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| HEB PRECAST  [precasttenders@heb.co.nz](mailto:precasttenders@heb.co.nz) | | | | | **Inspection and Test Plan: 03**  Issued 31/10/2023 | | | **Approval** | | **Initial** |
| **Project:** | Mangakootokutuku Bridge | | HEB Precast Project Manager | | Paul Malan |
| **Procedure:** | HEB Precast Prestressed | | HEB Production Manager | | Gareth Cole |
| **Structure:** | Super Tee Girder | | HEB Production/Quality Coordinator | | Duncan Taylor |
| **Unit Type:** | 1225mm Super Tee Beam | | Design Engineer | | BBO |
| **No:** | **Inspection / Test Point** | **ACTION**  (Hold, Monitor, Witness) | **Detail** | **Reference** | **Frequency** | **Inspection / Test Method** (submission, visual inspection, testing, measure,  review) | **Conformance Criteria** | | **Records** | **Responsibility** |
| **A.** | **Pre-Construction** | | | | | | | | | |
| **1** | **Shop Drawing Approval** | Hold | Shop drawings to be submitted for approval. | Structural drawings | Prior to casting | Document Review | Approved IFC Shop Drawings | | Client approval | Project Manager |
| **2** | **Concrete Mix Design Approval** | Hold | Concrete mix design to be submitted for approval prior to concrete being supplied to site. | - | Prior to casting | Document Review | Minimum compressive strength at 28 days 60MPa. The mix design to comply with aspects of the contract specification. | | Client approval | Project Manager |
| **3** | **Lift Design** | Hold | Lift design provided for units demoulding, storage and transportation. | - | Prior to casting | Document Review | Specific Lift design (Lifting eyes and position) produced and followed | | Lift design Shop Drawings | Project Manager |
| **4** | **Steel Reinforcement compliance** | Hold | Mill certificates for steel reinforcing to be provided | AS/NZS 4671 | Prior to casting | Document Review | Steel to be manufactured with ACRS certificate details and verification  Mill certificates to match ACRS certificates. | | Mill Certificates Detail sheets Test Certificates | Production / Quality Coordinator |
| **5** | **Steel pre-stressing material (Strands) compliance** | Hold | Mill certificates for prestressing strand coils to be provided | AS/NZS 4672 | Prior to casting | Document Review | Prestressing strands (coils) to be supplied by ACRS accredited Manufacturer.  Mill certificates checked against size, type and strand - mill certificate to match ACRS certificate | | Mill Certificates ACRS Certificate | Production / Quality Coordinator |
| **6** | **Design Stressing calculation** | Hold | Design stressing calculation and calibration certificates to be submitted to the Design Engineer | Structural drawings | Prior to casting | Document Review | Expected extensions and gauge readings to be calculated for each cast. | | Design Stressing Calculation Calibration Certificates Client Approval | Project Manager |
| **B.** | **During Casting** | | | | | | | | | |
| **7** | **Steel Reinforcement cage assembly** | Monitor | Steel reinforcing cage to be assembled and inspected. | Approved shop drawings | Prior to each cast | Visual Inspection | Cage assembly to comply with correct size, class, length, shape and location/spacing as specified in shop Dwgs.  Free from visual damage. | | Pre-Pour Inspection sheet REO detail sheets | Production / Quality Coordinator |
| **8** | **Mould Preparation** | Witness | Before casting ensure mould has been prepared to comply with tolerances. | NZS3109  Table 5.1 | Prior to each cast | Measure | Tolerance on placement of moulds shall be a per NZS 3109 | | Pre-Pour Inspection sheet | Production / Quality Coordinator |
| **9** | **Pre-Stressing** | Monitor | Review actual strand extension/pressure compliance with  approved design calculation. Draw-in measurements to be taken and recorded  Check that debonding has been included as required. Debonding shell be by plastic sleeves around the strand. | Approved shop drawings Design Stressing calculation | Prior to each cast | Visual Inspection/Measure | Stressing data/records reported on stressing calculation sheet. | | Stressing Calculation sheet Pre-Pour Inspection sheet | Stressing Controller |
| **10** | **Steel Reinforcement Placement** | Witness | Reinforcing steel shall be handled, placed as per NZS 3109. | Approved shop drawings NZS 3109 | Prior to each cast | Visual Inspection | Steel reinforcing cage placed as per approved shop drawings.  Spacers shall be installed evenly to ensure correct cover as per shop drawings achieved. | | Pre-Pour Inspection sheet | Production / Quality Coordinator |
| **11** | **Cast-in Items** | Witness | All cast in items positioned as per shop drawings Lifters positioned as per lift design | NZS3109 Table 5.1  Approved shop drawings Approved Lift Design | Prior to each cast | Visual Inspection | Correct type and number of cast in items used Correct Lifters used, positioned in accordance with approved lift design | | Pre-Pour Inspection sheet | Production / Quality Coordinator |
| **12** | **Pre Pour Inspections** | Hold | Pre Pour Inspection shall be carried out before casting.  The Engineer's Rep shall be advised at least 48 hours before the proposed pour. | Approved shop drawings | Prior to each cast | Measure, Document review | Confirmation that the unit has been cast in accordance with approved shop drawings and NZ standards for tolerances. | | Pre Pour inspection sheet Marked up shop drawing, Stressing records | Foreman & Production / Quality Coordinator |
| **13** | **Concrete Mix Conformance** | Hold | All concrete dockets reviewed at time of delivery. | Approved mix design | Prior to placement of concrete | Visual Inspection | All concrete delivered to site shall be produced in accordance with the approved mix design | | Concrete Delivery Dockets | Supervisor & Production / Quality Coordinator |
| **14** | **Concrete Mix Workability** | Hold | Fresh concrete to be visually assessed for its workability compliance. | Approved mix design | Prior to placement of concrete | Visual Inspection | Workability as per mix design.  Concrete slump test to be performed by concrete supplier before delivery | | Concrete Delivery Dockets | Supervisor & Production / Quality Coordinator |
| **15** | **Concrete Finish** | Witness | Concrete to be placed to achieve the specified formed and unformed finishes | Approved shop drawings NZS3114 | During and after placement of concrete | Visual Inspection | ST Beam to be Type F4 finish  All construction joints - Type B / UNO  Top surface Type B / CJ and U2 where specified | | Pre-Pour Inspection sheet | Foreman & Production / Quality Coordinator |
| **C.** | **Post-Construction** | | | | | | | | | |
| **16** | **Curing and Release Strength** | Hold | Heat accelerrated curing as per approved methodology. 7 Day post mould water curing as per approved methodology | NZS 3109  NZS 3112 | Prior to every unit transfer | Testing (Schmidt hammer or Compressive strength test) | Minimum compressive strength at transfer of prestressed units to be 40MPa prior to stripping and demoulding. | | Post-Pour Inspection sheet | Production Manager |
| **17** | **Transfer** | Monitor | Visual inspection to ensure strands are tight and no slippage of strand into concrete. Locallised spalling around full bonded strand at transer as result of excessive slippage will be identified as non conformance and the unit will be rejected and remade. | Approved shop drawings | Prior to transfer | Visual Inspection | Stressing data/records reported on stressing calculation sheet. | | - | Production / Quality Coordinator |
| **18** | **Draw-in** | Monitor | Strand draw-in to be measured on each cast. If ave draw-in for group exceeds 2mm, or 4mm for single strand, then results to be submitted to Eng | NZS3109 C8.72.3 | Every unit - at transfer | Measure | Draw-in to be measured on each beam at transfer | | Post-Pour Inspection sheet | Production / Quality Coordinator |
| **19** | **Lifting** | Monitor | Units are to be demoulded following lift design | Approved lift design | Every unit | Document Review | Approved lift design to be followed. | | - | Production / Quality Coordinator |
| **20** | **Marking** | Hold | Units are to be clearly marked each end with unique number, cast date and installation direction (Super T). | Approved shop drawings | Every unit - after demoulding, prior storing | Visual Inspection | Ensure every unit is clearly marked | | - | Production / Quality Coordinator |
| **21** | **Concrete Supply Testing** | Hold | Concrete compressive strength test to be carried out by supplier. 1 Set per beam with additional set for any truck with water added after leaving the batch plant | NZS 3112, Part 2 | 1 test sample for every beam [1 cylinder - at 7 days age  3 cylinders - at 28 days age 3 cylinders - transfer  strength] | Testing | Compressive Strength result to be a minimum orf 60MPa at 28 days | | Concrete suppliers Test Reports | Concrete Supplier + Production / Quality Coordinator |
| **22** | **Post Pour Inspection** | Hold | All units shall be inspected for its compliance prior to delivery | Approved shop drawings | Every unit - prior delivery | Visual Inspection | Confirmation that the unit has been cast in accordance with approved shop drawings and NZ standards | | Post-Pour Inspection sheet (red pen mark-up - as-built) | Production / Quality Coordinator |
| **23** | **QA Package / As-Built** | Hold | Compliance documentation is to be collated as per project requirements | - | At Delivery and installation | Document Review | Compliance documentation is to be submitted to the Engineer. | | Post Pour inspection sheet Marked up shop drawings - as built | Production / Quality Coordinator |

Comments:

Accepted by HEB Precast Project Manager

# Paul Malan

Signature:

Date:

Accepted by HEB Production Manager

# Gareth Cole

Signature:

Date:

**Accepted by HEB Production/Quality Coordinator Duncan Taylor**

Signature:

Date:

Accepted by Design Engineer

Signature:

Date: