TECHNICAL STANDARD (TS)

FORMWORK, CONCRETING AND MASONRY WORKS

Prepared by	Reviewed and verified by	Authorized by
M/s Chola MS Risk Services Bhanodaya V 09/02/2023	Arbind Sharma (Project Head - Infrastructure) Jose Numpeli (Project Head - Downstream) 22/02/2023 Samar Suri (Project Head - Upstream)	Santhosh Mundhada (Executive Director)

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1 PURPOSE

This procedure establishes the minimum safety requirements of Formwork, Concreting and Masonry work to prevent accidents.

2 SCOPE

This procedure shall apply to all AMNS project sites and related work areas including contractors to meet –

- Legal and regulatory requirements
- AMNS HSE requirements
- ISO 45001 and ISO 14001 standard requirements
- AMNS HSE Policy

3 DEFINITIONS

Formwork

A product or material or combination of built up structure that is positioned or constructed to receive the placement of concrete.

Concrete

Concrete is a construction material composed of cement, fine aggregates (sand) and coarse aggregates mixed with water along with some additives (If required) which hardens in time.

Masonry work

A structure built by binding individual materials together with mortar, a paste made of cement, water, and sand.

4 RESPONSIBILITIES

Project Head

The Project Head is responsible for ensuring that the project is in compliance with the safety requirements stated in this procedure.

Site Engineers/ Supervisors

To ensure that all provisions and requirements for controlling the risks are implemented including validation of the requirement of the permit to work.

HSE Manager

Provide advice on this standard, and oversight inspections to verify compliance.

5 FORMWORK, CONCRETE & MASONRY WORKS SAFETY

5.1 FORMWORK

HAZARDS

- Workers falling during steel fixing and the erection of formwork.
- Collapse of the formwork / falsework.
- Materials falling
- Silica dust from scrubbing operations.
- Manual handling of shutters, reinforcing bars
- Cement burns from wet cement.
- Arm and back strain for steel fixers

SAFETY MEASURES

- The formwork shall be designed, erected, supported, braced, and maintained so as to safely support all vertical/ lateral loads that may be imposed upon it during placement of concrete.
- The timber formwork shall be carefully inspected before use and members having cracks and excessive knots shall be discarded.
- The timber centering usually sinks when loaded with concrete, thus while designing, allowance for this factor shall be considered.
- The vertical supports must be sufficiently braced or secured in position so that they don't fail when the load is released, or the supports are accidentally hit.
- When timber centering and tubular steel is to be used in combination, necessary precautions must be taken to avoid any unequal settlement of shuttering under load.
- A thorough inspection of tubular steel centering must be carried out before its installation, and members showing evidence of excessive resting, dents, kinks, or damaged welds shall be removed.
- The buckled or broken members of the shuttering shall be replaced.
- The shuttering frames must be tied together with sufficient braces to make rigid struts, and diagonals braces should be installed in the proper position so that frames develop full load-carrying capacity.
- The use of rusted or spoiled threaded bolts and nuts shall be avoided.
- The stability of the props shall be assured by setting the sills firmly on the soil.
- Proper drainage shall be ensured to drain away water due to the washing of forms, rains, or during the curing of the concrete to avoid displacement in the supporting soil strata.
- All centering shall be inspected/checked to ensure that:

- All the footings or sills under every post of the centring are sound.
- All cross braces are correctly placed, and locking devices are in a closed and secure position.

- During the pouring of the concrete, the centering shall be continuously inspected and strengthened.
- Adequate protection for the shuttering shall be secured from moving vehicles or swinging loads.
- Destripping of forms shall not be allowed before the time specified in the relevant codes until it is certain that the concrete has developed sufficient strength to support itself and all loads that will be imposed on it.
- Only workers engaged in removing the formwork shall be allowed in the area during these operations.
- Those engaged in removing the formwork shall wear helmets, gloves, goggles, safety shoes and approved safety harness if working above 1.8m high.
- While cutting any tying wires in tension, care shall be taken to prevent backlash, which might hit a worker.
- Permit to work shall be obtained before starting the work.

5.2 CONCRETE WORK

Concrete works include a number of hazards from different types of activities and objects.

HAZARDS

- Dust from Cements
- Wet Concrete
- Chemicals properties
- Falling Objects
- Unguarded Machinery
- Electric shocks
- Improper Postures
- Suffocating Places
- Poorly Maintained Vehicles

SAFETY MEASURES

- The workers shall wear masks to avoid the inhalation of dust.
- Wash off the eyes with cold water in case dust goes in.
- Wear gloves to protect your hands from the effects of cement.
- Wear uniform that is appropriate for handling chemicals.
- Wear gloves that are chemical resistant.
- Wear goggles designed for handling chemicals / dust (as per the hazard)

- Wear full length pants and full-sleeve shirts.
- Wear waterproof and slip resistant boots.
- If chemical goes into the eyes, wash off with cold water for 20 minutes then immediately rush to the hospital.
- Workman shall not to work under elevators or conveyor belts and heavy machineries.
- While servicing machinery follow effective lockout and tag out procedures.
- Adopt manual material handling techniques while handling block makers, cutters, mixers, cage rollers and rebar benders.
- Wear electrical hazard protective boots while handling electrical devices.
- In order to avoid jamming, maintain the conveyor belt system properly.
- Properly lubricate all parts of the vehicles.
- Do not overload the cranes.
- Make sure the reverse horns are properly functioning.
- Do not touch hot parts of the machinery of the vehicles with bare hands.
- Use ear protection while cement loading which might affect the ear drum due to noise explosion.
- Train the workers properly in handling of loads. Intimate them about the correct postures and ways.
- Train the workers in proper handling of machinery with safety measures.
- Obtain work permit

5.3 MASONRY WORK

HAZARDS

- Silica dust (respirable silica) from cutting and mixing masonry products
- Flying debris from cutting and sawing block which can fly into a person's eye
- Heat illness from working outdoors without adequate shade and water
- Slips, trips, and falls from walking surface trip hazards
- Back strains from improperly lifting of material and equipment
- Cuts and abrasions from hand and power tool use
- Falls from scaffolds when installing masonry products above the first level
- Struck by incidents from falling tools and equipment from scaffolds
- Falls from step ladders
- Struck by from mobile equipment on the construction site

SAFETY MEASURES

- Ensure only trained and medically fit masons are deployed for the brickwork
- Ensure the adequate availability of Cut resistant hand gloves, goggles, Lifeline arrangements, and Safety harnesses for brickwork activity

- Ensure the stacking of bricks in rows & up to 5ft stacking height to avoid sliding/falling hazards and the bricks stacking area should be free from insects/snakes.
- Ensure work surfaces, passageways, and floors are clear of protruding nails, free wires, debris, and other potential hazards.
- Bricks should not be stacked more than 5 Nos in the working platform
- The brickwork shall not be more than ten courses a day to avoid the collapse of the wall which leads to a major injury.
- Supervision should be provided continuously throughout the activity
- Throwing bricks should be strictly prohibited
- Ensure the tools used for small concrete works in the bricks should be tied to the permanent structure.
- Ensure curing is done on regular basis to prevent falls on the wall
- Work permit shall be obtained

6 CHECKING, CORRECTIVE AND PREVENTIVE ACTION

Periodic inspections shall be carried out to assess the hazards as the work progresses. Any deviations shall be reported to Project Head & Corrective and preventive action shall be taken.

7 TRAINING AND COMMUNICATION REQUIREMENTS

- All personnel shall be given training on civil activity Hazard & Safety and precautions.
- Where chemicals are used, workmen shall be trained in safe handling of chemicals as per the procedure "AMNS-Project-TS-HSEM-15 - Management of Hazardous Substances".

8 REFERENCE DOCUMENTS

AMNS/Project/SS/HSEM/08	Hazard identification, risk assessment and control
AMNS/Project/TS/HSEM/13	PPE
AMNS/Project/TS/HSEM/11	Permit to Work
AMNS-Project-TS-HSEM-15	Management of Hazardous Substances
AMNS-Project-TS-HSEM-05	Manual Material Handling Safety