, must be submitted for review and acceptance. Reviewed and accepted copies must be sent to erector and the Consultant’s field personnel. * Oil or grease must be solvent wiped prior to blast cleaning. * All girders must be blast cleaned after fabrication, paying attention to remove any flux residue from weld areas. The blast cleaning must be as per Steel Structures Steel Painting Council Standard (SSPC) No. SP6, which is the removal of all scale and rust. It must be maintained in this condition until splices have been made. * Rubber drip stopper 19x19 (American Biltrite Compound # Ab-263) must be fastened on a cleaned blasted steel surface with SC 200 epoxy. It must be checked for adhesion. * **Witness points – Inspection for surface preparation prior to coating and inspection of coating after coating application.** |  |
| 1. Cleaning and Coating |  | * At all bearing locations, an organic zinc epoxy primer must be applied to the underside of the bottom flange in contact with the bearing sole plate. The primer must extend the full width of the flange and 15 mm beyond the projected contact surface of the bearing sole plate in the longitudinal direction. * At all deck joint locations a complete SF2, SF3 or SF4 approved bridge coating system from the Department’s Products List must be applied to the bottom flange surfaces (underside, top and edges), with the exception that the faying surface of the underside of bottom flange in contact with the bearing sole plate must only receive the organic zinc epoxy primer. The coating system must extend longitudinally from the girder end to a distance 100 mm beyond the bearing sole plate or 100 mm beyond the jacking stiffener, whichever distance is greater. The selected SF2, SF3 or SF4 coating system must be applied to the full height of the bridge webs (both sides of web and including any applicable bearing/jacking stiffeners and diaphragm bracing members) and to the underside of the top flanges. The longitudinal extent of this coating must be the same as described in this paragraph above. Faying surfaces of bolted connections must only receive the organic zinc epoxy primer. * Any of the portions of the girder noted above that will be encased in cast in place concrete must be left in the bare steel condition with no coating applied. * The approved organic zinc epoxy primer must meet the requirements of a Class B coating. A certificate of the slip coefficient compliance must be provided to the Department for review and acceptance prior to application. The top coat colour must conform to US Federal Standard 595C colour FS30045. |  |
| 1. Final Inspection |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when each girder segment is ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * Shipping must be in accordance with the reviewed and accepted Transportation Drawings. * Shipping bolts must be wrench tightened to prevent loss of material during transportation. * Handling and lifting devices must not mark, damage, or distort members. * Timber blocking must be used and located at positions that prevent damage and/or distortion from deflection. * Softeners must be used where chains or other tie down devices are used in direct contact with the steel members. * No field welding, additional drilling or any other modifications must be made for shipping or erection purposes. * The Contractor must provide the Consultant a transportation schedule for structural steel a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 6.2.8.7 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, non-conformance reports and repair records, fabrication schedules and as-built shop drawings. The Consultant QA Inspector must prepare daily and weekly inspection reports with photos during the fabrication of steel girders and these must also be included in the fabrication records along with any additional QA NDT inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |

* + - * 1. Deck Joint Assemblies

Cover Plated V-Seal Deck Joint Assemblies

|  |
| --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE - Cover Plated V-Seal Deck Joint Assemblies** |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + **Alberta Transportation:**Project Sponsor/Administrator, Fabrication Specialist.   + **Consultant:** Project Manager, Inspector.   + **Contractor:** Project Manager, and all personnel involved in supervision of the work.   + **Contractor’s Specialty Staff or Subcontractor:** Fabrication Superintendent(s), Independent testing Agency Representatives, and all personnel involved in supervision of the work. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions** | | **Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting)** | |
| **1** | **2** | **3** | **4** |
| **Agenda Item** | **Project Specific Agenda Sub-Item** | **Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes** | **Meeting Actions or Decisions, with Identification by Responsible Person** |
| 1. Standards |  | * Fabrication must be in accordance with:   + - * + Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 6, Edition 17, 2020;         + AASHTO LRFD Bridge Construction Specifications, 4th Edition 2017;         + AASHTO/AWS Bridge Welding Code D1.5M/D1.5; and * Alberta Transportation Typical and Standard drawings: S-1800, S‑1801, S-1802, S-1803, S-1804 and S-1805. |  |
| 1. Qualifications |  | * The fabrication facility must be certified by the Canadian Welding Bureau (CWB) to Division I or Division II. This certification requirement extends to all subcontractors engaged in the fabrication of structural steel components. * Welders, welding operators and tackers must be CWB certified in the applicable category. A copy of the welder’s current qualification documents must be provided to the Consultant for record purposes. * The fabricator’s quality control plan, including visual inspection and non-destructive testing, must meet, at a minimum, the requirements of AASHTO/American Welding Society (AWS) Bridge Welding Code D1.5M/D1.5 Clause 6 except that the Contractor’s visual quality control welding inspector must be certified by the CWB as a Level 2 or Level 3 inspector in accordance with CSA W178.2. * Contractor QC testing technicians: Third party NDT technicians must be certified to Level 2 in accordance with CAN/CGSB-48.9712 and employed by a testing agency certified to CSA W178.1. Coating testing must be completed and by an independent National Association of Corrosion Engineers (NACE) Level 2 certified coating inspector. * The Consultant’s QA Inspector must be certified as a Level 3 welding inspector in accordance with CSA 178.2 and possess bridge related fabrication experience. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication: * Inspection and Testing Plan (ITP); * List of all fabricators and fabrication shop and all subcontractor certification documentation; * Fabrication sequence and equipment; * Review documentation of any contract modifications (if applicable); * Shop drawings; * CWB approved weld procedure data sheets (WPDS) and processes (WPS); * Valid CWB Welder’s tickets for all welders and the operations they will perform; * Mill test reports for all material. Boron content must not exceed 0.0008% for steel being welded; * Verification testing results for all steel melted outside of Canada or the United States of America; * Product data sheets for all other materials including epoxy, drip sheets and coatings; and   + - * + Fabrication schedule, including the expected completion date of each deck joint. Note: the production schedule is required so the Consultant’s QA Inspectors can perform their duties during fabrication. * **Hold point – Reviewed and Accepted ITP and Prefabrication Submissions** |  |
| 1. Materials |  | * Material requirements:   + - * + Deck joint plates: CSA G40.21 350A and metallized plates in accordance with the Standard Drawings;         + Curb, median and barrier cover plate steel: CSA G40.21 300W (hot dip galvanized);         + Cover plate and shipping angle bolts: ASTM F3125 Grade A325 heavy hex (galvanized);         + Stainless steel troughs and associated bolts: AISI Type 316;         + V-seals must be neoprene, supplied in one continuous piece and selected from this list provided on standard drawing S-1800.         + Fibre reinforced neoprene American Biltrite AB 3210;         + Stud shear connectors: ASTM A108 Grades 1015, 1018 or 1020 either semi-killed or killed deoxidation. Only AWS D1.5 Type B studs must be used;         + Testing of boron content must be reported to sufficient accuracy to determine clearly whether the limit of 0.0008% is exceeded or not (for steel being welded); and         + All steel from sources outside of Canada or the United States of America must be retested by an independent certified laboratory in Canada. The Canadian laboratory report must clearly state whether the retest values meet the requirements of the specified material standard. |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in Subsection 6.2.8.6.2 of the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector for each deck joint. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * The Consultant’s QA Inspector does not provide quality control for the fabricator. The Consultant’s QA Inspector will inspect the completed work that has passed the fabricator’s quality control. |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution of imperial material must be reviewed and accepted by the Consultant and shop drawings must show use of the reviewed and accepted imperial material. * All fabrication is to take place in an adequately enclosed area, free of drafts, well lit, and maintained at a minimum temperature of 10˚C. * Storage of low hydrogen electrodes and flux and welding practices for low hydrogen welding must be in accordance with AWS D1.5. * All welding equipment must be maintained in good repair (gauges, clamps, connections, etc.). * The T-stiffeners under the base plates must be tack welded only. Continuous welds will not be accepted as they will adversely impact the deck joint design and performance. * Handling devices must not mark the plate. This must be observed starting at the receiving area and throughout the course of fabrication. * Repair procedures must be submitted to the Consultant and the Department for review and acceptance for damaged base metal, defective weldments, and any other defect identified by the Consultant, prior to commencement of the repair work. Any repairs to cut plate edges must use AWS D1.5 criteria in determining whether a flaw can be ground out or if it requires a welded repair. Welded repairs must be preheated. Any repairs accepted for implementation must be authenticated in accordance with APEGA requirements. * Neoprene drip boots must be shop fabricated to the correct dimensions with bolt holes shop punched. * Epoxy injection fittings are to be provided on both sides of the joint (deck and abutment sides) at a spacing not exceeding 2 m as shown on the standard drawings. * Alignment marks are to be scribed across the top surface of the joint at each end (two per joint section) parallel to roadway centreline after the Consultant has reviewed and accepted the shop assembly. |  |
| 1. Cutting of Plates |  | * All plate material for main members and any material welded to main members must be thermally cut in accordance with Subsection 6.2.6.3 of the SSBC. * Plate edge roughness must meet contract requirements. * **Witness point – Dimensional checks of cut plate and verification of specified tolerances prior to welding.** |  |
| 1. Welding |  | * All welding must conform to AWS D1.5 and the WPSs and WPDSs reviewed and accepted by the Consultant. * Only welders certified to weld the joint type using the process specified in the position required will be accepted. * All welds must have an approved procedure. The approval must be obtained from CWB and reviewed and accepted by the Consultant. Any substitution to welding procedures will require the review and acceptance by the Consultant prior to welding. Welders must follow the procedure parameters to within the allowable tolerances. * Run-off tabs must be used at the ends of all welds that terminate at the edge of a member. The thickness and shape of the tabs must replicate the joint detail being welded and must be a minimum of 100 mm long unless greater length is required to acceptably complete the work. * Weld areas must be clean, free of mill scale, dirt, grease, and other contaminants prior to welding. For multi-pass welds, previously deposited weld metal must also be thoroughly cleaned prior to depositing subsequent passes. * Tack welds are not permitted unless they will be included in the final weld. Tacks, where acceptable, must be a minimum length of four times the weld size. * Preheat and interpass temperatures must be in accordance with the SSBC unless AWS D1.5 requires a higher temperature for the thickness of material being welded. * Arc strikes are not permitted. In the event of an accidental isolated arc strike, a repair procedure must be submitted in accordance with Subsection 6.2.5.8 of the SSBC. At a minimum, the repair procedure must include the complete grinding out of the crater produced by the arc strike. The repair procedure must also include MPI and hardness testing of the affected area. Hardness of the repaired area must conform to the requirements of Subsection 6.2.8.4.1.4 of the SSBC. These areas will be examined by the Consultant’s QA Inspector to ensure complete removal of the metal in the affected area. * **Hold point – Visual inspection and NDT of all welding prior to coating.** |  |
| 1. Surface Preparation & Coating |  | * All components (except stainless steel, galvanized or metallized surfaces) must be blast cleaned after fabrication, to remove any flux residue from weld areas. The blast cleaning must be as per Steel Structures Steel Painting Council Standard (SSPC) No. SP6, which is the removal of all scale and rust. * Exposed faces of 16 mm vertical plates, stop movement bars and top surface of the deck side base plate must be metallized after blast cleaning in accordance with SSPC-CS 23.00/AWS C.2.23/NACE No. 12 and as shown on Standard Drawing S-1801. * Hot dip galvanizing must be in accordance with ASTM A123 & F2329. |  |
| 1. Fabrication Tolerances |  | * Shop assemble deck joint for inspection in a relaxed condition with shipping and erection angles removed:   + Variation in gap setting “X” must be within +/- 3 mm between crown and gutter lines;   + Plate gap measurements between the cover plate and base plate must be taken at both the -5°C and at +15°C gap settings. Maximum allowable gap along the entire length must be less than or equal to 0.4 mm;   + Out of straightness of the deck joint assembly measured between the crown and gutter line in the vertical plane must not exceed 5 mm;   + Maximum allowable variation for flatness in the transverse direction (parallel to traffic) must not exceed 0.5 mm/m;   + Horizontal sweep of the expansion joint assembly between the crown and gutter lines must not exceed 6 mm; and   + In the fully closed position the cover plate must have a uniform side gap to the adjacent finger of 3 mm ± 1.5mm. * **Hold point– Inspection for tolerance checks of deck joint assembly.** |  |
| 1. Final Inspection |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when each deck joint is ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * After an acceptable final inspection, the deck joint assembly must be set at 15°C (or a gap setting corresponding to the installation temperature determined by the Consultant) and shipping bolts fully torque for shipping. Gap tolerances between the finger plate and base plate should be checked after installation and tightening of shipping angle bolts. Depending on the flatness of the fabricated joint and the shipping angles, steel shims may be required at the shipping angle locations to compensate for any gaps between the angle and the deck joint due to plate unevenness. * Stainless steel surfaces must be shipped with a protective film to prevent damage during transport and handling. * To avoid damage during shipping, softeners must be used where chains or other tie down devices are used in direct contact with the steel components * The Contractor must provide the Consultant a transportation schedule for structural steel a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 6.2.8.7 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare inspection reports with photos during fabrication and these must also be included in the fabrication records along with additional QA NDT inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |

Finger Plated Deck Joint Assemblies

|  |
| --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE - Finger plated deck joint assemblies** |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + Alberta Transportation: Project Sponsor/Administrator, Fabrication Specialist;   + Consultant: Project Manager, Inspector;   + Contractor: Project Manager, and all personnel involved in supervision of the work; and   + Contractor’s Specialty Staff or Subcontractor: Fabrication Superintendent(s), Independent testing Agency Representatives, and all personnel involved in supervision of the work. |

|  |  |  |  |
| --- | --- | --- | --- |
| Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions | | Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting) | |
| 1 | 2 | 3 | 4 |
| Agenda Item | Project Specific Agenda Sub-Item | Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes | Meeting Actions or Decisions, with Identification by Responsible Person |
| 1. Standards |  | * Fabrication must be in accordance with:   + - * + Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 6, Edition 17, 2020;         + AASHTO LRFD Bridge Construction Specifications, 4th Edition 2017;         + AASHTO/AWS Bridge Welding Code D1.5M/D1.5; and * Alberta Transportation Typical and Standard drawings: S-1860, S‑1861, S-1862, S-1863, S-1864 and S-1865. |  |
| 1. Qualifications |  | * The fabrication facility must be certified by the Canadian Welding Bureau (CWB) to Division I or Division II. This certification requirement extends to all subcontractors engaged in the fabrication of structural steel components. * Welders, welding operators and tackers must be CWB certified in the applicable category. A copy of the welder’s current qualification documents must be provided to the Consultant for record purposes. * The fabricator’s quality control plan, including visual inspection and non-destructive testing, must meet, at a minimum, the requirements of AASHTO/American Welding Society (AWS) Bridge Welding Code D1.5M/D1.5 Clause 6 except that the Contractor’s visual quality control welding inspector must be certified by the CWB as a Level 2 or Level 3 inspector in accordance with CSA W178.2. * Contractor QC testing technicians: Third party NDT technicians must be certified to Level 2 in accordance with CAN/CGSB-48.9712 and employed by a testing agency certified to CSA W178.1. Coating testing must be completed and by an independent National Association of Corrosion Engineers (NACE) Level 2 certified coating inspector. * The Consultant’s QA Inspector must be certified as a Level 3 welding inspector in accordance with CSA 178.2 and possess bridge related fabrication experience. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication: * Inspection and Testing Plan (ITP); * List of all fabricators and fabrication shop and all subcontractor certification documentation; * Fabrication sequence and equipment; * Review documentation of any contract modifications (if applicable); * Shop drawings; * CWB approved weld procedure data sheets (WPDS) and processes (WPS); * Valid CWB Welder’s tickets for all welders and the operations they will perform; * Mill test reports for all material. Boron content must not exceed 0.0008% for steel being welded; * Verification testing results for all steel melted outside of Canada or the United States of America; * Product data sheets for all other materials including epoxy, drip sheets and coatings; and   + - * + Fabrication schedule, including the expected completion date of each deck joint. Note: the production schedule is required so the Consultant’s QA Inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions.** |  |
| 1. Materials |  | * Material requirements:   + - * + Finger joint plates: CSA G40.21 350A and metallized in accordance with the Standard Drawings;         + Curb, median, barrier cover plates: CSA G40.21 300W (hot dip galvanized);         + Cover plate and shipping angle bolts: ASTM F3125 Grade A325 Type 1 heavy hex, galvanized;         + Stainless steel troughs and associated bolts: AISI Type 316 stainless steel;         + Fibre reinforced neoprene: American Biltrite AB 3210;         + Stud shear connectors: ASTM A108 Grades 1015, 1018 or 1020 either semi-killed or killed deoxidation. Only AWS D1.5 Type B studs must be used; * Testing for boron content must be reported to sufficient accuracy to determine clearly whether the limit of 0.0008% is exceeded or not (for steel being welded); and * All steel from sources outside of Canada or the United States of America must be retested by an independent certified laboratory in Canada. The Canadian laboratory report must clearly state whether the retest values meet the requirements of the specified material standard. |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in Subsection 6.2.8.6.2 of the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector for each deck joint. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * The Consultant’s QA Inspector does not provide quality control for the fabricator. The Consultant’s QA Inspector will inspect the completed work that has passed the fabricator’s quality control. |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution of imperial material must be reviewed and accepted by the Consultant and shop drawings must show use of the reviewed and accepted imperial material. * All fabrication is to take place in an adequately enclosed area, free of drafts, well lit, and maintained at a minimum temperature of 10˚C. * Storage of low hydrogen electrodes and flux and welding practices for low hydrogen welding must be in accordance with AWS D1.5. * All welding equipment must be maintained in good repair (gauges, clamps, connections, etc.). * The T-stiffeners under the base plates are to be tack welded only. Continuous welds will not be accepted as they will adversely impact the deck joint design and performance. * Handling devices must not mark the plate. This must be observed starting at the receiving area and throughout the course of fabrication. * Repair procedures must be submitted to the Consultant and the Department for review and acceptance for damaged base metal, defective weldments, and any other defect identified by the Consultant, prior to commencement of the repair work. Any repairs to cut plate edges must use AWS D1.5 criteria in determining whether a flaw can be ground out or if it requires a welded repair. Welded repairs must be preheated. Any repairs accepted for implementation must be authenticated in accordance with APEGA requirements. * Neoprene drip sheets must be shop fabricated to the correct dimensions with bolt holes shop punched. * Epoxy injection fittings are to be provided on both sides of the joint (deck and abutment sides) at a spacing not exceeding 2 m as shown on the standard drawings. * Alignment marks are to be scribed across the top surface of the joint at each end (two per joint section) parallel to roadway centreline after the Consultant has reviewed and accepted the shop assembly. |  |
| 1. Cutting of Plates |  | * All plate material for main members and any material welded to main members must be thermally cut in accordance with Subsection 6.2.6.3 of the SSBC. * Plate edge roughness must meet contract requirements.   **Witness point – Dimensional checks of cut plate and verification of specified tolerances prior to welding.** |  |
| 1. Welding |  | * All welding must conform to AWS D1.5 and the WPSs and WPDSs reviewed and accepted by the Consultant. * Only welders certified to weld the joint type using the process specified in the position required will be accepted. * All welds must have an approved procedure. The approval must be obtained from CWB and reviewed and accepted by the Consultant. Any substitution to welding procedures will require the review and acceptance by the Consultant prior to welding. Welders must follow the procedure parameters to within the allowable tolerances. * Run-off tabs must be used at the ends of all welds that terminate at the edge of a member. The thickness and shape of the tabs must replicate the joint detail being welded and must be a minimum of 100 mm long unless greater length is required to acceptably complete the work. * Weld areas must be clean, free of mill scale, dirt, grease, and other contaminants prior to welding. For multi-pass welds, previously deposited weld metal must also be thoroughly cleaned prior to depositing subsequent passes. * Tack welds are not permitted unless they will be included in the final weld. Tacks, where acceptable, must be a minimum length of four times the weld size. * Preheat and interpass temperatures must be in accordance with the SSBC unless AWS D1.5 requires a higher temperature for the thickness of material being welded. * Arc strikes are not permitted. In the event of an accidental isolated arc strike, a repair procedure must be submitted in accordance with Subsection 6.2.5.8 of the SSBC. At a minimum, the repair procedure must include the complete grinding out of the crater produced by the arc strike. The repair procedure must also include MPI and hardness testing of the affected area. Hardness of the repaired area must conform to the requirements of Subsection 6.2.8.4.1.4 of the SSBC. These areas will be examined by the Consultant’s QA Inspector to ensure complete removal of the metal in the affected area. * **Hold point – Visual inspection and NDT of all welding prior to coating.** |  |
| 1. Surface Preparation & Coating |  | * All components (except stainless steel, galvanized or metallized surfaces) must be blast cleaned after fabrication, to remove any flux residue from weld areas. The blast cleaning must be as per Steel Structures Steel Painting Council Standard (SSPC) No. SP6, which is the removal of all scale and rust. * Exposed faces of 16 mm vertical plates and top surface of the deck side base plate must be metallized after blast cleaning in accordance with SSPC-CS 23.00/AWS C.2.23/NACE No. 12 and as shown on S-1862. * Hot dip galvanizing must be in accordance with ASTM A123 & F2329. |  |
| 1. Fabrication Tolerances |  | * Shop assemble deck joint for inspection in a relaxed condition with shipping and erection angles removed:   + Variation in gap setting “X” must be within +/- 3 mm between crown and gutter lines.   + Out of straightness of the deck joint assembly measured between the crown and gutter line in the vertical plane must not exceed 5 mm.   + Maximum allowable variation for flatness in the transverse direction (parallel to traffic) must not exceed 0.5 mm/m.   + Horizontal sweep of the expansion joint assembly between the crown and gutter lines must not exceed 6 mm.   + In a fully closed position the fingers must have a uniform side gap to the adjacent finger of 3 mm +/- 1.5mm.   + Tip and heel of each finger must be checked at two gap settings i.e. at -5°C and at +15°C and must meet the following tolerances:     - FINGER TIPS       * Plate gaps between finger plate tips and base plate ≤ 0.4 mm.     - FINGER HEELS       * Plate gaps between finger heel and base plate ≤ 1.0 mm. * **Hold point – Inspection for tolerance checks.** |  |
| 1. Final Inspection |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when each deck joint is ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * After an acceptable final inspection, the deck joint assembly must be set to a 15°C gap setting (or a gap setting corresponding to the installation temperature determined by the Consultant) and shipping bolts fully torque for shipping. Gap tolerances between the finger plate and base plate should be checked after installation and tightening of shipping angle bolts. Depending on the flatness of the fabricated joint and the shipping angles, steel shims may be required at the shipping angle locations to compensate for any gaps between the angle and the deck joint due to plate unevenness. * Stainless steel surfaces must be shipped with a protective film to prevent damage during transport and handling. * To avoid damage during shipping, softeners must be used where chains or other tie down devices are used in direct contact with the steel components * The Contractor must provide the Consultant a transportation schedule for structural steel a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 6.2.8.7 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare inspection reports with photos during fabrication and these must also be included in the fabrication records along with additional QA NDT inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |

* + - * 1. Precast Concrete Units

Precast Concrete Girders

|  |
| --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE - Precast Concrete Girders** |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including Quality Control and Quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + Alberta Transportation:Project Sponsor/Administrator/Fabrication Specialist;   + Consultant: Project Manager, Inspector;   + Contractor: Project Manager, and all personnel involved in supervision of the work;   + Contractor’s Specialty Staff or Subcontractor: Fabrication Superintendent(s), Independent Testing Agency Representatives, and all personnel involved in supervision of the work. |

|  |  |  |  |
| --- | --- | --- | --- |
| Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions | | Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting) | |
| **1** | **2** | **3** | **4** |
| Agenda Item | Project Specific Agenda Sub-Item | Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes | Meeting Actions or Decisions, with Identification by Responsible Person |
| 1. Standards |  | * Fabrication must be in accordance with the following documents: * Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 7, Edition 17, 2020; * Canadian Standards Association (CSA) Standards A23.4; * Precast/Prestressed Concrete Institute (PCI) Quality Control Manual MNL-116; and * Alberta Transportation Standard and Typical Detail Drawings as applicable. |  |
| 1. Qualifications |  | * The fabrication facility must be certified by the Canadian Precast Quality Assurance (CPCQA) certification program in the applicable Product Group classification. * The fabricator’s quality control team must be certified as a Level I/II Technician/Inspector in the PCI Quality Control Personnel Certification program. * The 3rd party independent concrete testing lab must be certified to CSA standards. * The Consultant’s QA Inspector must be certified as a Level II Technician/Inspector in the PCI Quality Control Personnel Certification program. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication: * Inspection and Testing Plan (ITP); * Fabricator’s Quality Control Plan; * Fabrication facility CPCQA certification and fabricator personnel certification; * Fabrication sequence and equipment; * Mill test reports of stressing steel, reinforcing steel, and miscellaneous steel. Boron content of steel being welded must not exceed 0.0008%; * Verification testing results for all welded steel melted outside of Canada or the United States of America; * Product data sheets; * Shop drawings; * Design notes and independent check notes (if applicable); * Review documentation of any contract modifications (if applicable); * Prestressing strand load/elongation curve and jack calibration certificate; * Stressing calculations, procedures, and strand release sequence; * Concrete mix design review letter and trial batch results; and * Fabrication schedule including the expected completion date of each girder unit. Note: the fabrication schedule is required so the QA inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions.** |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector for each girder section. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * Witness and hold points for precast concrete girder fabrication include: * Form dimensions and set-up (witness point); * Placement of reinforcing steel, post tensioning ducts, cross bracing anchorage devices, bridgerail anchor rod assemblies and prestressing strand (hold point); * Placement of voids and other hardware (witness point); * Stressing (hold point); * Concrete sampling and testing (witness point); * Detensioning (witness point); * Clean-up and repair (witness point); * Curing (witness point); * Concrete surface roughening and application of concrete surface finishes and concrete sealer (witness point); * Storage of precast concrete units (witness point); * Verification testing and inspection of precast concrete units if fabricated outside of Canada and the United States (hold points); and * Final inspection including dimensional tolerances (hold point). * The Consultant’s QA Inspector does not provide quality control for the fabricator. The Consultant’s QA Inspector will inspect the completed work that has been reviewed and accepted by the fabricator’s quality control. |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution by imperial material must be reviewed and accepted by the Consultant and the shop drawings must show use of reviewed and accepted imperial material. * The fabrication of precast concrete units must be done in a sufficiently large environmentally controlled permanent building. The building temperature must be maintained between 15°C and 30°C and prevent contamination and/or deterioration of materials. * Stainless steel must be stored and handled to avoid contamination with deposits of iron or other non-stainless steels. * Prestressing steel must be stored in individual coils with their heat numbers identified so that they can be tracked for incorporation into the concrete units. |  |
| 1. Form Dimensions and Set-up |  | * Steel formwork must be coated with release agents. * Fabricator’s name, year of manufacture, serial number of units, and CL‑800 to be cast into bottom of girder in 50 mm letters at 1000 mm (verify this is far enough for bridges with integral abutments) from the girder ends. * Formwork must be checked for integrity, dimensions, alignment, and cleanliness. * **Witness point – Inspection of formwork set up and dimensions. Formwork to be continuously checked until concrete pour.** |  |
| 1. Reinforcing Steel Installation and Fabrication |  | * Plain reinforcing steel must meet CSA Specification G30.18M Grade 400W. * Welded Wire Reinforcement must meet ASTM A1064/A1064M Grade 480W with a minimum yield strength of 480 MPa based on the 0.2% offset method. * Low carbon/chromium reinforcing steel must meet requirements of ASTM A1035 (fy =500MPa). * All bars requiring bending must be cold bent at the fabrication facility. Bars must be bent only once. * Bars must be cut by shearing or with fluid cooled saws. Torch cutting will not be permitted. * Reinforcing steel spacing and cover to be accurately maintained as per design drawings. Discuss cover requirements to all surfaces of precast unit here. * **Hold point - Inspection reinforcing steel installation. Reinforcing steel installation to be continuously checked until concrete pour.** |  |
| 1. Prestressing Steel Installation and Fabrication |  | * Prestressing steel must be uncoated Grade 1860, low relaxation 7-wire strand 15.2 mm diameter. * Prestressing strands must be free of dirt and oil or other contaminants. * Prestressing strand ends must have 15 mm deep termination recesses formed around strands. * Prestressing strands with any broken wire, nicks, or gouges must be removed and replaced. * Confirm number and locations of debonded strands and projected strands per design drawings. * Prestressing strands from different strand packs used in the same unit must be clearly identified.   + - **Hold point - Inspection of prestressing steel. Prestressing steel installation to be continuously checked before stressing and before concrete pour.** |  |
| 1. Installation of Post Tensioning Ducts, Anchor Rod Assemblies and Cross Bracing Anchorage Devices |  | * Post tensioning ducts, anchor rod assemblies and cross bracing anchorage devices must meet the requirements of the contract documents. * Post tensioning ducts, anchor rod assemblies and cross bracing anchorage devices must be free of dirt, oil and any other contaminants prior to installation into the form. * Post tensioning ducts, anchor rod assemblies and cross bracing anchorage devices must be installed into the forms within the tolerances specified in the SSBC and must be held securely in position to prevent displacement during concrete placement. * **Hold point - Inspection of post tensioning ducts, anchor rod assemblies and cross bracing anchorage devices and must be continuously checked until and during concrete placement.** |  |
| 1. Installation of Voids and Remaining Hardware |  | * Three galvanized camber hubs required in each unit, at midpoint and 150 mm from each end. * All exposed embedded hardware is to be hot dip galvanized. Dywidag threadbars are not galvanized and are for lifting only and are sacrificial. * Shoe plates must be hot dipped galvanized after fabrication. * Shoe plates must conform to the requirements of CSA G40.21M Grade 300W or 350W. * Steel for diaphragms must conform to the requirements of CSA G40.21M Grade 300W or 350W. Bolts must conform to ASTM F3125 Grade A325 type 1 heavy hex style. These items must be hot dip galvanized. * **Witness point - Inspection of voids and hardware installation. Void and hardware installation to be continuously checked until concrete pour.** |  |
| 1. Stressing (Pretensioning) |  | * Pull strands to measured elongation and monitor gauge pressure; or vice versa. * Strands of different moduli of elasticity (E values) will be stressed accordingly to get same required force; this must be identified and recorded in stressing records. * Requirements for both stressing verification checks, as outlined in PCI MNL 116, must be completed. The final elongation and force are required to be within 5% of the theoretical values, as well as within 5% of each other. Strands to be marked after initial tension (pre-pull) and at final elongation to obtain actual elongation length. * Dead end verification of force to be checked in draped strands. * **Hold point – Inspection of stressing operations.** |  |
| 1. Concrete Sampling and Testing |  | * Concrete strength requirements are specified on the design drawings. * Air content must be in accordance with CSA A23.1 Table 4, based on the maximum aggregate size used. Indicate required air content here. * The fabricator is responsible for quality control of unit weight, air content, temperature, slump, and casting of release cylinders. The samples for concrete test and release cylinders will be taken at the Consultant’s QA Inspector’s discretion. * Concrete testing must be in accordance with SSBC Subsection 7.2.6.3. * Strength cylinders will be made and sent to an independent CSA certified lab for testing, with test results to be sent to the Consultant. 28-day test cylinders will be sent to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * Indicate required concrete release strength and 28-day compressive strength.   + - **Witness point – Concrete sampling and testing.** |  |
| 1. Clean up and Repair |  | * Precast concrete girder surfaces must be sufficiently cleaned in order to allow for inspection of defects. * Honeycombs, cracks, spalls, cavities and chips or any other casting defect must be immediately reported to the Consultant. * Defects including honeycombs, cavities, spalls, chips and cracks must be assessed for reparability by the Consultant and the Department in accordance with Subsection 7.2.5.13 of the SSBC. * A repair procedure must be submitted to the consultant for review and acceptance prior to commencement of any repair work. Any approved patching and repair work must be completed within 24 hours of removal from the forms and prior to placement into curing. * Repairs must be completed before girder destressing as per SSBC Subsection 7.2.5.13 – Repairing Concrete Defects. * **Witness point - Inspection of concrete defects and repairs.** |  |
| 1. Detensioning of Prestressing Strands |  | * Prestressing strands must be simultaneously released from both ends. * Torch cutting of strands must follow the strand detensioning procedure submitted and reviewed and accepted by the Consultant. * Camber survey and sweep measurements must be conducted.   + - **Witness point - Inspection of strand detensioning.** |  |
| 1. Concrete Finishing and Curing |  | * Cleaning and patching to be done on a daily basis before steam curing. * Strand recesses must be filled with a moisture insensitive epoxy paste adhesive meeting the requirements of ASTM C811, Type IV, Grade 3, Class B or C. The paste must be grey in color. * Surface finishing must be in accordance with the design drawings. Indicate required finishing here. * All units to be steam cured for a period of 4 days. Girders must not be thermally shocked at any time. The difference between ambient air temperatures within the enclosure must not be greater than 10°C at any time. Steam must be in a fully saturated condition at 95-100% R.H. and an ambient temperature of between 40°C and 60°C. See SSBC Subsection 7.2.5.11.   + - **Witness point - Inspection of concrete finishing and verification of curing.** |  |
| 1. Concrete Sealing |  | * Approved Type 1c concrete sealer to meet requirements of AT standard drawings if required. * **Witness point – Inspection of sealer.** |  |
| 1. Sandblasting |  | * Sandblasting or pressure washing of concrete surfaces in shear key, block out, diaphragm, and girder end void locations if required. |  |
| 1. Handling and Storage |  | * Girders are to be properly stored so that no sweep is induced. Girders must be supported near their ends on stable foundations. * Camber survey conducted as required to monitor camber growth.   + - **Witness point – Inspection of precast concrete girder storage.** |  |
| 1. Final Inspection |  | * Camber survey must be completed at the time of final inspection and prior to shipping. * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when each girder is ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * Shipping must be in accordance with the reviewed and accepted Transportation Drawings. * Shipping details must not damage material during transportation. * Handling and lifting devices must not mark, damage, or distort members. * Blocking must be used to protect girder bearing areas and flanges. * Softeners must be used where chains or other tie down devices are used in direct contact with the precast concrete units. * The Contractor must provide the Consultant a transportation schedule for precast concrete units a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 7.2.6.6 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, product data sheets, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare daily and weekly inspection reports with photos during the fabrication of precast concrete girders and these must also be included in the fabrication records along with additional QA inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements * Plant and project specific hazard identification. |  |

Precast Concrete MSE Wall Fascia Panels

|  |  |  |  |
| --- | --- | --- | --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE – Precast Concrete Mechanically Stabilized Earth (MSE) Wall Fascia Panels** | | | |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** | | | |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * **The following representation is required for this meeting.**   + **Alberta Transportation:**Project Sponsor/Administrator;   + **Consultant:** Project Manager, Inspector;   + **Contractor:** Project Manager, qualified personnel experienced in constructing MSE walls to supervise and perform the work;   + **Contractor’s Specialty Staff or Subcontractor:** Fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work. | | | |
| **Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions** | | **Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting)** | |
| **1** | **2** | **3** | **4** |
| **Agenda Item** | **Project Specific Agenda Sub-Item** | **Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes** | **Meeting Actions or Decisions, with Identification by Responsible Person** |
| 1. Standards |  | * Fabrication must be in accordance with the following documents:   + - * + Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 4, Section 7 and Section 25, Edition 17, 2020;         + Canadian Standards Association (CSA) Standards A23.4; and * Precast/Prestressed Concrete Institute (PCI) Quality Control Manual MNL-116. |  |
| 1. Qualifications |  | * The fabrication facility must be certified by the Canadian Precast Quality Assurance (CPCQA) certification program in the applicable Product Group classification. * The fabricator’s quality control team must be certified as a Level I/II Technician/Inspector in the PCI Quality Control Personnel Certification program. * The 3rd party independent concrete testing lab must be certified to CSA standards. * The Consultant’s QA Inspector must be certified as a Level II Technician /Inspector in the PCI Quality Control Personnel Certification program. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication: * Inspection and Testing Plan (ITP); * Fabricator’s Quality Control Plan; * Fabrication facility CPCQA certification and fabricator personnel certification; * Fabrication sequence and equipment; * Mill test reports of reinforcing steel, anchors, straps and miscellaneous steel. Boron content of steel being welded must not exceed 0.0008%; * Verification testing results for all welded steel melted outside of Canada or the United States of America; * Product data sheets; * Shop drawings; * Design notes and independent check notes; * Review documentation of any contract modifications (if applicable); * Concrete mix design review letter and trial batch results; and * Fabrication schedule. Note: the fabrication schedule is required so the QA inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions.** |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector for precast concrete MSE wall fascia panels. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * Witness and hold points for precast concrete MSE wall fascia panel fabrication include: * Form dimensions and set-up (witness point); * Placement of reinforcing steel, steel connection hardware and geosynthetic reinforcing (hold point); * Concrete sampling and testing (witness point); * Clean-up and repair (witness point); * Concrete surface finishes (witness point); * Curing (witness point); * Storage (witness point); * Verification testing and inspection of precast concrete MSE wall fascia panels if fabricated outside of Canada and the United States (hold points); and * Final inspection including dimensional tolerances (hold point). * The Consultant’s QA Inspector does not provide quality control for the fabricator. The Consultant’s QA Inspector will inspect the completed work that has been reviewed and accepted by the fabricator’s quality control. |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution by imperial material must be reviewed and accepted by the Consultant and the shop drawings must show use of reviewed and accepted imperial material. * The fabrication of precast concrete MSE wall fascia panels must be done in a sufficiently large environmentally controlled permanent building. The building temperature must be maintained between 15°C and 30°C and prevent contamination and/or deterioration of materials. |  |
| 1. Form Dimensions and Set-up |  | * Steel formwork to be coated with release agents. * Minimum panel thickness must be 140 mm, excluding any additional thickness for aesthetic surface treatment. * All edges of precast concrete fascia panels must be chamfered. * Product identification must be marked on each panel. * Formwork must be checked for integrity, dimensions, alignment, and cleanliness. * **Witness point – Inspection of formwork set up and dimensions. Formwork to be continuously checked until concrete pour.** |  |
| 1. Reinforcing Steel Installation and Fabrication |  | * Plain reinforcing steel must meet CSA Specification G30.18M Grade 400W. * Welded Wire Reinforcement must meet ASTM A1064/A1064M Grade 480W with a minimum yield strength of 480 MPa based on the 0.2% offset method. * Low carbon/chromium reinforcing steel must meet requirements of ASTM A1035 (fy =500MPa). * All bars requiring bending must be cold bent at the fabrication facility. Bars must be bent only once. * Bars must be cut by shearing or with fluid cooled saws. Torch cutting will not be permitted. * Minimum cover to reinforcing steel must be 50 mm from all faces. * Rebar spacing and cover to be accurately maintained as per design drawings. Discuss cover requirements to all surfaces of precast unit here. * Reinforcing steel must be electrically isolated from steel connection hardware and/or steel soil reinforcement straps. * **Hold point - Inspection reinforcing steel installation. Reinforcing steel installation to be continuously checked until concrete pour.** |  |
| 1. Installation of Geosynthetic Reinforcing and Other Hardware |  | * Steel connection hardware must be placed accurately in the locations indicated on the design drawings, isolated from reinforcing steel and held securely in position. All exposed embedded hardware must be hot dip galvanized. * Structural steel jigs must be used to maintain alignment and projection lengths of geosynthetic reinforcing. * Geosynthetic reinforcing embedded in panels must exit perpendicular to the precast concrete fascia panel. * **Hold point – Installation inspection of geosynthetic reinforcing and other hardware. Installation to be continuously checked until concrete pour.** |  |
| 1. Concrete Sampling and Testing |  | * Concrete must be Class HPC with 5% minimum air entrainment, up to 8% maximum air entrainment. * Concrete strength requirements are specified on the design drawings. Indicate required concrete 28-day compressive strength. * Concrete must have a minimum strength of 18 MPa prior to formwork removal. * The fabricator is responsible for quality control of unit weight, air content, temperature, slump, and casting of release cylinders. The samples for concrete test and release cylinders will be taken at the Consultant’s QA Inspector’s discretion. * Concrete testing must be in accordance with SSBC Subsection 7.2.6.3. * Strength cylinders will be made and sent to an independent CSA certified lab for testing, with test results to be sent to the Consultant. 28-day test cylinders will be sent to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * **Witness point – Concrete sampling and testing.** |  |
| 1. Clean up and Repair |  | * Precast concrete fascia panels with the following defects must be rejected:   + - * + Units with variation in precast concrete fascia panel face trueness for any line across a precast concrete fascia panel face from a straight edge more than 2 mm over 1 m;         + Units with honeycombing, cracks, spalls, or broken corners;         + Units with more than 10 surface cavities per m2 with cavity diameters from 2 mm up to 5 mm;         + Units with more than three surface cavities per m2 with cavity diameter from 5 mm up to 10 mm; and         + Units with any surface cavities greater than 10 mm in diameter. * During repair of surface cavities up to the start of elevated temperature curing or moist curing, panel faces must be kept in a continuously saturated surface dry condition. * Repair of surface cavities to be completed in a sheltered environment with a minimum ambient temperature of 10°C using a Department approved concrete patching material. * **Witness point – Inspection of concrete defects and repairs.** |  |
| 1. Concrete Finishing and Curing |  | * Exposed precast concrete fascia panels must be finished in accordance with SSBC Section 4 with the exception that all required surface cavities must be filled with an approved patching material. * The entire exposed panel fascia finish texture must be a form finish and not a washed or rubbed surface. * Precast concrete MSE wall fascia panels must be undergo elevated temperature curing or be moist cured in accordance with SSBC Section 7.   + Elevated temperature curing for 4 days between 40°C to 60°C ambient temperature and 95% to 100% relative humidity; or   + Moist curing under two layers of light colored filter fabric/burlap and kept at an ambient temperature of 15°C for 7 days. * **Witness point - Inspection of concrete finishing and verification of curing.** |  |
| 1. Handling and Storage |  | * Precast MSE fascia panels should be uniformly supported on timber bearing blocks with plastic separators. * The uniform color of the panels must be maintained and protected from staining or discoloration. * **Witness point – Inspection of precast MSE fascia panel storage.** |  |
| 1. Final Inspection |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when units are ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * Shipping details must not damage material during transportation. * Handling and lifting devices must not mark, damage, or distort members. * Softeners must be used where chains or other tie down devices are used in direct contact with the precast concrete units. * The Contractor must provide the Consultant a transportation schedule for precast concrete units a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 7.2.6.6 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, product data sheets, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare inspection reports with photos during the fabrication of precast concrete units and these must also be included in the fabrication records along with additional QA inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |

Precast Concrete RCP and PBC Structures

|  |
| --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE – Prefabrication Meeting for Precast Reinforced Concrete Pipe (RCP) and Precast Box Culvert (PBC) Structures** |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + **Alberta Transportation:**Project Sponsor/Administrator;   + **Consultant:** Project Manager, Inspector;   + **Contractor:** Project Manager, and all personnel involved in supervision of the work;   + **Contractor’s Specialty Staff or Subcontractor:** Fabrication superintendent(s), independent testing agency representatives, and all personnel involved in supervision of the work. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions** | | **Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting)** | |
| **1** | **2** | **3** | **4** |
| **Agenda Item** | **Project Specific Agenda Sub-Item** | **Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes** | **Meeting Actions or Decisions, with Identification by Responsible Person** |
| 1. Standards |  | * Fabrication must be in accordance with the following documents: * Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 26, Edition 17, 2020; * Indirect designed RCP – CSA A257 or ASTM C76M; * Direct designed RCP – ASTM C1417M; * Maintenance access holes – ASTM C478M * PBC structures – ASTM C1433M |  |
| 1. Qualifications |  | * The fabrication facility must be certified by the Canadian Precast Quality Assurance (CPCQA) certification program in the applicable Product Group classification. * The 3rd party independent concrete testing lab must be certified to CSA standards. * The Consultant’s QA Inspector must be certified as a Level II Technician/Inspector in the PCI Quality Control Personnel Certification program. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication: * Inspection and Testing Plan (ITP); * Fabricator’s Quality Control Plan; * Fabrication facility CPCQA certification and fabricator personnel certification; * Fabrication sequence and equipment; * Mill test reports of reinforcing steel, and miscellaneous steel. Boron content of steel being welded must not exceed 0.0008%; * Verification testing results for all welded steel melted outside of Canada or the United States of America; * Product data sheets; * Shop drawings; * Design notes and independent check notes (if applicable); * Review documentation of any contract modifications (if applicable); * Concrete mix design review letter and trial batch results; and * Fabrication schedule including the expected completion date of each precast unit. Note: the fabrication schedule is required so the QA inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions** |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector for RCP and PBC structures. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * Witness and hold points for precast concrete deck panel fabrication include: * Form dimensions and set-up (witness point); * Placement of reinforcement (witness point); * Concrete mixture and placement (witness point); * Clean-up and repair (hold point); * Storage of RCP and PBC structures (witness point); * Verification testing and inspection of RCP and PBC structures if fabricated outside of Canada and the United States (hold points); and * Final inspection (hold point). * The Consultant’s QA Inspector does not provide quality control for the fabricator. The Consultant’s QA Inspector will inspect the completed work that has been reviewed and accepted by the fabricator’s quality control. |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution by imperial material must be reviewed and accepted by the Consultant and the shop drawings must show use of reviewed and accepted imperial material. * The fabrication of precast concrete units must be done in a sufficiently large environmentally controlled permanent building. The building temperature must be maintained between 15°C and 30°C and prevent contamination and/or deterioration of materials. |  |
| 1. Form Dimensions and Set-up |  | * Steel formwork to be coated with release agents. * Formwork must be checked for integrity, dimensions, alignment, and cleanliness. * Product identification markings must be waterproof paint or cast into structure. Cast in markings must not compromise minimum specified cover. * Classed and indirect designed RCP structures must be marked as follows: * Pipe classification and manufacturing standard; * Nominal inside diameter; * Date of manufacture; * Name or logo of fabricator; * Plant identification; and * Installation orientation markings, if required. * Direct designed RCP structures must be marked as follows:   + - Pipe designation diameter, installation type, and fill height;     - Manufacturing standard;     - Date of fabrication;     - Name or logo of fabricator;     - Plant identification;     - Pipe identification number; and     - Installation orientation markings, if required. * PBC structure sections must be marked as follows:   + - Box designation span, rise, and fill height;     - Manufacturing standard;     - Date of fabrication;     - Name or logo of fabricator;     - Plant identification;     - Box identification number; and     - Installation orientation markings showing top of culvert wall up on both inside and outside faces. * Standard identification plaques must be suppled and installed in accordance with SSBC Section 13 and standard drawing S-1847. * **Witness point – Inspection of formwork set up and dimensions. Formwork to be continuously checked until concrete pour.** |  |
| 1. Reinforcing Steel Installation and Fabrication |  | * Reinforcing steel for RCP structures must meet ASTM C76M or ASTM C1417M. * Reinforcing steel for PBC structures must meet ASTM C1433 and SSBC Section 5. * Boron content of reinforcing steel being welded must not exceed 0.0008% * Rebar spacing and cover to be accurately maintained as per design drawings. Discuss cover requirements to all surfaces of precast unit here. * Hold point - Inspection reinforcing steel installation. Reinforcing steel installation to be continuously checked until concrete placement. |  |
| 1. Installation of Rubber Gaskets, Flexible Joint Sealant and other Hardware |  | * Rubber gaskets for RCP structures must meet CSA A257.3. * Rubber gaskets for PBC structures must meet ASTM C1619. * Flexible joint sealants for PBC structures must meet ASTM C990. * **Hold point inspection of hardware installation. Hardware installation to be continuously checked until concrete pour.** |  |
| 1. Concrete Sampling and Testing |  | * Concrete must be standard weight silica fume concrete with 5% minimum air entrainment, up to 8% maximum air entrainment. * Concrete strength requirements must meet those specified on the design drawings. * The fabricator is responsible for quality control of unit weight, air content, temperature, slump, and casting of release cylinders. The samples for concrete test and release cylinders will be taken at the Consultant’s QA Inspector’s discretion. * Indicate required concrete release strength and 28-day compressive strength. * **Witness point – Concrete sampling and testing**. |  |
| 1. Clean up and Repair |  | * Damage, cavities, spalls, chips, cracking, and other defects must be immediately reported to the Consultant. Repair procedures must be submitted for review and acceptance by the Department and Consultant prior to the commencement of the repair. * Repair procedures may vary for RCP and PBC structures and the fabricator must consider the physical dimensions and properties of the element being repaired. * Repair procedure must be in accordance with Subsection 26.2.7.3 of the SSBC. * In cold weather conditions, repairs must be carried out in accordance with Subsection 4.21 of the SSBC. * Sections with cracks 0.3 mm in width or greater must be replaced with new sections. * **Witness point - Inspection of concrete defects and repairs.** |  |
| 1. Concrete Finishing and Curing |  | * Finishing must be in accordance with design drawings. * Curing must be in accordance with SSBC. * **Witness point - Inspection of concrete finishing and verification of curing.** |  |
| 1. Handling and Storage |  | * All materials must be stored in a neat and orderly manner to facilitate testing and inspection. * Rubber gaskets and sealants must be stored in accordance with manufacturer’s recommendations. * All RCP and PBC structure sections must be handled carefully to prevent cracking, gouging, chipping, or any other damage to the concrete surfaces. * RCP and PBC structure sections must be stored at ground height with supports acceptable to the Consultant and must not be stacked vertically. * **Witness point – Inspection of RCP and PBC structure storage.** |  |
| 1. Final Inspection |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when units are ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * The Contractor must provide the Consultant a transportation schedule for RCP and PBC structures a minimum of 1 week prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 26.2.8.6 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, product data sheets, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare inspection reports with photos during the fabrication and these must also be included in the fabrication records along with additional QA inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |

Precast Concrete Deck Panels

|  |
| --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE – Precast Concrete Deck Panels** |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + **Alberta Transportation:** Project Sponsor/Administrator;   + **Consultant:** Project Manager, Inspector;   + **Contractor:** Project Manager, and all employees involved in supervision of the work;   + **Contractor’s Specialty Staff or Subcontractor:** Fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions** | | **Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting)** | |
| **1** | **2** | **3** | **4** |
| **Agenda Item** | **Project Specific Agenda Sub-Item** | **Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes** | **Meeting Actions or Decisions, with Identification by Responsible Person** |
| 1. Standards |  | * Fabrication must be in accordance with the following documents:   + - Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 7, Edition 17, 2020;     - Canadian Standards Association (CSA) Standards A23.4;     - Precast/Prestressed Concrete Institute (PCI) Quality Control Manual MNL-116; and * Low Volume Standard Bridge Precast Concrete Panels on Steel Girders Standard Drawings LRS-1001 to 1014. |  |
| 1. Qualifications |  | * The fabrication facility must be certified by the Canadian Precast Quality Assurance (CPCQA) certification program in the applicable Product Group classification. * The fabricator’s quality control team must be certified as a Level I/II Technician/Inspector in the PCI Quality Control Personnel Certification program. * The 3rd party independent concrete testing lab must be certified to CSA standards. * The Consultant’s QA Inspector must be certified as a Level II Technician /Inspector in the PCI Quality Control Personnel Certification program. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication: * Inspection and Testing Plan (ITP); * Fabricator’s Quality Control Plan; * Fabrication facility CPCQA certification and fabricator personnel certification; * Fabrication sequence and equipment; * Mill test reports of reinforcing steel, dowels and miscellaneous steel. Boron content of steel being welded must not exceed 0.0008%; * Verification testing results for all welded steel melted outside of Canada or the United States of America; * Product data sheets; * Shop drawings; * Design notes and independent check notes (if applicable); * Review documentation of any contract modifications (if applicable); * Concrete mix design review letter and trial batch results; and * Fabrication schedule. Note: the fabrication schedule is required so the QA inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions** |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector for precast concrete deck panels. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * Witness and hold points for precast concrete deck panel fabrication include: * Form dimensions and set-up (witness point); * Placement of reinforcing steel and bridgerail anchor rods (hold point); * Concrete sampling and testing (witness point); * Clean-up and repair (witness point); * Concrete surface finishes (witness point); * Curing (witness point); * Storage (witness point); * Verification testing and inspection of precast concrete deck panels if fabricated outside of Canada and the United States (hold points); and * Final inspection including dimensional tolerances (hold point). * The Consultant’s QA Inspector does not provide quality control for the fabricator. The Consultant’s QA Inspector will inspect the completed work that has been reviewed and accepted by the fabricator’s quality control. |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution by imperial material must be reviewed and accepted by the Consultant and the shop drawings must show use of reviewed and accepted imperial material. * The fabrication of precast concrete units must be done in a sufficiently large environmentally controlled permanent building. The building temperature must be maintained between 15°C and 30°C and prevent contamination and/or deterioration of materials. |  |
| 1. Form Dimensions and Set-up |  | * Steel formwork to be coated with release agents. * Fabricator’s name, year of manufacture, serial number of units, and CL‑800 to be cast into bottom of each slab in 50 mm letters approximately 2000 mm from the deck panel edge. * All exposed concrete corners excluding the stud pockets and transverse joints must have a 20 mm chamfer or fillet unless otherwise noted in the design drawings. * Formwork must be checked for integrity, dimensions, alignment, and cleanliness. * **Witness point – Inspection of formwork set up and dimensions. Formwork to be continuously checked until concrete pour.** |  |
| 1. Reinforcing Steel Installation and Fabrication |  | * Plain reinforcing steel must meet CSA Specification G30.18M Grade 400W. * Welded Wire Reinforcement must meet ASTM A1064/A1064M Grade 480W with a minimum yield strength of 480 MPa based on the 0.2% offset method. * Low carbon/chromium reinforcing steel must meet requirements of ASTM A1035 (fy =500MPa). * Headed reinforcement must meet the requirements of ASTM A970/970M with class HA heads except the bars must be manufactured from CAN/CSA-G30.18 Grade 400W deformed bars. * All bars requiring bend must be cold bent at the fabrication facility. Bars must be bent only once. * Bars must be cut by shearing or with fluid cooled saws. Torch cutting will not be permitted. * Rebar spacing and cover to be accurately maintained as per design drawings. Discuss cover requirements to all surfaces of precast unit here. Typical clear cover must be 50 mm unless noted otherwise. * Adjust reinforcement where required to clear girder stud pockets, bridgerail post anchor rods, and lifting hook assemblies. * **Hold point - Inspection reinforcing steel installation. Reinforcing stell installation to be continuously checked until concrete pour.** |  |
| 1. Installation of Anchor Assemblies and Other Hardware |  | * All exposed embedded hardware is to be hot dip galvanized. Dywidag threadbars are not galvanized and are for lifting only and are sacrificial. * Reinforcing dowels must conform to the requirements of CSA G40.21 grade 300W and must be hot-dipped galvanized after fabrication. * All plate steel and structural shapes must conform to CSA G40.21 Grade 350W unless otherwise specified. * Bridgerail post anchor rods must be ASTM A193 Grade B7 and be hot-dipped galvanized. Galvanizing of high strength anchor rod must follow the procedures outlined in Subsection 6.2.7.3.1 of the SSBC. * The Contractor must fabricate embrittlement test rods for bend testing in accordance with Subsection 6.2.7.3.1 of the SSBC. * **Hold point – Inspection of anchor rod installation. Anchor rod installation to be continuously checked until concrete pour.** |  |
| 1. Concrete Sampling and Testing |  | * Concrete must consist of hydraulic cement, condensed silica fume, coarse and fine aggregates, water and admixtures. * Concrete strength requirements are specified on the design drawings. * Air content must be in accordance with CSA A23.1 Table 4, based on the maximum aggregate size used. Indicate required air content here. * The fabricator is responsible for quality control of unit weight, air content, temperature, slump, and casting of release cylinders. The samples for concrete test and release cylinders will be taken at the Consultant’s QA Inspector’s discretion. * Concrete testing must be in accordance with SSBC Subsection 7.2.6.3. * Strength cylinders will be made and sent to an independent CSA certified lab for testing, with test results to be sent to the Consultant. 28-day test cylinders will be sent to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * Indicate required concrete release strength and 28-day compressive strength. * **Witness point – Concrete sampling and testing.** |  |
| 1. Clean up and Repair |  | * Precast concrete girder surfaces must be sufficiently cleaned in order to allow for inspection of defects. * Honeycombs, cracks, spalls, cavities and chips or any other casting defect must be immediately reported to the Consultant. * Defects including honeycombs, cavities, spalls, chips and cracks must be assessed for reparability by the Consultant and the Department in accordance with Subsection 7.2.5.13 of the SSBC. * A repair procedure must be submitted to the consultant for review and acceptance prior to commencement of any repair work. Any approved patching and repair work must be completed within 24 hours of removal from the forms and prior to placement into curing. * **Witness point - Inspection of concrete defects and repairs.** |  |
| 1. Concrete Finishing and Curing |  | * Surface finishing must be in accordance with the design drawings. Indicate required finishing here. * All units to be cured in accordance with Subsection 7.2.5.11.2 of the SSBC. Panels must not be exposed to thermal shock. * **Witness point - Inspection of concrete finishing and verification of curing.** |  |
| 1. Abrasive blasting |  | * All surfaces that will be in contact with magnesium phosphate based grout or flowable non-shrink grout must be intentionally roughened by heavy abrasive blasting. This includes the transverse deck panel joints, the stud pockets, and the horizontal joint between the end deck panels and the backwall panels. * **Witness point - Inspection of roughened surfaces.** |  |
| 1. Handling and Storage |  | * It is the contractor’s responsibility to determine the lifting hook locations. * Deck panels must be maintained level during handling and lifting forces must be vertical at all time. * **Witness point – Inspection of precast deck panel storage.** |  |
| 1. Final Inspection and Shipping |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when units are ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * Shipping details must not damage material during transportation. * Handling and lifting devices must not mark, damage, or distort members. * Blocking must be used to protect bearing areas. * Softeners must be used where chains or other tie down devices are used in direct contact with the precast concrete units. * The Contractor must provide the Consultant a transportation schedule for precast concrete units a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 7.2.6.6 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, product data sheets, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare inspection reports with photos during the fabrication and these must also be included in the fabrication records along with additional QA inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |

* + - * 1. Bearings

Laminated Elastomeric Bearings

|  |
| --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE – Laminated Elastomeric Bearings** |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency and laboratory representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + Alberta Transportation: Project Sponsor/Administrator;   + Consultant: Project Manager, Inspector;   + Contractor: Project Manager, and all employees involved in supervision of the work;   + Contractor’s Specialty Staff or Subcontractor: Fabrication superintendent(s); independent testing agency representatives and all employees involved in supervision of the work. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions** | | **Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting)** | |
| **1** | **2** | **3** | **4** |
| **Agenda Item** | **Project Specific Agenda Sub-Item** | **Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes** | **Meeting Actions or Decisions, with Identification by Responsible Person** |
| 1. Standards |  | * Fabrication must be in accordance with:   + - * + Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 8, Edition 17, 2020.         + AASHTO LRFD Bridge Construction Specifications, 4th Edition 2017.         + AASHTO/AWS Bridge Welding Code D1.5M/D1.5.         + AASHTO Standard Specification for Transportation Materials and Methods of Sampling and Testing.         + AASHTO Standard Specification for Plain and Laminated Elastomeric Bridge Bearings. AASHTO Designation M251-06. * Alberta Transportation Typical Detail Drawing T-1761 “Typical Expansion Bearing Details.” |  |
| 1. Qualifications |  | * The fabrication facility must be certified by the Canadian Welding Bureau (CWB) in accordance with CSA-W47.1 to Division I or II. This certification requirement extends to all subcontractors engaged in the fabrication of bearings or bearing components. * Welders, welding operators and tackers must be CWB certified in the applicable category. A copy of the welder’s current qualification documents must be provided to the Consultant for record purposes. * The fabricator’s quality control plan, including visual inspection and non-destructive testing, must meet, at a minimum, the requirements of AASHTO/American Welding Society (AWS) Bridge Welding Code D1.5M/D1.5 Clause 6 except that the Contractor’s visual quality control welding inspector must be certified by the CWB as a Level 2 or Level 3 inspector in accordance with CSA W178.2. * Contractor QC testing technicians: Third party NDT technicians must be certified to Level 2 in accordance with CAN/CGSB-48.9712 and employed by a testing agency certified to CSA W178.1. Coating testing must be completed and by an independent National Association of Corrosion Engineers (NACE) Level 2 certified coating inspector. * The fabricator must engage an AASHTO National Transportation Product Evaluation Program (NTPEP) Elastomeric Bridge Bearing Pad Designated Laboratory or an equivalent independent certified testing company. * The fabricator and/or their sub-contractor completing metalizing must be certified by the SSPC to QP-6, Thermal Spray (Metalizing) Contractor Certification Program or ISO9001. * The Consultant’s QA Inspector must be certified by the CWB as a level 2 or level 3 welding inspector in accordance with CSA 178.2 and possess bridge related fabrication experience. |  |
| 1. Design Requirements |  | * The design requirements for laminated elastomeric bearings must be in accordance with SSBC Subsection 8.2 - Design Requirements and Typical Detail Drawing T-1761. * The design and the independent check notes must be completed and submitted by the bearing supplier to accommodate the loadings, translations and rotations specified on the design drawings, in accordance with the requirements of CSA S6, and the exceptions noted in the SSBC. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication:   + - * + Inspection and Testing Plan (ITP);         + List of all fabricators and fabrication shop and all subcontractor certification documentation;         + Independent Inspection and Testing Laboratory Qualifications;         + Fabrication sequence and equipment;         + Mill Test Reports and product data sheets;         + Design and independent check notes;         + Review documentation of any contract modifications (if applicable);         + Shop drawings;         + CWB approved welding procedure data sheets (WPDS) and processes (WPS);         + Valid CWB welder’s tickets for all welders and the operations they will perform;         + Mill Test Reports for all materials. Boron content must not exceed 0.0008% for steel being welded;         + Verification testing results for all steel melted outside of Canada or the United States of America; and         + Fabrication schedule, including the expected completion date. Note: the fabrication schedule is required so the QA inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions** |  |
| 1. Materials |  | * Material requirements:   + - * + All materials must be new with no reclaimed material incorporated in the finished bearing;         + The steel laminates within laminated elastomeric bearings must be rolled mild steel with minimum yield strength of 230 MPa.         + The steel for base plate, keeper bars, pintels, and shims must conform to the requirements of CSA G40.21 Grade 300W or 350W or ASTM A572/A572M Grade 50. The steel for sole plates must be in accordance with the Drawings;         + Stainless steel sheets must conform to the requirements of AISI Type 304, no. 8 mirror finish (0.2 µm maximum surface roughness);         + Cured elastomeric compounds must be low temperature Grade 5 and meet the minimum requirements listed in Table X1.1 of AASHTO M251-06. Cured elastomeric compounds must have 60 durometer hardness shore A;         + Cured elastomeric compounds must also meet the requirements of ASTM D2240 for low temperature crystallinity increase in hardness at an exposure of -25°C for 168 hours;         + PTFE must be unfilled, 100% virgin polymer conforming to Subsection 18.8.2.5, Unfilled PTFE Sheet of the 2017 AASHTO LRFD Bridge Construction Specifications including all interim revisions;         + Adhesive for bonding PTFE to metal must be an epoxy resin satisfying the requirements of AASHTO M 235M/M 235 (ASTM C881/C881M) FEP film or equal producing a bond with a minimum peel strength of 4 N/mm, when tested according to ASTM D429 Method B. Adhesives must not degrade in the service environment; and * Anchor rods and connecting bolts must meet the requirements of Table 8-2 of the SSBC. |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * Witness and hold points for laminated elastomeric bearings include: * Inspection of steel laminates prior to incorporation within the elastomer (witness point); * Dimensional checks and verification of tolerances (witness point); * Bearing testing (witness point); * Verification testing and inspection of bearings if fabricated outside of Canada and the United States (hold point); and * Final inspection (hold point). * The Consultant’s QA Inspector does not provide quality control for the fabricator. The Consultant’s QA Inspector will inspect the completed work that has been reviewed and accepted by the fabricator’s quality control. |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution of imperial material must be reviewed and accepted by the Consultant and shop drawings must show use of the reviewed and accepted imperial material. * All fabrication is to take place in an adequately enclosed area, free of drafts, well lit, and maintained at a minimum temperature of 10˚C. * Storage of low hydrogen electrodes and flux and welding practices for low hydrogen welding must be in accordance with AWS D1.5. * All welding equipment must be maintained in good repair (gauges, clamps, connections, etc.). * Handling devices must not mark plates or components. This must be observed starting at the receiving area and throughout the course of fabrication. * Repair procedures must be submitted to the Consultant and the Department for review and acceptance for damaged base metal, defective weldments, and any other defect identified by the Consultant, prior to commencement of the repair work. Any repairs to cut plate edges must use AWS D1.5 criteria in determining whether a flaw can be ground out or if it requires a welded repair. Welded repairs must be preheated. Any repairs accepted for implementation must be authenticated in accordance with APEGA requirements. |  |
| 1. Welding |  | * All welding must conform to AWS D1.5 and the WPSs and WPDSs reviewed and accepted by the Consultant. * Only welders certified to weld the joint type using the process specified in the position required will be accepted. * All welds must have an approved procedure. The approval must be obtained from CWB and reviewed and accepted the Consultant. Any substitution to welding procedures will require the review and acceptance by the Consultant prior to welding. Welders must follow the procedure parameters to within the allowable tolerances. * Weld areas must be clean, free of mill scale, dirt, grease, and other contaminants prior to welding. For multi-pass welds, previously deposited weld metal must also be thoroughly cleaned prior to depositing subsequent passes. * Tack welds are not permitted unless they will be included in the final weld. Tacks, where acceptable, must be a minimum length of four times the weld size. * Preheat and interpass temperatures must be in accordance with the SSBC unless AWS D1.5 requires a higher temperature for the thickness of material being welded. The preheat temperature must be measured 75 mm from the point of welding on the opposite where the weld is being applied. * Arc strikes are not permitted. In the event of an accidental isolated arc strike, a repair procedure must be submitted in accordance with Subsection 6.2.5.8 of the SSBC. At a minimum, the repair procedure must include the complete grinding out of the crater produced by the arc strike. The repair procedure must also include MPI and hardness testing of the affected area. Hardness of the repaired area must conform to the requirements of Subsection 6.2.8.4.1.4 of the SSBC. These areas will be examined by the Consultant’s QA Inspector to ensure complete removal of the metal in the affected area. |  |
| 1. Fabrication |  | * The steel laminates must be of uniform 3 mm nominal thickness without any sharp edges. The bond between the elastomer and the steel laminates must be such that when a sample is tested for separation, failure must occur within the elastomer and not between the elastomer and steel laminate. The top 9.5 mm galvanized laminate for sliding bearings must have a 2.5 mm recess. * **Witness point – Inspection of steel laminates prior to incorporation into the elastomer.** * Laminated elastomeric bearings must be moulded under pressure as a single unit and heated in moulds that have a smooth surface finish. * Steel plates must be machined in accordance with Subsection 8.3.6.5 of the SSBC * The fabricator must provide a smooth finish on all edges and surfaces, and remove all weld spatters, and all welding flux residue from the steel components prior to galvanizing. * Each bearing must be clearly identified as described in Subsection 8.3.6.6 of the SSBC. * Stainless steel sheets in contact with PTFE must be continuously welded around the perimeter to its backing plate to prevent ingress of moisture. The weld must be clean, uniform, and without overlaps and located outside the area in contact with PTFE. * Galvanizing must be by the hot dip method or by metallizing where specified in the SSBC. Hot dip galvanizing must be in accordance with the current edition of ASTM A123/A123M Standard. Metallizing must be in accordance with SSPC-CS 23.00/AWS C2.23/NACE No. 12 Standard Practice. Bolts, nuts and special threaded fasteners must be hot-dip galvanized in accordance with ASTM F2329 and as modified in the following item: * The cleaning and pickling procedure of high strength ASTM A193 Grade B7 anchor rods must be modified as follows prior to hot-dip galvanizing:   + Brush blast to remove mill scale and oil after threading ends;   + Pickle up to 5 minutes; and   + Quick dry prior to hot-dip galvanizing (not stored in flux or acid rinse). * The Contractor must fabricate embrittlement test rods for embrittlement testing in accordance with Subsection 6.2.7.3.1 of the SSBC. * Galvanized sole plates and slider plates bolted to the bottom flanges of weathering steel girders must use galvanized ASTM F3125 Grade A325/A325M Type 1 heavy hex style bolts. The bolt layout, size and configuration must be as detailed on the Drawings. * Repair of galvanizing must be completed in accordance ASTM A780, Method A3 “Metallizing”. The need for repair must be based on ASTM A123 and determined by the Consultant. Areas less than 100 mm2 can be repaired in accordance with ASTM A780 Method A1. * The bottom surface of each base plate must be protected by a medium grey concrete colour barrier coating accepted by the Consultant. Preparation of the surface before applying the coating must be in accordance with the SSBC. * Completed bearings must undergo dimensional checks and verification of tolerances upon completion of fabrication. * **Witness point – Dimensional checks and verification of tolerances of completed bearings.** |  |
| 1. Testing and Inspection |  | * The Contractor must meet the testing and inspection requirements set out in Subsection 8.3.7.3 of the SSBC. * The Contractor’s quality control testing and inspection records and/or reports must be submitted on a weekly basis to the Consultant for review and acceptance. All quality control testing and inspection records and/or reports must contain the written acceptance of the fabricator’s QC manager. * The Contractor must engage an independent CSA certified testing company at his expense to perform testing of bearing materials and the completed bearings In accordance with Subsection 8.3.7.3.1 of the SSBC. Testing of elastomeric compounds must be in accordance with AASHTO M251-06. The number of tests must be in accordance with Section 8 of AASHTO M251-06 (2016) and the SSBC. * Testing, inspection and related costs incurred by the Consultant as a result of defective work must be paid for by the Contractor. * **Witness point – Testing of bearing materials and completed bearings.** |  |
| 1. Final Inspection |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when the bearings are ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * Stainless steel surfaces must be shipped with a protective film to prevent damage during transport and handling. * Bearings must be fully protected during shipping. * To avoid damage during shipping, softeners must be used where chains or other time down devices are used in direct contact with components. * The Contractor must provide the Consultant a transportation schedule for bearings a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 8.3.7.6 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, product data sheets, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare inspection reports with photos during fabrication and these must also be included in the fabrication records along with additional QA NDT inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |

Fixed Steel Plate Rocker Bearings

|  |  |  |  |
| --- | --- | --- | --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE – Fixed Steel Plate Rocker Bearings** | | | |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** | | | |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + Alberta Transportation: Project Sponsor/Administrator;   + Consultant: Project Manager, Inspector;   + Contractor: Project Manager, and all personnel involved in supervision of the work;   + Contractor’s Specialty Staff or Subcontractor: Fabrication Superintendent(s); Independent Testing Agency Representatives, and all personnel involved in supervision of the work. | | | |
| **Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions** | | **Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting)** | |
| **1** | **2** | **3** | **4** |
| **Agenda Item** | **Project Specific Agenda Sub-Item** | **Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes** | **Meeting Actions or Decisions, with Identification by Responsible Person** |
| 1. Standards |  | * Fabrication must be in accordance with:   + - * + Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 8, Edition 17, 2020.         + AASHTO LRFD Bridge Construction Specifications, 4th Edition 2017.         + AASHTO AWS Bridge Welding Code D1.5M/D1.5. * AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing. |  |
| 1. Qualifications |  | * The fabrication shop must be certified by the Canadian Welding Bureau (CWB) in accordance with CSA-W47.1 to Division I or II. This certification requirement extends to all subcontractors engaged in the fabrication of structural steel components. * Welders, welding operators and tackers must be CWB certified in the applicable category. A copy of the welder’s current qualification documents must be provided to the Consultant for record purposes. * The fabricator’s quality control plan, including visual inspection and non-destructive testing, must meet, at a minimum, the requirements of AASHTO/American Welding Society (AWS) Bridge Welding Code D1.5M/D1.5 Clause 6 except that the Contractor’s visual quality control welding inspector must be certified by the CWB as a Level 2 or Level 3 inspector in accordance with CSA W178.2. * Contractor QC testing technicians: Third party NDT technicians must be certified to Level 2 in accordance with CAN/CGSB-48.9712 and employed by a testing agency certified to CSA W178.1. Coating testing must be completed and by an independent National Association of Corrosion Engineers (NACE) Level 2 certified coating inspector. * The Consultant’s QA Inspector must be certified by the CWB as a level 2 or level 3 welding inspector in accordance with CSA 178.2 and possess bridge related fabrication experience. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication:   + - * + Inspection and Testing Plan (ITP);         + List of all fabricators and fabrication shop and all subcontractor certification documentation;         + Independent Inspection qualifications;         + Fabrication sequence and equipment;         + Mill Test Reports and product data sheets;         + Design and independent check notes (if applicable);         + Review documentation of any contract modifications (if applicable);         + Shop drawings;         + Mill Test Reports for all materials;         + Verification testing results for all steel melted outside of Canada or the United States of America; and         + Fabrication schedule, including the expected completion date. Note: the fabrication schedule is required so the QA inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions** |  |
| 1. Materials |  | * Material requirements:   + - * + All materials must be new with no reclaimed material incorporated in the finished bearing;         + The steel for the sole plates and fixed rockers must be in accordance with the design drawings; * Anchor rods and connecting bolts must be the requirements of SSBC Table 8-2. |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * Witness and hold points for fixed steel plate rocker bearings include:   + - * + After completion of machining prior to bearing assembly (witness point);         + Dimensional checks and verification of tolerances of components (witness point);         + Dimensional checks and verification of tolerances of completed bearings (witness points);         + Embrittlement testing of high strength anchor rods (witness point);         + Verification testing and inspection of bearings if fabricated outside of Canada and the United States (hold point); and         + Final inspection (hold point). * The Consultant’s QA Inspector does not provide quality control for the fabricator. The Consultant’s QA Inspector will inspect the completed work that has been reviewed and accepted by the fabricator’s quality control. |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution of imperial material must be reviewed and accepted by the Consultant and shop drawings must show use of the reviewed and accepted imperial material. * Fabrication must be performed in a permanent fully enclosed structure that is maintained at a temperature of at least 10°C. * Handling devices must not mark the plate. This must be observed starting at the receiving area and throughout the course of fabrication. * Repair procedures must be submitted to the Consultant and the Department for review and acceptance for damaged base metal, defective weldments, and any other defect identified by the Consultant, prior to commencement of the repair work. Any repairs to cut plate edges must use AWS D1.5 criteria in determining whether a flaw can be ground out or if it requires a welded repair. Welded repairs must be preheated. Any repairs accepted for implementation must be authenticated in accordance with APEGA requirements. |  |
| 1. Fabrication |  | * Steel plates must be machined in accordance with Subsection 8.3.6.5 of the SSBC. * **Witness point – Inspection of machined surfaces prior to bearing assembly.** * Dimensional checks and verification of tolerances of individual bearing components. * **Witness point – Dimensional checks and verification of tolerances of individual bearing components.** * Each bearing must be clearly identified as described in SSBC Subsection 8.3.6.6. * For parts that are to be galvanized, the fabricator must provide a smooth finish on all edges and surfaces, and remove all weld spatters, and all welding flux residue from the steel components prior to galvanizing. * Galvanizing must be by the hot dip method in accordance with the current edition of ASTM A123/A123M Standard. Bolts, nuts and special threaded fasteners must be hot-dip galvanized in accordance with ASTM F2329 and as modified in the following item. * The cleaning and pickling procedure of high strength ASTM A193 Grade B7 anchor rods must be modified as follows prior to hot-dip galvanizing:   + - * + Brush blast to remove mill scale and oil after threading ends;         + Flash pickle up to 5 minutes; and         + Quick dry prior to hot-dip galvanizing (not stored in flux or acid rinse). * The Contractor must fabricate embrittlement test rods for embrittlement testing in accordance with Subsection 6.2.7.3.1 of the SSBC. * Galvanized sole plates bolted to the bottom flanges of weathering steel girders must use galvanized ASTM F3125 Grade A325/A325M Type 1 heavy hex style bolts. The bolt layout, size and configuration must be as detailed on the Drawings. * Repair of galvanizing must be completed in accordance ASTM A780, Method A3 “Metallizing”. The need for repair must be based on ASTM A123 and determined by the Consultant. Areas less than 100 mm2 can be repaired using ASTM A780 Method A1. * The bottom surface of each base plate must be protected by a medium grey concrete colour barrier coating accepted by the Consultant. Preparation of the surface before applying the coating must be in accordance with the SSBC. |  |
| 1. Testing and Inspection |  | * The Contractor must meet the testing and inspection requirements set out in Subsection 8.3.7.3 of the SSBC. * The Contractor’s quality control testing and inspection records and/or reports must be submitted on a weekly basis to the Consultant for review and acceptance. All quality control testing and inspection records and/or reports must contain the written acceptance of the fabricator’s QC manager. * Testing, inspection and related costs incurred by the Consultant as a result of defective work must be paid for by the Contractor. * Testing of embrittlement test rods must be in accordance with Subsection 6.2.7.3 of the SSBC. * **Witness point – Embrittlement testing of high strength embrittlement test rods.** |  |
| 1. Final Inspection |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when the bearings are ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * Bearings must be fully protected during shipping. * To avoid damage during shipping, softeners must be used where chains or other time down devices are used in direct contact with components. * The Contractor must provide the Consultant a transportation schedule for bearings a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 8.3.7.6 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, product data sheets, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare inspection reports with photos during fabrication and these must also be included in the fabrication records along with additional QA NDT inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |

Pot Bearings

|  |  |  |  |
| --- | --- | --- | --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE – Pot Bearings** | | | |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** | | | |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency and laboratory representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + Alberta Transportation: Project Sponsor/Administrator/Fabrication Specialist;   + Consultant: Project Manager, Inspector;   + Contractor: Project Manager, and all personnel involved in supervision of the work;   + Contractor’s Specialty Staff or Subcontractor: Fabrication superintendent(s); independent testing agency representatives, and all personnel involved in supervision of the work. | | | |
| **Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions** | | **Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting)** | |
| **1** | **2** | **3** | **4** |
| **Agenda Item** | **Project Specific Agenda Sub-Item** | **Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes** | **Meeting Actions or Decisions, with Identification by Responsible Person** |
| 1. Standards |  | * Fabrication must be in accordance with:   + - * + Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 8, Edition 17, 2020.         + AASHTO LRFD Bridge Construction Specifications, 4th Edition 2017.         + AASHTO/AWS Bridge Welding Code D1.5M/D1.5. * AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing. |  |
| 1. Qualifications |  | * The fabrication shop must be certified by the Canadian Welding Bureau (CWB) in accordance with CSA-W47.1 to Division I or II. This certification requirement extends to all subcontractors engaged in the fabrication of bearings or bearing components. * Welders, welding operators and tackers must be CWB certified in the applicable category. A copy of the welder’s current qualification documents must be provided to the Consultant for record purposes. * The fabricator’s quality control plan, including visual inspection and non-destructive testing, must meet, at a minimum, the requirements of AASHTO/American Welding Society (AWS) Bridge Welding Code D1.5M/D1.5 Clause 6 except that the Contractor’s visual quality control welding inspector must be certified by the CWB as a Level 2 or Level 3 inspector in accordance with CSA W178.2. * Contractor QC testing technicians: Third party NDT technicians must be certified to Level 2 in accordance with CAN/CGSB-48.9712 and employed by a testing agency certified to CSA W178.1. Coating testing must be completed and by an independent National Association of Corrosion Engineers (NACE) Level 2 certified coating inspector. * The fabricator must engage an AASHTO National Transportation Product Evaluation Program (NTPEP) Elastomeric Bridge Bearing Pad Designated Laboratory or an equivalent independent certified testing company. * The fabricator and/or their sub-contractor completing metalizing must be certified by the SSPC to QP-6, Thermal Spray (Metalizing) Contractor Certification Program or ISO9001. * The Consultant’s QA Inspector must be certified by the CWB as a level 2 or level 3 welding inspector in accordance with CSA 178.2 and possess bridge related fabrication experience. |  |
| 1. Design Requirements |  | * The design requirements for pot bearings must be in accordance with Subsection 8.2 of the SSBC. * The design and the independent design check must be completed by the bearing supplier to accommodate the loadings, translations and rotations specified on the Drawings, in accordance with the requirements of CSA S6, and the exceptions noted in the SSBC. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication:   + - * + Inspection and Testing Plan (ITP);         + List of all fabricators and fabrication shop and all subcontractor certification documentation;         + Independent Inspection and Testing Laboratory Qualifications;         + Fabrication sequence and equipment;         + Mill Test Reports and product data sheets;         + Design and independent check notes;         + Review documentation of any contract modifications (if applicable);         + Shop drawings;         + CWB approved welding procedure data sheets (WPDS) and processes (WPS);         + Valid CWB welder’s tickets for all welders and the operations they will perform;         + Mill Test Reports for all materials. Boron content must not exceed 0.0008% for steel being welded;         + Verification testing results for all steel melted outside of Canada or the United States of America; and         + Fabrication schedule, including the expected completion date. Note: the fabrication schedule is required so the QA inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions** |  |
| 1. Materials |  | * Material requirements:   + - * + All materials must be new with no reclaimed material incorporated in the finished bearing;         + The steel for base plate, pot plates, piston plates, and shims must conform to the requirements of CSA G40.21 Grade 300W or 350W or ASTM A572/A572M Grade 50. The steel for sole plates must be in accordance with the Drawings;         + Stainless steel sheets must conform to the requirements of AISI Type 304, no. 8 mirror finish (0.2 µm Re maximum surface roughness). Boron content must not exceed 0.0008%;         + Brass sealing rings must be in accordance with ASTM B36M, half-hard;         + Cured elastomeric compounds must be low temperature Grade 5 and meet the minimum requirements listed in Table X1.1 of AASHTO M251-06. Cured elastomeric compounds must have 50 durometer hardness shore A;         + Cured elastomeric compounds must also meet the requirements of ASTM D2240 for low temperature crystallinity increase in hardness at an exposure of -25°C for 168 hours;         + PTFE must be unfilled, 100% virgin polymer conforming to Subsection 18.8.2.5, Unfilled PTFE Sheet of the 2017 AASHTO LRFD Bridge Construction Specifications including all interim revisions. Material used as the mating surface for guides for lateral restraint may be one of the following: * Unfilled PTFE. * PTFE filled with up to 15% by mass of glass fibres.   + - * + Lubricant must be silicone crease, effective to -40°C, and comply with the Society of Automotive Engineers (SAE) specification SAE AS8660;         + Adhesive for bonding PTFE to metal must be an epoxy resin satisfying the requirements of AASHTO M 235M/M 235 (ASTM C881/C881M) FEP film or equal producing a bond with a minimum peel strength of 4 N/mm, when tested according to ASTM D429 Method B. Adhesives must not degrade in the service environment; and * Anchor rods and connecting bolts must be the requirements of Table 8-2 of the SSBC. |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * Witness and hold points for pot bearings include:   + After completion of machining prior to bearing assembly (witness point);   + Dimensional checks and verification of tolerances of components (witness point);   + Visual inspection of welding and completion of non destructive testing, prior to galvanizing and/or metallization (hold point);   + Dimensional checks and verification of tolerances of completed bearings (witness points);   + Bearing testing (witness point);   + Embrittlement testing of high strength anchor rods (witness point);   + Verification testing and inspection of bearings if fabricated outside of Canada and the United States (hold point); and   + Final inspection (hold point). |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution of imperial material must be reviewed and accepted by the Consultant and shop drawings must show use of the reviewed and accepted imperial material. * Fabrication must be performed in a permanent fully enclosed structure that is maintained at a temperature of at least 10°C. * Storage of low hydrogen electrodes and flux and welding practices for low hydrogen welding must be in accordance with AWS D1.5. * All welding equipment must be maintained in good repair (gauges, clamps, connections, etc.). * Handling devices must not mark the plate. This must be observed starting at the receiving area and throughout the course of fabrication. * Repair procedures must be submitted to the Consultant and the Department for review and acceptance for damaged base metal, defective weldments, and any other defect identified by the Consultant, prior to commencement of the repair work. Any repairs to cut plate edges must use AWS D1.5 criteria in determining whether a flaw can be ground out or if it requires a welded repair. Welded repairs must be preheated. Any repairs accepted for implementation must be authenticated in accordance with APEGA requirements. |  |
| 1. Welding |  | * All welding must conform to AWS D1.5 and the WPSs and WPDSs reviewed and accepted by the Consultant. * Only welders certified to weld the joint type using the process specified in the position required will be accepted. * All welds must have an approved procedure. The approval must be obtained from CWB and reviewed and accepted by the Consultant. Any substitution to welding procedures will require the review and acceptance by the Consultant prior to welding. Welders must follow the procedure parameters to within the allowable tolerances. * Run-off tabs must be used at the ends of all welds that terminate at the edge of a member. The thickness and shape of the tabs must replicate the joint detail being welded and must be a minimum of 100 mm long unless greater length is required to acceptably complete the work. * Weld areas must be clean, free of mill scale, dirt, grease, and other contaminants prior to welding. For multi-pass welds, previously deposited weld metal must also be thoroughly cleaned prior to depositing subsequent passes. * Tack welds are not permitted unless they will be included in the final weld. Tacks, where acceptable, must be a minimum length of four times the weld size. * Preheat and interpass temperatures must be in accordance with the SSBC unless AWS D1.5 requires a higher temperature for the thickness of material being welded. The preheat temperature must be measured 75 mm from the point of welding on the opposite where the weld is being applied. * Arc strikes are not permitted. In the event of an accidental isolated arc strike, a repair procedure must be submitted in accordance with Subsection 6.2.5.8 of the SSBC. At a minimum, the repair procedure must include the complete grinding out of the crater produced by the arc strike. The repair procedure must also include MPI and hardness testing of the affected area. Hardness of the repaired area must conform to the requirements of Subsection 6.2.8.4.1.4 of the SSBC. These areas will be examined by the Consultant’s QA Inspector to ensure complete removal of the metal in the affected area. |  |
| 1. Fabrication |  | * Steel plates must be machined in accordance with Subsection 8.3.6.5 of the SSBC. * **Witness point – Inspection of machined surfaces prior to bearing assembly.** * Dimensional checks and verification of tolerances of individual bearing components. * **Witness point – Dimensional checks and verification of tolerances of individual bearing components.** * Stainless steel sheets in contact with PTFE must be continuously welded around the perimeter to its backing plate to prevent ingress of moisture. The weld must be clean, uniform, and without overlaps and located outside the area in contact with PTFE. * Each bearing must be clearly identified as described in Subsection 8.3.6.6 of the SSBC. * The threaded portion of the bolts must be coated with silicone grease prior to installation. * Virgin or glass filled PTFE elements must be recessed in a rigid backing material and must be bonded over the entire area with an adhesive. The rigid backing material must be grit blasted and cleaned with oil free compressed air prior to applying the adhesive. * The PTFE elements used as mating surfaces for guides for lateral restraint must extend to within 10 mm from the ends of the backing plates. * The fabricator must provide a smooth finish on all edges and surfaces, and remove all weld spatters, and all welding flux residue from the steel components prior to galvanizing/metallizing/coating. * Welding must be inspected throughout the process. All finial welds must be visually inspected and tested by the Contractor through an independent certified testing agency using non destructive means in accordance with Subsection 8.3.7.3 of the SSBC. * **Hold point – Visual inspection and non destructive testing of welding prior to galvanizing and/or metallizing.** * Galvanizing must be by the hot dip method or by metallizing where specified in the SSBC. Hot dip galvanizing must be in accordance with the current edition of ASTM A123/A123M Standard. Metallizing must be in accordance with SSPC-CS 23.00/AWS C2.23/NACE No. 12 Standard Practice. Bolts, nuts and special threaded fasteners must be hot-dip galvanized in accordance with ASTM F2329 and as modified in the following item: * The cleaning and pickling procedure of high strength ASTM A193 Grade B7 anchor rods must be modified as follows prior to hot-dip galvanizing:   + Brush blast to remove mill scale and oil after threading ends;   + Pickle up to 5 minutes; and   + Quick dry prior to hot-dip galvanizing (not stored in flux or acid rinse). * The Contractor must fabricate embrittlement test rods for embrittlement testing in accordance with Subsection 6.2.7.3.1 of the SSBC. * Galvanized sole plates and slider plates bolted to the bottom flanges of weathering steel girders must use galvanized ASTM F3125 Grade A325/A325M Type 1 heavy hex style bolts. The bolt layout, size and configuration must be as detailed on the Drawings. * Repair of galvanizing must be completed in accordance ASTM A780, Method A3 “Metallizing”. The need for repair must be based on ASTM A123 and determined by the Consultant. Areas less than 100 mm2 can be repaired in accordance with ASTM A780 Method A1. * The bottom surface of each base plate must be protected by a medium grey concrete colour barrier coating accepted by the Consultant. Preparation of the surface before applying the coating must be in accordance with the SSBC. * Dimensional checks and verification of tolerances must be completed assembled bearings at the completion of fabrication. Tolerances must be in accordance with Subsection 8.3.6.9 of the SSBC. * **Witness point – Dimensional checks and verification of tolerances of completed bearings.** |  |
| 1. Testing and Inspection |  | * The Contractor must meet the testing and inspection requirements set out in Subsection 8.3.7.3 of the SSBC. * The Contractor’s quality control testing and inspection records and/or reports must be submitted on a weekly basis to the Consultant for review and acceptance. All quality control testing and inspection records and/or reports must contain the written acceptance of the fabricator’s QC manager. * Testing, inspection and related costs incurred by the Consultant as a result of defective work must be paid for by the Contractor. * The Contractor must engage an independent certified testing agency to perform magnetic particle inspection of at least 25% of all fillet and partial penetration welds. Non-destructive examination by MPI must be in accordance with ASTM Standard E-709. * Testing of embrittlement test rods must be in accordance with Subsection 6.2.7.3 of the SSBC. * **Witness point – Embrittlement testing of high strength embrittlement test rods.** * The Contractor must engage an independent CSA certified testing company at his expense to perform testing of bearing materials and the completed bearings. Testing of elastomeric compounds must be in accordance with AASHTO M251-06. Testing of the completed bearings must in accordance with the requirements of Subsection 18.3.4 of the 2017 AASHTO LRFD Bridge Construction Specifications including all interim revisions. The long-term deterioration test described in Subsection 18.3.4.4.3 is not required. The proof load test described in Subsection 18.3.4.4.4 must be completed in accordance with the long-term proof load test requirements. * **Witness point – Testing of bearing materials and completed bearings.** |  |
| 1. Final Inspection |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when the bearings are ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * Stainless steel surfaces must be shipped with a protective film to prevent damage during transport and handling. * Bearings must be fully protected during shipping. * To avoid damage during shipping, softeners must be used where chains or other time down devices are used in direct contact with components. * The Contractor must provide the Consultant a transportation schedule for bearings a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 8.3.7.6 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, product data sheets, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare inspection reports with photos during fabrication and these must also be included in the fabrication records along with additional QA NDT inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |

* + - * 1. Bridgerail

|  |
| --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE –Bridgerail** |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** |

|  |
| --- |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + Alberta Transportation: Project Sponsor/Administrator;   + Consultant: Project Manager, Inspector;   + Contractor: Project Manager, and all personnel involved in supervision of the work;   + Contractor’s Specialty Staff or Subcontractor: Fabrication superintendent(s); independent testing agency representatives and all personnel involved in supervision of the work. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions** | | **Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting)** | |
| **1** | **2** | **3** | **4** |
| **Agenda Item** | **Project Specific Agenda Sub-Item** | **Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes** | **Meeting Actions or Decisions, with Identification by Responsible Person** |
| 1. Standards |  | * Fabrication must be in accordance with the following documents:   + Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 12, Edition 17, 2020.   + AASHTO LRFD Bridge Construction Specifications, 4th Edition 2017.   + AASHTO/AWS Bridge Welding Code D1.5M/D1.5 for all steel components except those composed of structural tubing.   + AWS Structural Welding Code D1.1/D1.1M for fabrication of components composed of structural tubing. |  |
| 1. Qualifications |  | * The fabrication shop must be certified by the Canadian Welding Bureau (CWB) in accordance with CSA-W47.1 to Division I or II. This certification requirement extends to all subcontractors engaged in the fabrication of structural steel components. * Welders, welding operators and tackers must be CWB certified in the applicable category. A copy of the welder’s current qualification documents must be provided to the Consultant for record purposes. * The fabricator’s quality control plan, including visual inspection and non-destructive testing, must meet, at a minimum, the requirements of AASHTO/American Welding Society (AWS) Bridge Welding Code D1.5M/D1.5 Clause 6 except that the Contractor’s visual quality control welding inspector must be certified by the CWB as a Level 2 or Level 3 inspector in accordance with CSA W178.2. * Contractor QC testing technicians: Third party NDT technicians must be certified to Level 2 in accordance with CAN/CGSB-48.9712 and employed by a testing agency certified to CSA W178.1. Coating testing must be completed and by an independent National Association of Corrosion Engineers (NACE) Level 2 certified coating inspector. * The Consultant’s QA Inspector must be certified by the CWB as a level 2 or level 3 welding inspector in accordance with CSA 178.2 and possess bridge related fabrication experience. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication:   + Inspection and Testing Plan (ITP);   + List of all fabricators and fabrication shop and all subcontractor certification documentation;   + Fabrication sequence and equipment;   + Mill Test Reports and product data sheets;   + Review documentation of any contract modifications (if applicable);   + Shop drawings;   + CWB approved welding procedure data sheets (WPDS) and processes (WPS);   + Valid CWB welder’s tickets for all welders and the operations they will perform;   + Mill Test Reports for all materials. Boron content must not exceed 0.0008% for steel being welded;   + Verification testing results for all steel melted outside of Canada or the United States of America; and   + Fabrication schedule, including the expected completion date. Note: the fabrication schedule is required so the QA inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions** |  |
| 1. Materials |  | * Material requirements:   + Structural tubing must be as indicated on the design drawings with silicon content less than 0.04% or between 0.15% and 0.25%.   + Steel plate and structural shapes must conform to the standard noted on the drawings. Silicon content must be less than 0.04% or between 0.15% and 0.25% for steel being galvanized.   + Anchor rods must conform to the requirements noted on the drawings.   + Boron content for steel being welded must not exceed 0.0008%. Testing of boron content must be reported to sufficient accuracy to determine compliance. |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * Witness and hold points for bridgerail include:   + Dimensional checks and verification of tolerances (witness point).   + Visual inspection of welding and completion of non destructive testing, prior to galvanizing and application of barrier coating (hold point).   + Barrier coating thickness and adhesion testing (witness point).   + Embrittlement testing of high strength anchor rods (witness point).   + Verification testing and inspection of bridgerail if fabricated outside of Canada and the United States (hold point).   + Final inspection (hold point).   + The Consultant’s QA Inspector does not provide quality control for a plant. The Consultant’s QA Inspector will inspect the completed work that has been reviewed and accepted by the fabricator’s quality control. |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution of imperial material must be reviewed and accepted by the Consultant and shop drawings must show use of the reviewed and accepted imperial material. * Fabrication must be performed in a permanent fully enclosed structure that is maintained at a temperature of at least 10°C. * Storage of low hydrogen electrodes and flux and welding practices for low hydrogen welding must be in accordance with AWS D1.5. * All welding equipment must be maintained in good repair (gauges, clamps, connections, etc.). * Handling devices must not mark the steel. This must be observed starting at the receiving area and throughout the course of fabrication. * All galvanized material must be handled using proper lifting slings so as not to damage the galvanized finish. * Repair procedures must be submitted to the Consultant and the Department for review and acceptance for damaged base metal, defective weldments, and any other defect identified by the Consultant, prior to commencement of the repair work. Any repairs to cut plate edges must use AWS D1.5 criteria in determining whether a flaw can be ground out or if it requires a welded repair. Welded repairs must be preheated. Any repairs accepted for implementation must be authenticated in accordance with APEGA requirements. |  |
| 1. Welding |  | * All welding must conform to AWS D1.5 and the WPSs and WPDSs reviewed and accepted by the Consultant. * Only welders certified to weld the joint type using the process specified in the position required will be accepted. * All welds must have an approved procedure. The approval must be obtained from CWB and reviewed and accepted by the Consultant. Any substitution to welding procedures will require the review and acceptance by the Consultant prior to welding. Welders must follow the procedure parameters to within the allowable tolerances. * Run-off tabs must be used at the ends of all welds that terminate at the edge of a member. The thickness and shape of the tabs must replicate the joint detail being welded and must be a minimum of 100 mm long unless greater length is required to acceptably complete the work. * Weld areas must be clean, free of mill scale, dirt, grease, and other contaminants prior to welding. For multi-pass welds, previously deposited weld metal must also be thoroughly cleaned prior to depositing subsequent passes. * Tack welds are not permitted unless they will be included in the final weld. Tacks, where acceptable, must be a minimum length of four times the weld size. * Preheat and interpass temperatures must be in accordance with the SSBC unless AWS D1.5 requires a higher temperature for the thickness of material being welded. The preheat temperature must be measured 75 mm from the point of welding on the opposite where the weld is being applied. * Arc strikes are not permitted. In the event of an accidental isolated arc strike, a repair procedure must be submitted in accordance with Subsection 6.2.5.8 of the SSBC. At a minimum, the repair procedure must include the complete grinding out of the crater produced by the arc strike. The repair procedure must also include MPI and hardness testing of the affected area. Hardness of the repaired area must conform to the requirements of Subsection 6.2.8.4.1.4 of the SSBC. These areas will be examined by the Consultant’s QA Inspector to ensure complete removal of the metal in the affected area. * **Hold point – Visual inspection and NDT of welding prior to galvanization/application of barrier coating** |  |
| 1. Anchor Rod Fabrication |  | * Threaded length of anchor rods must not be less than specified nor more than 15 mm greater than the specified value. * **Witness point - Dimensional checks and verification of tolerances** * Anchor rods must be assembled in cages after galvanizing with rods aligned square and plumb. * High strength anchor rods must be galvanized with the following procedure :   + Brush blast anchor bolts to remove mill scale and oil after threading ends;   + Flash pickling not to exceed 5 minutes; and   + Quick dry prior to hot-dip galvanizing (do not store in flux or acid rinse). * The Contractor must fabricate embrittlement test rods for embrittlement testing in accordance with Subsection 6.2.7.3.1 of the SSBC. * Threaded ends of anchor rods must be chamfered. |  |
| 1. Post Fabrication |  | * Bridgerail post baseplates must be flat, have square cut edges and corners with no lips or gouges. The holes in the plates are to be accurately drilled (no punching or burning of holes). * Posts must be perpendicular to the baseplates unless noted otherwise on the drawings. * Tubular posts must be fabricated so that the tube weld seam is on the back side of the post. * Post to base plate welds must be completed with an approved procedure. W beam and tubular shaped pedestrian/cyclist standard barrier posts must be filet welded to the base plate in accordance with the drawings. Tubular posts, other than for the standard pedestrian/cyclist barrier, must be butt welded to the base plate using properly fitted backing bars. * Post to baseplate groove welds and post to baseplate fillet welds must be preheated to a minimum temperature of 100°C and 60°C respectively unless a higher temperature is required by AASHTO/AWS Bridge Welding Code D1.5M/D1.5 * Post assembly length must be within 3 mm of the specified length. * **Witness point - Dimensional checks and verification of tolerances.** * Mark numbers on posts to be located on the underside of base plates. * The bottom of the galvanized base plates must be protected by a medium grey concrete colour barrier coating to prevent contact between zinc and concrete. The Contractor must also complete barrier coating adhesion testing on adhesion test plates in accordance with ASTM D3359 Method A or B as outlined in Subsection 12.2.7.3 of the SSBC. |  |
| 1. Rail Fabrication |  | * Tubular rails must be fabricated in the configurations shown on the drawings. * All rail splices are to be shown on the shop drawings. * Welded rail splices must be completed joint penetration groove welds completed with properly fitted backing bars. Only one welded rail splice will be permitted per each rail section. Welded splices must be ground smooth after fabrication. * Rail of square cross section is to be fabricated so that the inside weld seam is always located at the bottom. Rail of rectangular cross section is to be fabricated so that the inside weld seam is always oriented towards the bottom or outside of the bridge. * Two test sleeve samples are required and both are to be galvanized. One sample is to be left at galvanizer’s plant and the other to be kept at the fabrication shop. These are to be used to check the sleeve fit. * Clearance between the rail sections and tube sleeves is to be adequate to ensure an easy sliding fit after galvanizing. The maximum radial clearance allowed around the sleeve when fitted into the rail must be 1 mm (2 mm total) after galvanizing with the tube seam removed. * Rail sections must be straight with no evidence of kinks. Maximum variation of straightness must not exceed 3 mm over a 3 m length. * **Witness point - Dimensional checks and verification of tolerances.** * Rail mark numbers are to be stamped on the underside of the rail near the ends. * The galvanized finish must be free of lumps, globules, sharp edges or heavy deposits of zinc. Handrail rail must be free of any sharp protrusions or edges. |  |
| 1. Testing and Inspection |  | * Contractor quality control inspection must be in accordance with Subsection 12.2.7.3 of the SSBC. * Any repair of galvanized surfaces must be completed in accordance with Subsection 6.2.7.3.3 of the SSBC. * The Contractor’s quality control testing and inspection records and/or reports must be submitted on a weekly basis to the Consultant for review and acceptance, with the exception that radiographic and ultrasonic NDT records and/or reports must be submitted within 24 hours of completion of the testing. All quality control testing and inspection records and/or reports must contain the written acceptance of the fabricator’s QC manager. * **Witness points – Embrittlement testing of high strength embrittlement test rods and barrier coating thickness and adhesion testing.** |  |
| 1. Final Inspection |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when bridgerail is ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract. * **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * Bridgerail must be acceptably protected during shipping. * To avoid damage during shipping, softeners must be used where chains or other time down devices are used in direct contact with components. * The Contractor must provide the Consultant a transportation schedule for bridgerail a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 12.2.7.6 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, product data sheets, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare inspection reports with photos during fabrication and these must also be included in the fabrication records along with additional QA NDT inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |

* + - * 1. Overhead Sign Structures

|  |
| --- |
| **PREFABRICATION MEETING AGENDA GUIDELINES / MEETING MINUTES TEMPLATE –Overhead Sign Structures** |
| **Date:**  **Time:**  **Location:**  **Attendees:**  **Prepared by:**  **Distribution to:** |

|  |
| --- |
| **General Commentary:**   * The purpose of the prefabrication meeting is to ensure that the roles and responsibilities during fabrication processes are discussed, understood by all parties and documented. The prefabrication meeting also serves as a roadmap to how the fabrication will be completed including quality control and quality assurance inspection and testing. * The prefabrication meeting must not occur until the inspection and test plan (ITP) and prefabrication submissions (hold points) have been submitted, reviewed and written acceptance provided by both the Contractor and the Consultant. * The prefabrication meeting must be held at the fabricator’s facility and at a date and time acceptable to the Department and the Consultant. A minimum of 2 weeks notice must be provided to the Consultant and the Department prior to the proposed date and time. * The Contractor is responsible for all travel, boarding and lodging costs incurred by the Consultant (up to 2 representatives) and the Department (1 representative) to attend the prefabrication meeting(s) for fabrication occurring outside the Province of Alberta. * The Contractor, fabricator and their sub-contractors must be in attendance at the prefabrication meeting including project manager(s), fabrication superintendent(s), independent testing agency representatives, and all employees involved in supervision of the work.   **Required Quorum:**   * The following representation is required for this meeting.   + Alberta Transportation: Project Sponsor/Administrator/Fabrication Specialist;   + Consultant: Project Manager, Inspector;   + Contractor: Project Manager, and all employees involved in supervision of the work;   + Contractor’s Specialty Staff or Subcontractor: Fabrication superintendent(s); independent testing agency representatives, and all employees involved in supervision of the work. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Fields 1 & 2 Appear on Distributed Agenda. Items Reviewed and Additions Made from Content in Special Provisions** | | **Fields 3 & 4 are for Consultant Guidance (either PM or Inspector will chair the meeting)** | |
| **1** | **2** | **3** | **4** |
| **Agenda Item** | **Project Specific Agenda Sub-Item** | **Commentary for Meeting Chair, with Discussions to be Included in Meeting Minutes** | **Meeting Actions or Decisions, with Identification by Responsible Person** |
| 1. Standards |  | * Fabrication must be in accordance with the following documents:   + Alberta Transportation Standard Specifications for Bridge Construction (SSBC) Section 24, Edition 17, 2020.   + AASHTO LRFD Bridge Construction Specifications, 4th Edition 2017.   + AASHTO/AWS Bridge Welding Code D1.5M/D1.5 for all steel components except those composed of structural tubing. * AWS Structural Welding Code D1.1/D1.1M for fabrication of components composed of structural tubing. |  |
| 1. Qualifications |  | * The fabrication shop must be certified by the Canadian Welding Bureau (CWB) in accordance with CSA-W47.1 to Division I or II. This certification requirement extends to all subcontractors engaged in the fabrication of bearings or bearing components. * Welders, welding operators and tackers must be CWB certified in the applicable category. A copy of the welder’s current qualification documents must be provided to the Consultant for record purposes. * The fabricator’s quality control plan, including visual inspection and non-destructive testing, must meet, at a minimum, the requirements of AASHTO/American Welding Society (AWS) Bridge Welding Code D1.5M/D1.5 Clause 6 except that the Contractor’s visual quality control welding inspector must be certified by the CWB as a Level 2 or Level 3 inspector in accordance with CSA W178.2. * Contractor QC testing technicians: Third party NDT technicians must be certified to Level 2 in accordance with CAN/CGSB-48.9712 and employed by a testing agency certified to CSA W178.1. Coating testing must be completed and by an independent National Association of Corrosion Engineers (NACE) Level 2 certified coating inspector. * The Consultant’s QA Inspector must be certified by the CWB as a level 2 or level 3 welding inspector in accordance with CSA 178.2 and possess bridge related fabrication experience. |  |
| 1. Design Requirements |  | * The design requirements for overhead sign structures must be in accordance with Subsection 24.2 of the SSBC. * The Fatigue Design must be in accordance with AASHTO, Chapter 11 based on Fatigue Category 1. * Design sign panel area must be the largest of:   + Actual sign panels;   + Ultimate stage sign panels; or * Area of 3.5 m x 60% of horizontal span length, placed in any position along the span. |  |
| 1. Prefabrication Submissions |  | * The following items must be submitted, reviewed and accepted prior to the commencement of fabrication:   + - * + Inspection and Testing Plan (ITP);         + List of all fabricators and fabrication shop and all subcontractor certification documentation;         + Fabrication sequence and equipment;         + Mill Test Reports and product data sheets;         + Design and independent check notes.         + Review documentation of any contract modifications (if applicable);         + Shop drawings;         + CWB approved welding procedure data sheets (WPDS) and processes (WPS);         + Valid CWB welder’s tickets for all welders and the operations they will perform;         + Mill Test Reports for all materials. Boron content must not exceed 0.0008% for steel being welded;         + Verification testing results for all steel melted outside of Canada or the United States of America; and * Fabrication schedule, including the expected completion date. Note: the fabrication schedule is required so the QA inspectors can perform their duties during fabrication. * **Hold point – Completion of ITP and Prefabrication Submissions** |  |
| 1. Materials |  | * Material requirements:   + All materials must be new;   + The use of aluminum and aluminum alloy will not be permitted;   + Steel materials including hardware and anchor rod assemblies must be hot dip galvanized;   + Structural steel plate material must conform to either CSA G40.21 Grade 300W or 350W or ASTM A572/A572M Grade 50;   + All other structural shapes except hollow structure steel (HSS) must be in accordance with CSA G40.21 Grade 300W or 350W or ASTM A572/A572M Grade 50;   + HSS members must conform to CSA G40.21 Grade 300W or 350W Class H;   + Steel shafts, structural flange plates, baseplates, HSS and any steel material to be welded must have a Charpy V-Notch minimum average absorbed energy of 20 Joules (J) at -20°C. Bolted HSS members that are not main load carrying tension members will not require a Charpy V-Notch minimum average value;   + Silicon content for all structural steel must be less than 0.04% or within the range of 0.15% to 0.25%;   + All bolts must conform to ASTM Standard F3125 Grade A325/A325M Type 1 heavy hex style. Nuts must be heavy hex style and must conform to ASTM A563/A563M. Hardened washers must conform to ASTM F436/F436M; * Anchor rods must be manufactured from smooth rods conforming to ASTM F1554 Grade 55 (Fy = 380 MPa) including supplementary requirement S4; * Extruded aluminum panels must be manufactured in accordance with Subsection 5.18, Supply of Permanent Highway Signs, Posts and Bases, Standard Specifications for Highway Construction, except as noted otherwise; and * Reflective sheeting materials used on all overhead sign structure panels must be in accordance with Subsection 5.18.2.8.2, Supply of Permanent Highway Signs, Posts and Bases, Standard Specifications for Highway Construction. |  |
| 1. Fabrication Witness and Hold Points |  | * The Inspection witness and hold points specified in the SSBC require sign off from the Contractor’s QC and Consultant’s QA Inspector. If fabrication continues past a hold point without the written acceptance of the work by both the Contractor and the Consultant, the Consultant may suspend the work. The Contractor will also be solely responsible for all costs required to repair or replace the work, as determined by and to the satisfaction of the Consultant and the Department. * Witness and hold points for overhead sign structures include:   + Backing bar complete joint penetration weld testing (hold point);   + Fitting of backing bar (hold point);   + Tube to flange plate and/or baseplate complete joint penetration weld testing (hold point);   + Visual welding inspection and non-destructive testing prior to shop pre-assembly (witness point);   + Pre-assembly and dimensional tolerance checks (witness point);   + Galvanizing (witness point);   + Ultrasonic non-destructive testing of complete joint penetration tube to flange plate and/or baseplate weld toes after galvanizing (witness point);   + Base plate barrier coating application and testing (witness point);   + Verification testing and inspection of overhead sign structures if fabricated outside of Canada and the United States (hold point); and   + Final inspection (hold point). |  |
| 1. Shop Requirements |  | * The fabrication is to be completed in metric. Any substitution of imperial material must be reviewed and accepted by the Consultant and shop drawings must show use of the reviewed and accepted imperial material. * Fabrication must be performed in a permanent fully enclosed structure that is maintained at a temperature of at least 10°C. * Storage of low hydrogen electrodes and flux and welding practices for low hydrogen welding must be in accordance with AWS D1.5. * All welding equipment must be maintained in good repair (gauges, clamps, connections, etc.). * Handling devices must not mark the plate. This must be observed starting at the receiving area and throughout the course of fabrication. * No splices are allowed unless they are shown on reviewed and accepted shop drawings. The location of any additional splice must be reviewed and accepted by the Consultant prior to splicing. * Repair procedures must be submitted to the Consultant and the Department for review and acceptance for damaged base metal, defective weldments, and any other defect identified by the Consultant, prior to commencement of the repair work. Any repairs to cut plate edges must use AWS D1.5 criteria in determining whether a flaw can be ground out or if it requires a welded repair. Welded repairs must be preheated. Any repairs accepted for implementation must be authenticated in accordance with APEGA requirements. |  |
| 1. Welding |  | * All welding must conform to AWS D1.5 and the WPSs and WPDSs reviewed and accepted by the Consultant. * Only welders certified to weld the joint type using the process specified in the position required will be accepted. * All welds must have an approved procedure. The approval must be obtained from CWB and reviewed and accepted by the Consultant. Any substitution to welding procedures will require the review and acceptance by the Consultant prior to welding. Welders must follow the procedure parameters to within the allowable tolerances. * Weld sequence should be predetermined by the fabricator in order to minimize shrinkage and twisting. * Run-off tabs must be used at the ends of all welds that terminate at the edge of a member. The thickness and shape of the tabs must replicate the joint detail being welded and must be a minimum of 100 mm long unless greater length is required to acceptably complete the work. * Weld areas must be clean, free of mill scale, dirt, grease, and other contaminants prior to welding. For multi-pass welds, previously deposited weld metal must also be thoroughly cleaned prior to depositing subsequent passes. * Tack welds are not permitted unless they will be included in the final weld. Tacks, where acceptable, must be a minimum length of four times the weld size. * Preheat and interpass temperatures must be in accordance with the SSBC unless AWS D1.5 requires a higher temperature for the thickness of material being welded. The preheat temperature must be measured 75 mm from the point of welding on the opposite where the weld is being applied. * Arc strikes are not permitted. In the event of an accidental isolated arc strike, a repair procedure must be submitted in accordance with Subsection 6.2.5.8 of the SSBC. At a minimum, the repair procedure must include the complete grinding out of the crater produced by the arc strike. The repair procedure must also include MPI and hardness testing of the affected area. Hardness of the repaired area must conform to the requirements of Subsection 6.2.8.4.1.4 of the SSBC. These areas will be examined by the Consultant’s QA Inspector to ensure complete removal of the metal in the affected area. |  |
| 1. Fabrication |  | * Columns, arms, extensions and clamps must be brake press formed or roll formed. The brake press knife must have a radius suitable for the thickness of the material and nature of the bend. The minimum bend radius for all cold formed sections must be 100 mm. * All plate material for main members and any plate material welded to the main member must be flame cut using an automatic cutting machine. Shearing will not be permitted. Any laminations or any suspect areas of lamellar tearing must be reported must be reported to the Consultant. * All plates and structural sections must be free of notches and gouges. * Corners of plates and structural sections must be ground to a 1 mm chamfer. * The diameter of bolt holes in baseplates must be sized in accordance with CSA S6 Clause 10.18.4.2 (a). The nominal diameter of all other bolt holes must be 2 mm greater than the nominal bolt size. * Punching of full size holes will not be permitted. The holes must be circular and perpendicular to the member and must be deburred to ensure a proper faying surface. * Hand holes, when specified, must be stiffened by providing a reinforcing rim with semi-circular ends. * Once the components of each overhead sign structure are acceptably fabricated, the assembly flange plates and/or baseplates must be stamped with permanent identification marks acceptable to the Department and the Consultant. Only low stress stamps must be used for identification marks. * The following welds must have 100% penetration:   + Column to baseplate;   + Horizontal arm to flange plate;   + Longitudinal seam welds within 150 mm of circumferential welds and 150 mm beyond hand holes (when provided) must be full penetration groove welds;   + Hand hole reinforcing rim   + Backing bar splices; and   + Flange plate to gusset plate. * The column to baseplate and flange to horizontal arm full penetration welds must be completed using acceptably fitted backing bars. The backing bar splice weld must have 100% penetration. * **Hold points – Inspection and NDT of complete joint penetration weld in backing bar, acceptable fitting of backing bar into the welded joint and visual inspection and NDT of the completed column to baseplate/flange to horizontal arm full penetration weld.** * Transition between full and partial penetration welds must be ground smooth. * All longitudinal seams must be made by an approved semi or fully automatic sub arc or metal core welding process. The longitudinal seam must have a minimum of 60% penetration. * No plug welds are allowed anywhere in the structure. * **Witness point - Visual inspection of and NDT of welding prior to shop pre-assembly.** * Dimensional tolerances must be conform to the requirements of Subsection 24.3.6.1.2 of the SSBC. * After welding and fabrication, but prior to galvanizing, the overhead sign structure must be pre-assembled to check the fit and geometry. The pre-assembled overhead sign structures must be inspected, reviewed and accepted by the Consultant. * **Witness point – Pre-assembly of and dimensional tolerance checks prior to galvanizing.** * All material must be hot dip galvanized after fabrication in accordance with Subsection 6.2.7.3 of the SSBC. * Repair of galvanized material must be completed in accordance Subsection 6.2.7.3.3. * **Witness point – Inspection of galvanized surfaces and any galvanized surface repairs.** * Full penetration groove welds at tube to transverse plate connection details having a constant amplitude fatigue threshold (CAFT) of 69 MPa or less, must be ultrasonically inspected for toe cracks after galvanizing as required by Subsection 5.15.5 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. * **Witness point - Ultrasonic non-destructive testing of complete joint penetration tube to flange plate and/or baseplate weld toes after galvanizing.** * The bottom surface of each base plate must be protected by a medium grey concrete colour barrier coating accepted by the Consultant. Preparation of the surface before applying the coating must be in accordance with the SSBC. The Contractor must also complete barrier coating adhesion testing on adhesion test plates in accordance with ASTM D3359 Method A or B as outlined in Subsection 24.3.7.3 of the SSBC. * **Witness point - Base plate barrier coating application and testing.** |  |
| 1. Testing and Inspection |  | * The Contractor must meet the testing and inspection requirements set out in Subsection 24.3.7.3 of the SSBC. * The Contractor’s quality control testing and inspection records and/or reports must be submitted on a weekly basis to the Consultant for review and acceptance. All quality control testing and inspection records and/or reports must contain the written acceptance of the fabricator’s QC manager. * Testing, inspection and related costs incurred by the Consultant as a result of defective work must be paid for by the Contractor. * The fabricator’s testing and inspection records must be open for examination by the Consultant. |  |
| 1. Final Inspection |  | * Once all the final QC and QA documentation is reviewed and accepted (review of these documents should be occurring regularly throughout the fabrication process), the Consultant will inform the fabricator when each overhead sign structure is ready for shipping or whether deficiencies remain that require repair. * Review and acceptance at the fabrication facility by the Consultant will not relieve the Contractor of their sole responsibility to meet the requirements of the Contract.   **Hold point – Final Inspection prior to shipping.** |  |
| 1. Clearance to Ship and Shipping |  | * Handling and lifting devices must not mark, damage, or distort members. * Timber blocking must be used and located at positions that prevent damage and/or distortion from deflection. * Softeners must be used where chains or other tie down devices are used in direct contact with the steel members. * The Contractor must provide the Consultant a transportation schedule for bearings a minimum of 72 hours prior to shipment from the fabrication facility. Written acceptance in accordance with Subsection 24.3.7.6 of the SSBC must be provided by both the Contractor and the Consultant prior to the commencement of shipping. |  |
| 1. Fabrication Records and Submittals |  | * The Consultant must compile the QC records received during fabrication. This must include but is not limited to fabricator and 3rd party inspection and testing records, mill test reports, product data sheets, non-conformance reports and repair records, fabrication schedules, as-built shop drawings. Consultant QA Inspector must prepare daily inspection reports with photos during fabrication and these must also be included in the fabrication records along with additional QA NDT inspection and testing records. |  |
| 1. Safety |  | * Plant PPE, training, and orientation requirements. * Plant and project specific hazard identification. |  |