TECHNICAL STANDARD (TS)

PLANT & MACHINERY OPERATION SAFETY

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1 PURPOSE

This Procedure establishes the control measures required to reduce the risks associated with the plant and machinery operation.

2 SCOPE

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

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

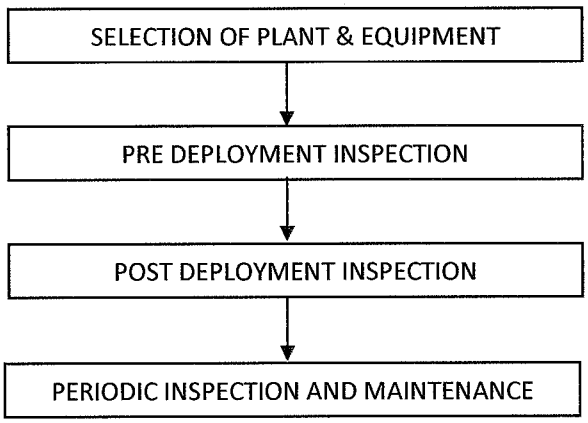
3 DEFINITIONS

Plant & Machinery: All equipment, machinery, appliances, power tools, tackles, of whatever nature required for the execution, completion or maintenance of the works or temporary work

4 RESPONSIBILITIES

- The Project Head is responsible for ensuring that the project is in compliance with the general requirements and those given in this procedure.
- HSE Manager is responsible for providing advice on this standard and oversight inspections to verify compliance.
- Maintenance department is responsible for developing and implementing a suitable preventive and reactive maintenance programme which ensures the plant and equipment is in a safe condition.
- Supervisor / engineer is responsible for ensuring that equipment inspections are carried out as required and that the workers comply with the safety requirements when operating the plant.

5 PLANT & MACHINERY – SAFETY ASSURANCE PROGRAMME



5.1. SELECTION OF PLANT AND MACHINERY

Prior to allowing a plant and machinery at AMNS site, the following should be taken into account:

- Suitability: Equipment selection must be suitable to the application and project site.
- Operations and maintenance safety: There should be access to all parts for doing maintenance activity.
- Experience and reputation of the equipment manufacturer in safe operation: This aspect examines the potential of sourcing partners for equipment.
- Impact on other building design elements (size, location, interference): Refers to as coordination, or developing a method of evaluating the coordination with mechanical, electrical and other system design and installation.
- Noise criteria (NC): This is a key aspect to be evaluated. Different scales for different frequencies of noise should be understood and evaluated, especially if equipment starts and stops routinely.
- Lifespan: Evaluating the requisite lifespan is an important aspect of equipment selection. This will help the avoidance of bringing into site the plants and machinery which has completed its life span.
- Environmental health attributes: This helps in the company's commitment to environment protection.
- Redundancy and failure-node risk: Evaluation to be done in areas where weakest-link scenarios arise. There may be value in robust equipment in areas where a failure could lead to difficulties in the facilities.
- Safety: This is an area every engineer must consider in equipment selection. What is safe to construct, operate, and maintain must be evaluated

5.2. PRE DEPLOYMENT INSPECTION

- Guarding of all dangerous parts / moving parts
- Provision of alarm systems where appropriate. For instance, to warn people of an imminent start-up where moving plant may endanger any person when plant is started and there is not a clear view of the plant from the control panel or operator's station;
- Release of hazardous substances – if any
- Noise and vibration levels to be in compliance with national standards.
- Provision of isolation of plant and machinery to protect personnel from hazardous energy before maintenance or repair.
- Ergonomically safe design of the plant and machinery
- There is appropriate space (suggested 600 mm, the minimum width of a walkway) for safe access to the plant for operation, cleaning, maintenance, inspection and emergency evacuation
- Emergency shut-down / off controls is easily accessible
- Ventilation requirements, must be appropriate to the nature and volume of emissions from the plant
- Refer document AMNS/SAFE/71/SOP for details on "Equipment Aging Norms".

5.2.1 INFORMATION TO BE PROVIDED ABOUT THE SAFE USE OF PLANT

Manufacturers / suppliers shall provide information about the way plant is to be used to ensure environment, health and safety risks can be managed. Information may take the form of written text or visual information such as signs, symbols or diagrams. Where visual information is provided, it shall conform to the relevant standard.

Information that shall be provided shall include but not be limited to:

- information relating to transport, handling and storage
- information relating to commissioning, installing, inspecting and testing
- the comprehensive range of uses for which the plant is intended, including prohibited usages;
- requirements for maintenance and repair;
- de-commissioning, dismantling and disposal of plant;
- information for emergency situations;
- effects of environmental conditions on the use of the plant;
- the results or documentation of tests and examinations carried out on the plant and design;
- any known residual risks (i.e. those that cannot be eliminated or appropriately reduced by design and against which guarding is not totally effective);
- recommendations, if available, on administrative control measures;
- requirements for isolation for maintenance and repair
- requirements for special tools needed to use or maintain plant;

- guidance, if required, on administrative control measures such as notices, signs and procedures; and
- Requirements for special tools required to use or maintain plant.

5.2.2 WARNING SIGNS AND REMINDERS

All plant and machinery must be fitted with relevant warning signs and reminders. These are intended to warn personnel of the inherent hazards (e.g. high noise, high temperature) and reminders of the safety rules (e.g. use machine guards). Warning signs may include flashing beacons or sirens to alert personnel to imminent danger such as shut-down or start-up.

The warning signs and reminders must be fixed in prominent places on the equipment or within the vicinity and must comply with the AMNS Project Procedure for Safety Signage.

5.3. POST DEPLOYMENT INSPECTION

The following checklists are to be followed by operators/site engineers / HSE representative on a daily/ weekly/ monthly basis:

1. Daily inspection of man lift checklist
2. Daily inspection of pick & carry checklist
3. Monthly welding machine inspection checklist
4. Monthly power tool inspection checklist
5. Monthly EOT crane checklist
6. Monthly gantry crane checklist
7. Daily crawler crane checklist
8. Daily tyre mounted crane checklist
9. Daily tower crane checklist
10. Daily winch machine checklist
11. Daily heavy mobile equipment inspection checklist
12. Electrical equipment checklist

5.4. MAINTENANCE

Maintenance includes maintaining, servicing and cleaning plant.

Respective plant and machinery owner is responsible for preparing a preventative maintenance schedule based on the plant manufacturer or supplier maintenance manual. This schedule shall include arrangements for maintenance, servicing and cleaning.

All personnel involved in maintenance of plant and equipment must be competent and briefed in the safe system of work to be followed.

Maintenance records for plant must be available for inspection for a period of not less than five years from the date of the maintenance, servicing or cleaning being carried out.

5.4.1 TESTING AND EXAMINATION

Testing and examination shall be done by the original equipment manufacturer or local government approved third party agency.

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

All employees affected by the requirements of this Procedure should attend relevant training. Training should cover the use of relevant plant, the risks associated with using the plant and the control measures put in place by the employer.

8 RECORDS

S. No.	Record Name	Maintained by	Retention period
01	Plant & Equipment Register	P&M Office	Until the completion of project
02	Maintenance Record	P&M Office	Until the completion of project
03	Inspection Record	HSE department	Until the completion of project
04	Training Records	HSE department	Until the completion of project

9 REFERENCE DOCUMENTS

Format No.	Standard Name
AMNS-Project-TS-HSEM-11	Lifting Operations safety Technical Standard
AMNS-Project-SS-HSEM-08	HIRAC Procedure
AMNS-Project-SS-HSEM-05	Training Awareness and Competence
AMNS-Project-SS-HSEM-12	Emergency Management Plan