METHOD STATEMENT FOR FORMWORK, REINFORCEMENT STEEL & CONCRETE WORKS

Project No: (.....)

REVISION HISTORY	ISSUE DATE	DESCRIPTION	REVIEW / STATUS

PREPARED BY:	REVIEWED BY:	APPROVED BY:

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1. Introduction

This document outlines the procedure that [Your Company Name] (hereinafter referred to as the "Contractor") proposes to adopt in carrying out the works of form fabrication, bending and installation of reinforcing bars, and concreting in its capacity as the subcontractors, at the site of [Client Project Name] (hereinafter referred to as the "Client").

2. Scope

This Method Statement will cover all concrete structures to be executed at the aforementioned project, including foundations and footings, pavements (heavy duty and medium duty), walls, pedestals, columns, and slabs.

3. Definitions

- [Client Project Acronym, e.g., CPAP]: [Client Project Name]
- [Contractor Company Acronym, e.g., XYZC]: [Your Company Name]

4. References

The latest revision of the following Project Specifications and International Standards shall be used as references and are part of this Method Statement in the execution of work:

- [Relevant Project Specification Document 1]: Ready Mixed Portland cement Concrete
- [Relevant Project Specification Document 2]: Concrete Retaining Wall
- [Relevant Project Specification Document 3]: Design and Construction of Precast and Pre-stressed Concrete
- [Relevant Project Specification Document 4]: Concrete Structure
- [Relevant Project Specification Document 5]: Foundation and Supporting Structure for Heavy Machinery
- [Relevant Project Specification Document 6]: Concrete Foundations
- [Relevant Project Specification Document 7]: Epoxy Coating of Steel Reinforcing Bars
- [Relevant Project Specification Document 8]: Criteria for Design and Construction Concrete Structures
- [Relevant Project Specification Document 9]: Approval Procedure for Ready Mixed Concrete Mix Design
- ACI 301: Specifications for Structural Concrete
- ACI 305R: Guide to Hot Weather Concreting
- ACI 306R: Guide for Cold Weather Concreting

- ACI 347: Guide to Formwork for Concrete
- ASTM A615/A615M: Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- ASTM A775/A775M: Standard Specification for Epoxy-Coated Steel Reinforcing Bars
- ASTM C31: Standard Practice for Making and Curing Concrete Test Specimens in the Field
- ASTM C39: Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- ASTM C1064: Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
- ISO 9001: Quality management systems — Requirements
- [Applicable National/Regional Standards, e.g., Euro code 2, BS 8500, AS 3600]

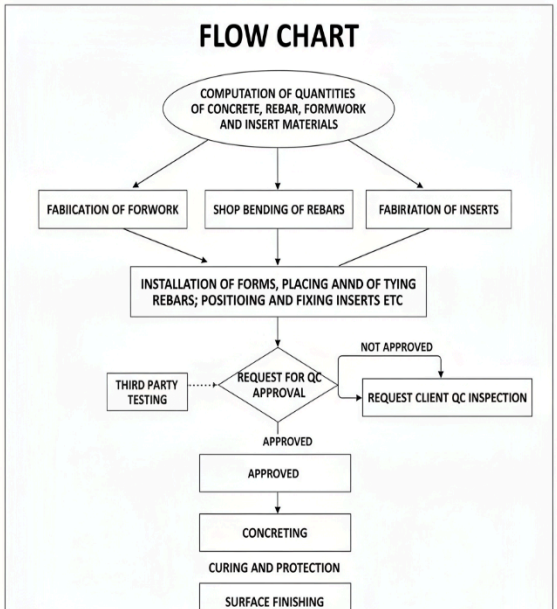
5. Limitations

This method statement may warrant modification to suit the specific requirements of other areas and/or works than those covered under its scope. The discrepancies between this document and project specifications will be governed by the project specifications.

6. Methodology

- The interrelationship between the three activities—formwork, rebar fixing & concreting—and their logical sequence is presented by way of a flowchart.
- The items of work are quantified suitably to determine resource requirements and the organizational structure needed to meet the requirements.
- Simultaneously, a Project Quality Plan is prepared by the Contractor in conformity with ISO 9001 guidelines, work specifications, and applicable codes/standards.
- A Safety Management Plan is also prepared to ensure safety at the work front. Furthermore, a time schedule will be prepared in keeping with the overall project schedule.

Here's a flowchart summarizing the methodology:



7. Fabrication and Installation of Forms

An outline of the configuration system of formwork proposed to be used by the Contractor is given hereunder.

It is proposed to use timber formwork for all the works. The main panel of the form will be made with 18mm laminated ply board. Lesser thickness may be used in the case of minor items. In any case, the forms will be made strong enough to withstand the liquid pressure of concrete and also watertight.

1. Preparing Plywod Panels

2. Ereting of Bracing Columon Forms

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All formwork will be coated with approved formwork releasing agent before placement.

- The main panels will be stiffened using aluminum and/or timber beams fixed along the length and width of the panels.

- Steel soldiers may be used to hold the panels together where the height of the form is more than 1.5M.
- There will also be props supporting the beams or soldiers, as the case may be. The props can be fine-tuned and adjustable.
- The spacing between the faces of the form can be adjusted by using steel tie rods running through the forms. These are screw-in type so that the spacing can be adjusted. Where these tie rods go through the concrete, they will be cut after curing to provide enough cover, the ends coated with epoxy, and then the concrete surface will be patched with approved material. However, tie rods will be fixed such that they do not pass through concrete as far as possible. For wall structures, the tie rods will be enclosed in PVC sleeves. In case of watertight structures, the tie rods will be provided with water stop nuts.
- Hanging slabs will be cast on laminated ply of 18mm resting on junior aluminum beams, which in turn will be resting on transversely placed senior joists. The senior joists will be supported by jack-type props.
- It will be ensured that the jack-type props are resting on a firm, rigid base.
- The design and construction of the form will be in accordance with ACI-347 and tolerances as per ACI-306.
- External corners of the structures above ground level will be formed with a 25mm chamfer.
- For vertical elements like walls, window openings will be provided to facilitate pre-pour cleanup, pouring in, and compacting, if required.
- Spacers will be used for vertical members.

7.1. Stripping of Forms

- Removal of forms will be done as per the guidelines of project specification without damaging the concrete surface.
- Forms for columns, walls, sides of beams, and other vertical beams not supporting the weight of concrete will be stripped only after 48 hours after placing concrete, if the concrete has sufficiently hardened. The concrete surface, which does not require a protective coating, will be coated with an approved curing compound simultaneously with the removal of the form.
- The vertical sides of beams, slabs, and other parts requiring support will not be removed until 48 hours after placing the concrete.

7.2. Quality Assurance for Formwork

- The formwork will be checked prior to each casting to ensure that the dimensions are as per the Approved for Construction (AFC) drawing.
- The position of every insert will be specifically checked before and after the form fabrication and fixing.

- On completion of formwork along with reinforcing bars and inserts, an Application for Inspection will be submitted to the Contractor's QC. The concreting will be carried out only after getting approval from the Contractor and witnessed by the Client, and all approvals shall be signed off by the Client in the relevant form.
- A tag will be marked with a red color cross once the form is inspected and passed by the Contractor's QC. Care will be taken that the concrete is not poured into forms without the red-cross mark. This is to ensure that the concrete is poured only after preparation of the form as per QC norms. However, tagging may be avoided in the case of minor items.

8. Reinforcement

The reinforcing steel conforming to ASTM-A615/A615M Grade 60 with a specified limitation of 422 Mpa will be used for all reinforcing work with certification from the supplier.

- Fusion bonded epoxy-coated rebar shall conform to [Relevant Specification Document, e.g., 09-SAMSS-106] and ASTM A775/A775M for below-grade level reinforced concrete. Epoxy-coated steel wires of 16 gauge or heavier will be used as tie wires (for below-grade reinforced concrete structures only).
- Welded wire fabric shall conform to [Relevant Standard, e.g., SASO SSA 224 or international equivalent such as ASTM A1064] (cold drawn) wire with a minimum yield strength of 240 MPa.

9. Handling and Stacking

Reinforcing steel will be handled with care so that no damage is caused to the epoxy coating thereon. The number of supports will be such that there is no sagging of the stacked bars.

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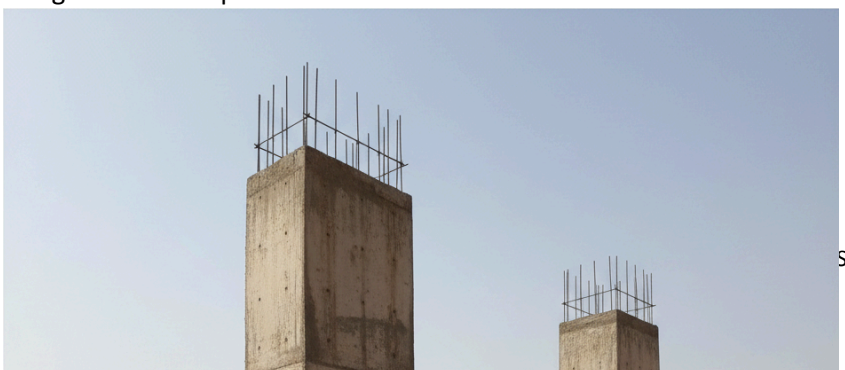
- The supports will be wrapped in polyethylene or other moisture-resistant material before stocking the rebar steel.
- The stacked rebar steel will be covered with tarpaulins or other means and protected from mud, mortar, oil, or anything else that causes damage to the epoxy coating.
- The standards as set out under project specifications will be adhered to for handling and storage of reinforcing materials.
- All visible damage to the epoxy coating, including that on binding wires, will be repaired with patching materials conforming to ASTM A775. This will be done using approved epoxy paint.
- A Bar Bending Schedule (BBS) shall be prepared based on AFC drawings and approved by the Client prior to fabrication.
- All reinforcement will be cold bent and not re-bent. The bending of rebar will be done at the bar bending shop only. Also, touch-up to damaged epoxy coating due to cutting the rebar or bending will be done at the bar bending shop only. Bending of rebar after placing will be avoided.
- Each bundle of bent bars will be tagged and identified by the drawing number, structure, mark number, bar size, and quantity.
- Reinforcement bars shall not be welded unless specifically shown in drawings or with specific approval from the Client.

10.Embedded Items

All embedded items will be fabricated or procured quite in advance prior to concreting and fixed in place using suitable templates.



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- Suitable templates will be designed for the positioning and fixing of the embedded items. Templates as supplied by the Contractor will be used in the case of foundations for large Skirt Mounted Vessels.
- The aptness, adequacy, and positioning will be checked by the supervisor before submitting an Application for Inspection to the Contractor's QC. The QC will check them in turn before forwarding this request to the Client's QC. This procedure ensures the correct embedded items are in the right place and in the right quantities.
- Where there are large numbers of embedded items, a checklist of embedded items will be prepared, and the same will be signed by the Supervisor and countersigned by the QC Engineer before submitting the Application For Inspection to the Client's QC department.
- In addition to the standard embedded items shown in the drawings, the Contractor may use additional items for purposes subject to approval from the Client, such as:
    - To hold the standard items in place without displacement before and during concreting.
    - To facilitate the handling of pre-cast concrete objects.
    - In order to achieve certain formations of the surface of the cast members.
- The Contractor will be informed of the schedule of major concreting in writing in an approved format.
- All welding, where applicable, will be carried out under the supervision of a Welding QC Inspector.
- When templates are used for the positioning of the inserts, they will be screwed onto the main body of the form or held in position by the supporting elements. In any case, rigid positioning of the template will be ensured.

11.Concreting

- Concreting will be carried out using the approved design mixes and as specified in the Approved for Construction (IFC) drawings. Concrete from approved sources will be used for all concreting works.
- The cement used in concrete will be as per project specification for all structures, foundations, and paving concrete unless otherwise mentioned on drawings.
- All rebar steel and forms will be cleaned using compressed air to remove debris and foreign materials before pouring. Concrete will be placed in accordance with ACI 301 & ACI 304R.
- It will be ensured that if the ambient temperature at the time of placing exceeds [e.g., 32°C or 90°F], concrete placement shall be in accordance with ACI 305R. The temperature of the fresh concrete shall be maintained between [e.g., 25°C and 30°C or 77°F and 86°F] unless otherwise noted in AFC drawings. If structural concrete temperature exceeds [e.g., 30°C or 86°F] at placement, it shall be rejected. In hot weather, concreting the forms and reinforcement will be cooled by fog misting with potable water immediately before concrete placing.
- The concrete pouring will be done within 90 minutes or 300 revolutions, whichever comes first from the batch time of the cement. For the purpose of this clause, the time of batching as marked on the delivery sheet will be considered.
- During hot weather, additional crew may be engaged to expedite finishing, etc.
- The concrete will then be poured into the mold form after ensuring that it is free of all foreign materials or debris, the inserts are in place, the re-bars are as per drawings, and all other QC requirements are complied with.

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The concrete surfaces shall be finished as per project specification and as specified in IFC drawings.

n thickness; each layer compacted separately before the next layer.

- At least two needle vibrators will be made available at the site, where one of them acts as a stand-by. The quantity may be increased according to the number of groups engaged & the volume of concrete to be poured.
- In case of mass pouring, uninterrupted concreting shall be done so that cold joints can be avoided. However, in case of slabs/paving, construction joints will be provided based on IFC drawings or pre-approved pour schemes.
- The concrete surface will be finished as per specification immediately after the initial setting time of concrete or two hours from placing, whichever is earlier.
- Control joints, if any, will be cut within 12 hours of placing concrete.
- All surfaces shall be finished as per project specification.

12.Testing of Concrete

An approved independent laboratory will be appointed to carry out tests on concrete as per the Client's requirements and relevant international standards.

- A sample of concrete for compression tests shall be taken each day concrete is poured for the project. The concrete shall be sampled, cured, and tested for compressive strength in

accordance with ASTM C31 and C39. There shall be four (4) test cylinders per sample. A sample shall be taken for each [e.g., 50M3] placed.

- A slump test will be conducted from each truck every day.
- The temperature of fresh concrete will be recorded in accordance with ASTM C1064 and ACI 301.
- Test Cylinders will be dated and numbered consecutively. Each cylinder of each set will be given an identifying tag. The tag will contain the following details:
  - The test cylinder number and tag number.
  - Grade of mix.
- Four (4) test cylinders shall be cured under standard moisture and temperature conditions in accordance with ASTM C31. One (1) sample shall be tested 3-days after concrete is poured. One (1) sample shall be tested 7-days after concrete is poured, and the other two (2) shall be tested 28-days after concrete is poured.

13.Curing and Protection of Concrete

The curing and protection of concrete will be done in accordance with ACI 301 and ACI 308. Concrete will be protected from premature drying, excessive heat or frost, and mechanical injury. It will be maintained

at a relatively constant temperature for a period during which the hydration of cement and hardening of concrete occurs. Water curing shall be continuous until the compressive strength has reached 70% of the specified strength, but not less than 7 days after placement.

- An exclusive crew will be engaged for carrying out the curing of concrete alone. Care will be taken to check the loss of moisture from concrete by adopting one of the following means:
  - Water Ponding or continuous water sprinkling at the top of footings and horizontal surfaces.
  - Covering with burlap at the top of the concrete bed and keeping it wet always.

14.Safety