OISD - GDN – 202(Draft-0)

For Restricted Circulation

Field Inspection of Drilling

&

Work-over Rig Mast, Substructure & Rig Equipment

(Second Edition-2014)

OIL INDUSTRY SAFETY DIRECTORATE

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Field Inspection of Drilling and Work-over Rig Mast, Substructure & Rig Equipment

Prepared by

Functional Committee
on
Field Inspection of Drilling and Work-over Rig Mast, Substructure & Rig Equipment

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Preamble

Indian petroleum industry is the energy lifeline of the nation and its continuous performance is essential for sovereignty and prosperity of the country. As the industry essentially deals with inherently inflammable substances throughout its value chain – upstream, midstream and downstream – Safety is of paramount importance to this industry as only safe performance at all times can ensure optimum ROI of these national assets and resources including sustainability.

While statutory organizations were in place all along to oversee safety aspects of Indian petroleum industry, Oil Industry Safety Directorate (OISD) was set up in 1986 by the Ministry of Petroleum and Natural Gas, Government of India as a knowledge centre for formulation of constantly updated world-scale standards for design, layout and operation of various equipment, facility and activities involved in this industry. Moreover, OISD was also given responsibility of monitoring implementation status of these standards through safety audits.

In more than 25 years of its existence, OISD has developed a rigorous, multi-layer, iterative and participative process of development of standards – starting with research by in-house experts and iterating through seeking & validating inputs from all stake-holders – operators, designers, national level knowledge authorities and public at large – with a feedback loop of constant updation based on ground level experience obtained through audits, incident analysis and environment scanning.

The participative process followed in standard formulation has resulted in excellent level of compliance by the industry culminating in a safer environment in the industry. OISD – except in the Upstream offshore Petroleum Sector – is still a regulatory (and not a statutory) body but that has not affected implementation of the OISD standards. It also goes to prove the old adage that self-regulation is the best regulation. The quality and relevance of OISD standards had been further endorsed by their adoption in various statutory Rules of the land.

Petroleum industry in India is significantly globalized at present in terms of technology content requiring its operation to keep pace with the relevant world level standards & practices. This matches the OISD philosophy of continuous improvement keeping pace with the global developments in its target environment. To this end, OISD keeps track of changes through participation as member in large number of International and national level Knowledge Organizations – both in the field of standard development and implementation & monitoring in addition to updation of internal knowledge base through continuous research and application surveillance, thereby ensuring that this OISD Standard, along with all other extant ones, remains relevant, updated and effective on a real time basis in the applicable areas.

Together we strive to achieve NIL incidents in the entire Petroleum and Natural Gas Sector. This, besides other issues, calls for total engagement from all levels of the stake holder organizations, which we, at OISD, fervently look forward to.

Jai Hind!!!

Executive Director

Oil Industry Safety Directorate

FOREWORD

The Oil Industry in India is more than 100 years old. Because of various collaboration agreements, a variety of international codes, standards and practices have been in vogue. Standardization in design philosophies and operating & maintenance practices at a national level was hardly in existence. This coupled with feed back from some serious accidents that occurred in the recent past in India and abroad, emphasized the need for the industry to review the existing state of art in designing, operating and maintaining oil and gas units.

With this in view, the Ministry of Petroleum and Natural Gas in 1986 constituted a Safety Council assisted by the Oil Industry Safety Directorate (OISD) staffed from within the industry in formulating and implementing a series of self regulatory measures aimed at removing obsolescence, standardising and upgrading the existing standards to ensure safe operations. Accordingly, OISD constituted a number of functional committees of experts nominated from the industry to draw up standards and guidelines on various subjects.

The present standard on **"Field Inspection of Drilling and Work-over Rig Mast, Substructure & Rig Equipment"** was prepared by the Functional Committee. The first edition of this standard titled "Inspection of Drilling and Workover Rig Mast/Substructure" has been completely revised besides addition of requirements of rig equipment other than mast/substructure. Accordingly, the standard has been renamed to reflect its coverage. This document is based on the accumulated knowledge and experience of industry members and the various national and international codes and practices.

This standard is meant to be used as supplement and not as a replacement for existing codes and practices.

It is hoped that provisions of this standard if implemented objectively, may go a long way to improve the safety and reduce accidents in Oil and Gas Industry. Users are cautioned that no standard can be a substitute for the judgement of responsible and experienced Drilling Engineers.

This standard in no way supersedes the statutory requirements of bodies like DGMS, PESO or any other Government Body which must be followed as applicable.

Suggestions are invited from the users after it is put into practice to improve the document further. Suggestions for amendments to this document should be addressed to the **Coordinator, Committee on Field Inspection of Drilling and Workover rig mast, substructure & rig equipment, Oil Industry Safety Directorate,8th Floor, OIDB Bhavan, Plot No. 2, Sector - 73 Noida – 201301 (U.P.)**

NOTE

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These documents are intended only to supplement and not to replace the prevailing statutory requirements.

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1.0 INTRODUCTION

The safe operation of the Drilling and Work-over rig largely depends on the fitness status of mast/derrick, sub-structure and rig equipment. In order to fulfill this condition, it is necessary to inspect the mast, sub-structure & equipment periodically at a defined interval so as to identify & correct the deficiencies/defects arising out of fatigue, wear and tear & other reasons.

Mast is subjected to compressive loading as the depth progresses. Besides this, mast is also subjected to tension with some lateral loading, shock loading and vibrations as a result of drilling / work-over operations. Due to this operation, mast is subjected to fatigue and may develop crack on the weld joints and heat affected zone of the parent metal of the mast. Environmental conditions also create corrosion problems on the members of the mast and sub-structure.

Mast is equipped with few other equipment / accessories like, crown block, travelling block & hook block, monkey board, dead line anchor, stabbing board, top-man escape device, various sizes of sheaves & electrical fittings for lighting. These also require to be inspected periodically along-with mast & sub-structure, for smooth operations.

In order to facilitate drilling or work-over operations, there are other rig equipment, which are required to be inspected periodically to ensure their fit for purpose status. These equipment are draw-works, power swivels, rotary-table, tubular Handling tools, mud handling equipment, air-compressors etc.

(Note: well control equipment, rig engines & electrical control systems' is not included under the scope of rig equipment inspection.)

(For inspection of 'Hoisting Equipment, pl. refer OISD-GDN-203, "Operation, Maintenance & Inspection of Hoisting equipment")

Field Inspection of Mast sub-structure & equipments is to be carried out in such a way that there is no damage to structure & equipment during inspection. As such, adoption of appropriate method of inspection is also important apart from its effectiveness in determining fitness for use.

Guidelines have been prepared keeping as a ready reference in field for the operating personnel.

2.0 SCOPE

Guidelines cover the Field Inspection of mast, sub-structure & rig equipment of Drilling and Work-over rigs deployed in onshore area.

3.0 DEFINITIONS

Cathead: A spool-shaped attachment on the end of the catshaft, around which rope for hoisting and moving heavy equipment on or near the rig floor is wound.

Centrifuge: A machine that uses centrifugal force to separate substances of varying densities. A centrifuge is capable of spinning substances at high speeds to obtain high centrifugal forces.

Crown block assembly: The stationery sheave or block assembly installed at top of a derrick or mast.

Derrick: A large load-bearing structure, usually of bolted construction. In drilling, the standard derrick has four legs standing at the corners of the substructure and reaching to the crown block. .

Design Load: That force or combination of forces which a structure is designed to withstand without exceeding the allowable stress in any member.

Draw-works: the hoisting mechanism on a drilling rig. It is essentially a large winch that spools off or takes in the drilling line and thus lowers or raises the drill stem and bit.

Deadline Anchor: A device, to which the deadline is attached, securely fastened to the mast or derrick substructure.

Desander and Desilter: Desanders and desilters are solid control equipment with a set of hydrocyclones that separate sand and silt from the drilling fluids in drilling rigs. Desanders are installed on top of the mud tank following the shale shaker and the degasser, but before the desilter. Desander removes the abrasive solids from the drilling fluids which cannot be removed by shakers. Normally the solids diameter for desander to be separated would be 45~74μm, and 15~44μm for desilter.

Degasser: Degasser is the equipment used to remove unwanted gas from a liquid, especially from drilling mud.

Erection Load: The load produced in the mast and its supporting structure during the raising and lowering operation and on the sub structure during its raising and lowering operation.

Finger board: a rack that supports the stands of pipe being stacked in the derrick or mast. It has several steel fingerlike projections that form a series of slots into which the derrickman can place a stand of drill pipe or collars after it is pulled out of the hole and removed from the drill string.

Guy line: A wire rope with one end attached to the derrick or mast assembly and the other end attached to a suitable anchor to provide structural and / or lateral support for a mast under design loading conditions.

Guy line anchor: A buried weight or anchor to which a guy line is attached

Height of derrick and mast: The minimum vertical distance from the top of the working floor to the bottom of the crown block support beams.

Hook load: the weight of the drill stem and associated components that are suspended from the hook.

Kelly: The heavy square or hexagonal steel member suspended from the swivel through the rotary table and connected to the topmost joint of drill pipe to turn the drill stem as the rotary table turns.

kelly spinner: A pneumatically operated device mounted on top of the kelly that, when actuated, causes the kelly to turn or spin.

Mast: a portable derrick that is capable of being raised as a unit, as distinguished from a standard derrick, which cannot be raised to a working position as a unit. For transporting by land, the mast can be divided into two or more sections to avoid excessive length extending from truck beds on the highway.

Maximum rated wind velocity: The maximum rated wind velocity is the wind velocity the derrick or the mast assembly is designed to resist against the force of the wind.

Monkey board: A platform located at a distance above the working floor for laterally supporting the upper end of racked pipe.

Mud Pump: A large, high-pressure reciprocating pump used to circulate the mud on a drilling rig. A typical mud pump is a two or three-cylinder pistons pump whose replaceable pistons travel in replaceable liners and are driven by a crankshaft actuated by an engine or a motor.

Mud Tanks: A mud tank is an open-top container, typically made of square steel tube & steel plate, to store drilling fluid on a drilling rig.

Mud Agitator: A Mud Agitator is used in surface mud systems to suspend solids and maintain homogeneous mixture throughout the system. A mechanical agitator is driven by an explosion-proof motor, coupled to a gear box that drives the impeller shaft. The impellers (turbines) transform mechanical power into fluid circulation or agitation. The objective is to obtain a uniform suspension of all solids.

Power Swivel: Power swivel is a device that moves with a travelling block and is designed to provide rotary power to the top of drilling string for drilling operation. It replaces the rotary swivel and includes rotary seal and bearing for supporting drill string weight.

Rated setback load: The maximum weight of tubular goods which can be supported by the substructure in the setback area.

Rig: the derrick or mast, drawworks, and attendant surface equipment of a drilling or workover unit

Rig down: To dismantle a drilling rig and auxiliary equipment following the completion of drilling operations.

Rig up: To prepare the drilling rig for making hole, for example, to install tools and machinery before drilling is started.

Rotary: The machine used to impart rotational power to the drill stem while permitting vertical movement of the pipe for rotary drilling. Modern rotary machines have a special component, the rotary or master bushing, to turn the kelly bushing, which permits vertical movement of the kelly while the stem is turning.

Rotary Hose: A reinforced, flexible tube on a rotary drilling rig that conducts the drilling fluid from the mud pump and stand pipe to the swivel and Kelly; also called the mud hose or the Kelly hose.

Shale Shaker: A series of trays with sieves that vibrate to remove cuttings from the circulating fluid in rotary drilling operations. The size of the openings in the sieve is carefully selected to match the size of the solids in the drilling fluid and the anticipated size of the cuttings.

Shale shakers are the primary solids separation tool on a rig. After returning to the surface of the well the used drilling fluid flows directly to the shale shakers where it begins to be processed. Once processed by the shale shakers the drilling fluid is deposited into the mud tanks where other solid control equipment begins to remove the finer solids from it. The solids removed by the shale shaker are discharged out of the discharge port into a separate holding tank where they await further treatment or disposal.

Stand Pipe: A vertical pipe rising along the side of the derrick or mast, which joins the discharge line leading from the mud pump to the rotary hose and through which mud is pumped going into the hole. It is a high pressure equipment of the drilling rig.

Substructure: The substructure is an assembly of heavy beams used to elevate the derrick and provide space to install blowout preventers, casing heads, and so forth.

Swivel: A rotary tool that is hung from the rotary hook and traveling block to suspend and permit free rotation of the drill stem. It also provides a connection for the rotary hose and a passageway for the flow of drilling fluid into the drill stem

Telescopic Mast: A portable mast that can be erected as a unit, usually by a tackle that hoists the wireline or by a hydraulic ram. The upper section of a telescoping mast is generally nested (telescoped) inside the lower section of the structure and raised to full height either by the wireline or by a hydraulic system.

Travelling Block: A traveling block is a sheaved pulley arrangement that moves up and down as it hangs in the derrick and is used to pull drill pipe, tubings and casing as well as to hold the power swivel for drill pipe turning.

Top drive : A device similar to a power swivel that is used in place of the rotary table to turn the drill stem

V-door: An opening at floor level in a side of a derrick or mast. The V-door is opposite to the drawworks and is used as an entry to bring in drill pipe, casing, and other tools from the pipe rack.

Workover rig : a portable rig used for working over a well

4. METHODS OF INSPECTION

4.1 Level I

This category involves primary checking of Mast, Sub-structure and rig equipment vide daily/weekly inspections.

For Mast & Sub-structure, visual inspection is generally carried out to determine the surface condition of the part, alignment of mating surfaces, shape or visible cracks. Visual inspection should include checks of the following points:

- Condition of the members where paints and corrosive protection coating has been lost.
- Damage to the members due to impact, dent, deformation etc.
- Corrosion/pitting on the members.
- Visible surface cracks in members.
- Visible cracks in weld.
- Loosened nuts and bolts (to be done weekly), in case of derrick structure.
- Check the areas of maximum stress.
- Ovality of bracket holes

Rig equipment shall be visually inspected daily for visual cracks, loose fittings / connections, elongation of parts and other signs of wear, corrosion or overloading, oil levels, abnormal sound, foundation bolts etc. Any equipment found to be having cracks, excessive wear etc., shall be removed from service for further detailed examination and repair.

Level I inspection include visual observation of the mast derrick, substructure and rig equipment by rig personnel during operations.

The equipment shall be visually inspected by a person having adequate knowledge & experience in operation and maintenance of the specific equipment.

4.2 Level II

In addition to Level I inspection of rig equipment further detailed inspection are carried out for locating corrosion / pitting , deformation, loose or missing components, deterioration, proper lubrication, visible external cracks, and misalignment.

In case of mast and structures, a thorough & intensive inspection of load bearing areas and sheaves for cracks, damage, corrosion, loose or missing components and premature wear is carried out. This detailed inspection should be performed during rig up operations.

A detailed checklist format for visual inspection of Mast, Substructure under level I & II is placed at **Annexure – I**. Similarly **Annexure-II** is placed for inspection for drilling & workover equipment. These checklists must be verified and signed by the 'Facility incharge' and records maintained at site for easy accessibility of inspecting agency. A detailed analysis of this report is necessary before taking up any repair / maintenance job. Also history of all accidents and damages including repair must be systematically maintained in equipment specific log book at site.

Personnel undertaking level II inspections should be individuals designated by the owner company who have adequate experience and knowledge of the equipment.

4.3 Level III

This Category includes NDT of critical areas. It may involve disassembly to access specific components and to identify wear that exceeds the manufacturer's allowable tolerances.

A thorough visual inspection of all load bearing components and members should be conducted to determine the condition of the rig equipment and documented on the checklist as applicable. Inspections on mobile (truck or trailer mounted) masts should include observation of rig up/rig down operations.

The person conducting the level III inspection must possess adequate knowledge and experience in the inspection criteria specified for level III inspections.

4.4 Level IV

In this category of inspection, the equipment is disassembled to the extent necessary to conduct NDT of all primary-load-carrying components in accordance with the O & M manual of OEM.

Equipment shall be:

- Disassembled in a suitably-equipped facility to the extent necessary to permit full inspection of all primary-load-carrying components and other components that are critical to the equipment;
- Inspected for excessive wear, cracks, flaws and deformations.

In case of mast and substructure, the equipment is to be disassembled and cleaned to the extent necessary to conduct NDT of all defined critical areas. An ultrasonic thickness test is recommended on all tubular style (or closed style) members to test for internal corrosion. Internal cameras, usually run on cable, may also be used to visually inspect for internal corrosion. MPI should be carried out to detect micro-cracks on welds. The level IV inspection should be conducted by or closely supervised by a Professional Engineer, Original Equipment Manufacturer (OEM) representative or other manufacturer of drilling structures authorized representative.

Level IV NDT inspectors would be required, as a minimum, to have certification as an ASNT Level II Technician, or the equivalent.

The owners shall verify that the NDT inspector has the following information:

- Assembly drawings and drawings identifying critical areas
- Rejection criteria.

Personnel performing level IV visual inspection of welds shall be qualified and certified as follows:

- AWS certified welding inspector or equivalent, or:
- An engineer or technician who, by training or experience, or both, in metals fabrication, inspection, and testing, is qualified to perform inspection of the work.

During level IV inspections:

- All welds should be visually examined.
- All welds in critical areas should be inspected using magnetic particle (MPI) or liquid penetrant (PT) method in accordance with Section 6 of AWS D1.1. An alternative is to utilize ultrasonic testing.
- Welds on galvanized structures may require different inspection techniques and intervals. Cracks are generally identified through visual inspection on a galvanized mast / derrick.
- The existence of cracks can indicate severe deterioration and impending failure. Their detection, identification and evaluation require accurate inspection methods.
- Prompt attention is then required to remove the equipment from service immediately or to provide appropriate service and/or repair.

5. FREQUENCY OF INSPECTION

5.1 For mast and substructure:

Level I-daily & weekly

Level II- rig up (As per Annexure-I)

Level III- Every 2 years

Level IV- Every 10 years

The above-recommended frequencies apply for equipment in use during the specified period. In corrosive environments (humidity, salt, H2S, etc.) an increase in the inspection frequency should be considered. This would include checking for internal corrosion on tubular style members on a more expedited schedule.

Following an exposure to temperatures exceeding 500 degree F, the affected areas of the structure should be inspected for distortion. Exposure to heat, above the critical temperature of the grade of steel, warrants further examination of the affected area by a qualified person.

The organization/owner or user of the equipment should develop his own schedule of inspections based on experience, manufacturer's recommendations, and consideration of one or more of the following factors: environment; load cycles; regulatory requirements; operating time; testing; repairs; remanufacture.

As an alternative the owner or user may use Table 1.

5.2 For rig equipment/accessories:

Periodic inspection & maintenance frequencies
Table 1

Equipment	Daily	Weekly	Six Monthly	Yearly	Five Yearly
Crown block sheaves & bearings		√	√		√
Drilling hooks	√	√	√		√
Travelling blocks, hook block & block to hook adapter	√	√	√		√
Tubing hooks & sucker rod hooks	√	√	√	√	√
Elevator links	√	√	√	√	√
Casing elevators, tubing elevators, drill-pipe & drill-collar elevators	√	√	√	√	√
Drill pipe spinner, Casing spinner	√	√	√	√	√
Casing slips, tubing slips, drill-pipe & drill-collar slips	√	√	√	√	√
Power tongs	√	√	√	√	√
Kelly	√	√	√	√	√
Sucker-rod elevators	√	√	√	√	√
Rotary swivel-bail adapters	√	√	√	√	√
Rotary swivels	√	√	√	√	√
Rotary Hose	√	√	√	√	√
Power swivels	√	√	√	√	√
Dead-line anchors	√	√	√	√	√
Drill-string motion compensators		√	√	√	√
Kelly spinners	√	√	√	√	√
Safety clamps, if capable of being used as hoisting equipment	√	√	√	√	√
Draw works	√	√	√	√	√
Rotary table	√	√	√	√	√

Mud Pump	√	√	√	√	√
Shale shakers	√	√	√	√	√
Desander	√	√	√	√	√
Desilter	√	√	√	√	√
Degasser	√	√	√	√	√
Mud tanks	√	√	√	√	√
Air compressor	√	√	√	√	√
Top drive assembly	√	√	√	√	√
Air Winch	√	√	√	√	√

A complete, on-job, shut-down inspection equivalent to the periodical Level III or Level IV (for the concerned equipment) should be made before (if anticipated) and after critical jobs (e.g., running heavy casing strings, jarring, pulling on stuck pipes and/or operating at extreme low temperatures).

Inspection and maintenance (lubrication) of wire rope used in hoisting shall be carried out on a regular basis. API RP 9B & OISD-STD-187 may be consulted for further information on inspection and maintenance of wire rope.

5.3 RESULT OF INSPECTION / CORRECTIVE ACTION

Any damage found during the inspection is defined as MAJOR, SECONDARY, or MINOR, on the following basis:

- Major Damage - Significant geometrical distortion or structural damage to primary load carrying components including raising assembly, main legs, hinge points and crown.
- Secondary Damage - Damage or distortion to non-primary load carrying components.
- Minor Damage - Damage or distortion to ancillary equipment, i.e., ladders, monkey board, walk-ways, tong hangers, etc.

Repairs shall be made in accordance with the manufacturer's recommendations.

Structural repair of a drilling or well servicing structure should be carefully planned prior to initiating work. The manufacturer should be consulted for approval of materials and methods. In absence of the manufacturer's approval, the services of a qualified person utilizing accepted engineering practices should be employed to supervise the required repairs.

The following recommendations should be followed when undertaking structural repairs of a drilling or well servicing structure:

- Repair or replace any damaged members of Mast/Substructure in accordance with OEM.
- Use welding procedures approved by the manufacturer or the qualified person directing the repairs or modifications.
- Drilling and well servicing structures may use high-strength steel, which require specific welding electrodes and welding techniques.

- Fixtures and accessories are preferably attached to structures by means of suitable clamps or bolted foundations.
- Do not drill or burn any holes in any members or perform any welding without first obtaining approval of the manufacturer or the qualified person, as applicable.
- Girts, braces, and other members should always be in place when the structure is under load.
- Replacement materials, pins, and bolts should meet OEM specifications or equivalent. Following remanufacture, verification shall be performed.

5.4 ACCEPTANCE CRITERIA

Acceptance criteria should be established based on experience and 'Original Equipment Manufacturer's recommendations. Worn equipment that does not meet the acceptance criteria should not be accepted for operation. For more details on acceptance criteria of mast/derrick and substructure refer API RP 4G.

Performance load test

A performance load test may be used to verify the function of the equipment and/or its ability to perform under specific conditions or in conjunction with other equipment or materials (for instance, it may be used to determine the effects of gripping a specific pipe with a given elevator). A performance test may consist of any number of cycles (as needed) of loads up to, but not exceeding, the rated load of the equipment under test.

Proof load test

A proof load test is performed by applying a load equal to 1.5 times the rated load of the equipment for a period of not less than 5 min. Proof load tests should not consist of more than one cycle and shall not be used in lieu of performance load tests. Hoisting equipment should be proof load tested only once following manufacture or remanufacture, since loads above the rated load may cause cumulative (fatigue) damage. A proof load test shall be followed by surface NDT, if required, based on visual inspection.

Corrosion

As a guideline, corrosion damage reducing the cross-sectional area of member by more than 10% (or percentage measured tolerance based on manufacturer's recommendation) should be considered for repair. Corroded areas should be abrasive blasted or mechanically cleaned to sound metal, evaluated and repaired by one of the following methods:

- Fill pockets/cavities with weld metal and grind flush.
- Fish plate the damaged region and seal weld.
- Remove the damaged area and re-plate.
- Replace the entire member.
- Following repair, the entire area should be recoated.

REJECTED EQUIPMENT

Rejected equipment shall be marked and removed from service.

EQUIPMENT IDENTIFICATION

Unit serial number or identification marking provided by the manufacturer should be maintained on the equipment. Identification marking shall be provided by the equipment owner for unidentified equipment. Serial numbers or identification marking shall be recorded in the equipment file.

6.0 DAILY/WEEKLY INSPECTION OF EQUIPMENT/ACCESORIES OF MAST & SUBSTRUCTURE

6.1 Deadline Anchor:

a) To check wear of bronze wire line clamp inserts to secure cable grip without line damage.
b) To check wear of the grooves on the anchor drum.
c) To check the foundation bolts of the anchor with sub base.
d) To check deflection of Dead end sheave on load.

6.2 Monkey Board:

a) Check for any damage in frame, fingers, cracks in welds, walkway platforms & railings.
b) Check for any missing safety pins and pin connections.

6.3 Stabbing Board:

a) Check for the movement of rail, cracks in welds.
b) Check for any missing safety pins and pin connections.

6.4 Top-Man Escape Device:

a) The track rope and haulage rope should be regularly cleaned and made free from any dust & rust
b) There should be no kink on any rope
c) The entire unit's pullies should be oiled and freely rotating.
d) The strands of the rope should not be damaged.
e) The turn buckles should be without damage and free from dust.
f) Also check whether the sheave rollers are free from dust rust and are rotating freely.
g) Check tension on haulage rope
h) A competent person should inspect every part of the escape device at least every day.
i) The anchor at the ground should not be less than 45 mtrs. from the derrick / base of mast or equal to height of the mast from ground level , whichever is more.
j) Check the rotation of centrifugal brake when it is on the ground.
k) The centrifugal brake should be re-calibrated.

6.5 All sheaves:

a) Check grooves of all the sheaves attached with the mast.

b) Check for the bearing, bushing for any wear and tear.

6.6 Pins:

Check for any crack. Cotter locks in all pins shall be ensured.

6.7 Inspection of Electrical Accessories of Mast

- **Electrical Lighting:**

Daily checks: Ensure that adequate lighting arrangement are available at derrick floor, driller's console, Monkey board, dog house, BOP control, Cat walk, every place where persons are to work and every access/ escapes. Mast aviation light should be in working condition.

- **Earthing:**

a) Weekly Check: Ensure that Equipment / mast are double earthed with appropriate G.I. strip / stranded flexible conductor.

b) Maintenance of earthing pit and its resistance measurement done at each new location during rig up and after a period of 6 months whichever is earlier.

- **Cable Connection:**

Following points need to be checked during rig building and or quarterly basis for its effectiveness:

a) Cables are laid down in the cable trenches as per IS 1255.
b) Cable connections have been provided with double compression glands in hazardous location.
c) Receptacles and plugs are in good condition.
d) Insulation of cable is in good condition.
e) Flame proof features (FLP) / increased safety features (as per zone classification) of junction boxes, lighting and cable connection viz. Air gap, glands etc are maintained in hazardous zones. For detailed requirements, refer OISD-STD-216.

7.0 CHECK LIST FORMATS

Check list format to be used in visual field inspection of mast and sub- structure is attached herewith at **Annexure – I.**

Check list format to be used under level I & II field inspection for drilling & work over equipment is attached herewith at **Annexure-II**.

8.0 REFERENCES

1. API Standards 4A,4G,4D,4E & 4F
2. API-RP-8B, 9B
3. OISD-GDN-203
4. OISD-STD-216
5. IS 1255
6. OISD-STD-187

9.0 ANNEXURES

9.1 Annexure I

CHECK LIST OF VISUAL FIELD INSPECTION OF MAST & SUB- STRUCTURE

(Level II – rig up)

RIG NAME: _____ RIG NO. _____

LOCATION _____ DATE _____

MAST/DERRICK
IDENTIFICATION NO. _____ SR. NO. _____

YEAR OF MANUFACTURE_____

RIG STANDING _____

INSPECTED BY _____

_____

ACTIVE SERVICE YEARS_____

DATE OF LAST INSPECTION_____

CUMULATIVE METERAGE DRILLED_____

A) MAST/DERRICK:

I Crown Assembly

a) Sheaves

NO. _____ MAIN CLUSTER SHEAVE SIZE_____FAST LINE SHEAVE SIZE_____

b) Condition

1. SHEAVES: WARPED_____OK_____
   GROOVE: WORN_____ OK_____

2. SPACERS OR SEALS: BAD_____OK_____
   GREASE FITTING: MISSING_____ OK_____

3. BEARINGS: LOOSE_____ BAD_____OK_____

7. CROWN SAFETY PLATFORM: MINOR DAMAGE _____BADLY DAMAGED_____
   WELD CRACKS _____OK_____

8. CROWN HANDRAILS: MINOR DAMAGE _____BADLY DAMAGED_____
   WELD CRACKS _____OK_____

6. CROWN FRAME: BENT BEAM FLANGES _____
BEAM WEBS BENT_____CRACKED WELDS_____
LOCATION_____OK_____
7. COMMENT: RUSTY_____ NEEDS REPAIR_____
NEEDS PAINTING_____ OTHER_____ OK_____

II Additional Sheave Assemblies:

NAME_____OK_____
NUMBER OF VISIBLE MARKS APPLIED_____

III Crown Support Beams

BEAM FLANGES BENT_____

BEAM WEBS BENT_____

CRACKED WELDS_____OK_____

NEEDS REPAIR_____

NUMBER OF VISIBLE MARKS APPLIED_____

IV Legs

a) The following points are to be checked at Front Leg off Drillers Side, Front Leg on Drillers Side, Rear Leg Drillers Side, Rear Leg Off Drillers Side

BEND within Limit_____BEND Exceeding limit_____
NEEDS REPAIR_____OK_____
PIN CONNECTION: BAD_____OK_____
PIN HOLE: BAD_____ OK_____
CRACKED WELDS_____ OK_____
SAFETY PINS: MISSING_____ OK_____

V. Spreaders (Back Panel trusses)

DAMAGE within limit_____DAMAGE exceeding limit_____OK_____
CRACKED WELDS _____
NEEDS REPAIR_____OK_____
BOLT AND PIN: IMPROPER LENGTH_____OK_____
SAFETY PINS: MISSING_____ OK_____
BOLT AND PIN HOLES: OVAL_____OK_____

VI. Girts and Bracing (diagonal braces)

BENT_____ OK_____
NUMBER BENT: SLIGHT_____ NOS. BADLY_____NOS._____
CRACKED WELDS _____
NEEDS REPAIR_____OK_____
NO OF VISIBLE MARKS APPLIED_____

VII. Feet or Pivots (Mast lugs)

DAMAGED_____
CRACKED WELDS _____
CORRODED_____
WORN HOLES_____WORN PINS_____
NEEDS REPAIRS_____

VIII. A- **Frame**

a) LEGS: DAMAGED MEMBERS _____
CRACKED WELDS_____OK_____
b) SPREADERS OR TRUSSES: DAMAGED MEMBERS_____
CRACKED WELDS_____OK_____
c)UPPER CONNECTIONS: DAMAGED _____
CRACKED WELDS_____OK_____
d)LOWER CONNECTIONS:

CORRODED_____OK_____
PIN CONNECTION: LOOSE_____ OK_____
PINHOLE: WORN_____ OK_____
SAFETY PINS: MISSING_____OK_____

IX. WORKING PLATFORM

a) RACKING PLATFORM:
FRAME: DAMAGED_____OK_____
CRACKED WELDS _____OK_____
PIN CONNECTION : WORN_____OK_____
SAFETY PINS: MISSING_____OK_____
FINGERS : DAMAGED_____OK_____
NEEDS REPAIR_____OK_____

b) RACKING HANDLERS :

FRAME : DAMAGED_____OK_____
FINGERS : DAMAGED_____ OK_____
BASKET : DAMAGED_____OK_____
CRACKED WELDS _____OK_____

c)WORKING PLATFORM DAMAGED_____OK_____
CRACKED WELDS_____OK_____

TUBING SUPPORT FRAME : DAMAGED_____OK_____
CONNECTIONS: DAMAGE_____OK_____
CRACKED WELDS _____OK_____

HAND RAILS:
DAMAGES:MINOR_____MAJOR_____OK_____
CRACKED WELDS _____OK_____
CONNECTIONS: NEED REPAIRS_____OK_____

X. LADDERS

CRACKED WELDS _____BAD RUNGS_____
BAD CONNECTIONS_____OK_____
DAMAGES: MINOR_____MAJOR_____

XI. RAISING AND TELESCOPING SYSTEM:

WIRELINE SYSTEM REFER TO API 4E FOR SPECIFICATIONS

a) WIRE LINE : FRAYED _____KINKED _____
CORRODED_____OK_____

b) CABLE CLAMPS:LOOSE_____OK_____
NO. OF CLAMPS PROPERLY INSTALLED _____

c) SHEAVES AND MOUNTINGS : DAMAGED_____OK_____

d) EQUALISER ASSY. : DAMAGED _____OK_____

e) SOCKETS AND PINS : DAMAGED_____OK_____

HYDRAULIC SYSTEM:

1. HYDRAULIC CYLINDERS:
i) RAISING : LEAKING_____OK_____
EXPOSED SURFACE_____OK_____
CORRODED_____OK_____
ii) SCOPING : LEAKING_____OK_____
EXPOSED SURFACE _____OK_____
CORRODED_____OK_____

2. CONNECTIONS : LEAKING_____OK_____
3. HOSES & HOSE END FITTING :
EXPOSED WIRE _____CORRODED_____OK_____
DAMAGED_____ OK_____
4. PIN HOLES: OVAL_____OK_____

5. SCOPING CYLINDER STABILIZERS:
BENT_____OK_____
LUBRICATION_____OK_____

MAST GUIDES :

CLEANED AND LUBRICATED _____OK_____
NEEDS ATTENTION_____ OK_____

XII. LOCKING DEVICES & SEATS - TELESCOPING MASTS

a) PINS, BARS OR PAWLS : DAMAGED_____ OK_____
b) SEATS : DEFORMED _____OK_____
c) MECHANISM : DAMAGED_____OK_____
d) NEEDS CLEANING & LUBRICATION_____OK_____

XIII. GUYLINES ANCHORAGE:

a) GUY LINE : DAMAGED_____
b) NEEDS ADJUSTING _____
c) NEEDS REPLACING_____OK_____

d) CABLE CLAMPS : LOOSE_____OK_____
e) PROPERLY INSTALLED_____
f) SOME MISSING_____OK_____

PINS AND SAFETY PINS: MISSING_____ OK_____

TURNBUCKLES : LOCKED /DAMAGED / REPLACE_____OK_____

ANCHOR & DEADEND: REPLACE_____OK_____

XIV. BOLTED STRUCTURES:

a) ALL BOLTED CONNECTIONS ARE TO BE INSPECTED , TIGHTENED , AND MISSING PARTS REPLACED OR VISIBLY MARKED AS MISSING OR DAMAGED AND IN NEED OF REPAIR.

b) ALL BOLTED CONNECTIONS FOUND TO BE SATISFACTOY AS CHECKED AND LOOSE BOLTS TIGHTENED

c)ALL BOLTED CONNECTIONS VISUALLY INSPECTED AND SPOTCHECKED FOR TIGHTNESS AND NO FURTHER BOLT TIGHTENING OR REPAIRS NECESSARY.

XV. SUMMARY OF INSPECTION OF DERRICK & MAST

a) WAS MANUFACTURER'S ASSY. DRAWING USED: YES/NO
b) APPEARANCE : GOOD _____ FAIR_____ POOR_____
c) REPAIRS NEED : NONE _____ MINOR_____ MAJOR_____
d) NUMBER OF MISSING PARTS_____

A) SUBSTRUCTURE & VERTICAL EXTENSION

(a) SHOES, PEDESTALS OR PIVOTS: DAMAGED_____OK_____
HOLES: WORN_____OK_____
BOLTS: NEED REPLACING_____OK_____
PINS: WORN_____OK_____
SAFETY PINS: MISSING_____OK_____
SUPPORT BEAMS: DAMAGED_____
CORRODED:_____OK_____

(b) FLOORING
DAMAGES: MINOR_____ MAJOR_____OK_____

(c) SUBSTRUCTURES FOR DERRICK OR MAST & SUB-SPREADERS & ROTARY BEAMS :
DAMAGES: MINOR_____MAJOR_____OK_____
CORROSION: MINOR_____MAJOR_____OK_____
CONNECTIONS: WORN_____

CRACKED WELDS_____
SAFETY PINS: MISSING_____ OK_____

d) ENGINE FOUNDATION SPREADERS :

DAMAGES: MINOR_____MAJOR_____OK_____
CORROSION: MINOR_____MAJOR_____OK_____
CONNECTIONS WORN_____
CRACKED WELDS_____OK_____
SAFETY PINS: MISSING_____OK_____

e) STAIRWAYS, LANDINGS & HANDRAILS

DAMAGES: MINOR_____ MAJOR_____ OK_____

f) HOLD DOWN AND ANCHORING CONNECTIONS :

BOLTS TIGHT_____BOLTS MISSING_____
DAMAGED_____
NEEDS REPAIRING_____OK_____

g) FOUNDATION:

ADEQUATE : YES_____NO_____WHY_____

h) SUMMARY OF INSPECTION OF SUBSTRUCTURE & VERTICAL EXTENTION

APPEARANCE: GOOD_____FAIR_____POOR_____
REPAIR NEEDED: NONE_____MINOR_____MAJOR_____
WAS MANUFACTURE'S ASSEMBLY DRAWING USED? YES_____NO_____
NUMBER OF MISSING PARTS_____

LOCALISED CLEANING DONE: _____
SAND BLASTING DONE:_____
NDT DONE :(MPI/UT) _____
HORIZONTAL MEMBER:
SLIGHT DAMAGE _____; BADLY DAMAGED _____;
CRACKED WELDS _____; NEED REPAIR _____;

VERTICAL MEMBER:
SLIGHT DAMAGE _____; BADLY DAMAGED _____;
CRACKED WELDS _____; NEED REPAIR _____;

DIAGONAL MEMBER:
SLIGHT DAMAGE _____; BADLY DAMAGED _____;
CRACKED WELDS _____; NEED REPAIR _____;

FEET:
DAMAGED _____; CRACKED WELDS _____;
CORRODED _____ ; WORN HOLES _____ ;
WORN PINS _____; NEED REPAIR _____ ;

B) SUBSTRUCTURE FOR MAST :

PRIMARY LOAD BEARING MEMBER:
SLIGHT DAMAGE _____; BADLY DAMAGED _____;
CRACKED WELDS _____; NEED REPAIR _____;
NEED REPLACEMENT _____;

SECONDARY LOAD BEARING MEMBER:
SLIGHT DAMAGE _____; BADLY DAMAGED _____;
CRACKED WELDS _____; NEED REPAIR _____;
NEED REPLACEMENT _____;

ANY OTHER MEMBER(INCLUDING DIAGONAL):
SLIGHT DAMAGE _____; BADLY DAMAGED _____;
CRACKED WELDS _____; NEED REPAIR _____;
NEED REPLACEMENT _____;

FLOORING:
DAMAGES: MINOR_____; MAJOR _____;
REPAIR NEEDED_____; REPLACEMENT NEEDED _____;
CORROSION: MINOR_____ ; MAJOR _____; NONE _____ ;

PAINTING DONE:
YES _____. NO _____. APPEARANCE _____

ELECTRICAL LIGHTING

ADEQUATE GENERAL LIGHTING ARRANGEMENTS AVAILABLE DURING THE WORKING HOURS AT :

A)DERRICK FLOOR	YES	NO
B)MONKEY BOARD	YES	NO
C)DRILLER'S END	YES	NO
D)DOG HOUSE	YES	NO
E)BOP CONTROL	YES	NO
F)CAT WALK	YES	NO
G)EVERY PLACE WHERE PERSONS ARE TO WORK	YES	NO
H)EVERY PLACE OF ESCAPE/ACCESS	YES	NO

- LIGHTING PROVIDED AT THE MAST /SUB STRUCTURE IS SO ARRANGED THAT IT DOES NOT CAUSE ANY GLARE OR EYE STRAIN. YES NO
- LIGHTING PROVIDED AT MAST / SUB STRUCTURE IS OF INCREASED SAFETY TYPE AS PER ZONE 2 REQUIREMENT OF OMR YES NO
- PROPER CARE HAS BEEN TAKEN WHILE FITMENT OF LIGHTING APPARATUS TO AVOID ACCIDENTAL DAMAGE YES NO
- ADEQUATE WIRE GUARDS ARE PLACED OVER THE TOUGHENED GLASS. YES NO
- AVIATION LIGHT OF INTERMITTENT TYPE IS FITTED AT TOP YES NO

OF THE MAST.

- EMERGENCY/SAFETY TORCH IS AVAILABLE AND PROPERLY MAINTAINED. YES NO
- LIGHTING VOLTAGE PHASE TO PHASE IS O.K. (215V) YES NO

EARTHING

- EQUIPMENT / MAST ARE DOUBLE EARTHED WITH APPROPRIATE GI STRIP. YES NO
- MAINTENANCE OF EARTHING PIT AND ITS RESISTANCE MEASUREMENT DONE AT EACH NEW LOCATION DURING DURING RIG BUILDING / SIX MONTHLY. YES NO

CABLE CONNECTIONS

- CABLES ARE LAID DOWN IN THE CABLE TRENCHES AS PER CODE OF PRACTICES I.E.BIS-255A YES NO
- CABLE CONNECTIONS HAVE BEEN PROVIDED WITH DOUBLE COMPRESSION GLANDS. YES NO
- RECEPTACLES AND PLUGS ARE IN GOOD CONDITION. YES NO
- INSULATION IS REGULARLY CHECKED AT THE NEW LOCATION DURING RIG BUILDING AND SUBSEQUENTLY . YES NO
- FLP /INCREASED SAFETY FEATURES(AS PER ZONE CLASSIFICATION)OF JUNCTION BOXES ,LIGHTING AND CABLE CONNECTION VIZ. AIR GAP, GLANDS ETC ARE MAINTAINED IN HAZARDOUS ZONES. YES NO

REMARKS : _____

*Reproduced from API Recommended Practice 4G.

9.2 Annexure II

FIELD INSPECTION CHECK LIST OF RIG EQUIPMENTS

1. DERRICK FLOOR AREA & DRAW WORKS

SL NO	CONDITION	STATUS	
		OK	NEED ATTENTION(DETAILS)
1	Rotary floor in good condition (no slippery space, no openings, railings in place)		
2	Rotary chain drive guarded		
3	Calibrated Weight indicator installed		
4	Weight indicator visible to brake operator		
5	Operator's draw works controls properly labeled/identified		
6	Pipe slips & Dies in good condition & secured.		
7	Racking floor area in good condition		
8	V-door barrier provided, in good condition and properly used.		
9	Air/Hydraulic hoist line in good condition □ near driller □ opposite driller		
10	Air/Hydraulic hoist line guide in operating condition □ near driller □ opposite driller		
11	Air/Hydraulic hoist line properly layed/wound on drum □ near driller □ opposite driller		
12	Air/Hydraulic hoist line properly guarded □ near driller □ opposite driller		
13	Are cathead & cat line including brakes in good condition.		
14	Kelly cock wrench and safety valve accessible		
15	Spinning chain in good condition		

16	Twin stop device installed and operational		
17	Drawworks drill line in good condition		
18	Drawworks emergency stop switches installed & in working condition.		
19	Drawworks guard installed & secured with all bolts.		
20	Sufficient wraps left on drum with blocks in down position		
21	Proper lay of drill line on reel		
22	Drawworks drum brakes in good condition		
23	Drawworks secondary brakes in good condition		
24	Deadline anchor & its retainer in good condition		
25	Drawworks brake linkage in good condition (no loose/missing parts)		
26	Clutch in good condition		
27	Adequate lighting (illumination level) provided		
28	Appropriate lighting installed (as per area classification)		
29	Minimum two exits from drill floor doghouse		

2. POWER, HAND TOOLS & TUBULARS HANDLING EQUIPMENTS

S.No.	Condition	STATUS	
		OK	NEED ATTENTION(DETAILS)
1	Makeup and breakout tongs in good condition		

2	Tong pull & restraining lines including clamps in good condition and installed properly		
3	Tong hanging line including clamps in good condition and installed properly as per OISD STD 187		
4	Tong counterweights installed		
5	Tong counterweights operational		
6	Tong body & jaws in good condition		
7	Tong safety handle pins secured		
8	Tong dies in good condition & secured		
9	Tongs securely fastened to a suitable fixed structure using a wire rope or a stiff arm		
10	Hand tools are inspected and in good condition & properly stored		
11	“Iron Roughneck” (if used) inspected and in good condition & properly secured.		
12	Any leak observed in hydraulic system		
13	Electric hand tools double insulated or grounded		
14	Electrical extension cords properly insulated		
15	Plugs of electrical extension cords in good condition		
16	“Emergency” switch installed on all Electric and Pneumatic tools		
17	Celebrated torque gauge in use		
18	Verify for proper sized tubular slip available (Drill pipe/casings/tubings etc)		
19	General condition of slip: clean & well lubricated		

20	Any cracks, dings or deformation observed in the slip.		
21	Check for loose or worn hinge, dies & handle pins		
22	Visually inspect elevators: Check ears, pins, bore, latch and latch lug for cracks or excessive wear and proper operation of elevators		
23	Condition of the air/hydraulic hoses		
24	Safety chains at both ends		
25	Wear, aging and chafing in hoses and couplings		
26	Control lever back to neutral automatically, when control are released		
27	Check control lever and linkages for wear and free movement		
28	Spring hanger or lifting cylinder fitted with a safety sling		
29	Function test unit in forward and reverse and verify proper operation		
30	Inspect condition of kelly flat and roller contact interface over full length of kelly.		
31	Any cracks in junction between upsets and drive sections?		
32	Check width of wear pattern on contact angles for excessive wear or rounding.		
33	Check the Kelly drive bushings have become oval shaped due to wear or not.		
34	Check if the Kelly drive bushing holes have become egg shaped due to wear		
35	Check if an arrow and L for lock on the master bushing and an arrow on the locking pin for locking the insert bowls in the master bushings has been welded on		
36	Check that split casing bushing have a minimum length of 17” to avoid from falling through the rotary table		
37	Check the rotary table for excessive wear		
38	Test rotary hose and swivel packing to MWP.		
39	Confirm all the hoses properly bundled and travel unobstructed in derrick		
40	Function test link tilt assembly and check for air leaks.		
41	Perform visual inspection of top drive power		

	panel. Check all contactors, relays, power supplies, and terminal boards to see that they are properly marked and that all screws and bolts are tight.		
42	Record DC drive motor data insulation resistance		
43	Verify proper operation of installed purge loss alarm system. Shut off purge air supply, note alarm, check emergency by-pass operation. Turn on air supply to see if system will go through an automatic purge cycle		
44	Visually inspect torque beam support chains on PT drive		

3. HOISTING TOOLS, HOOKS, BAILS, ELEVATORS AND OTHER RELATED EQUIPMENT

S.No.	Condition	STATUS	
		OK	NEED ATTENTION(DETAILS)
1	Traveling blocks in good condition		
2	Traveling blocks properly guarded		
3	Sheave guards in good condition		
4	Bales and/or links in good condition		
5	Elevators in good condition		
6	Rod hook in good condition		
7	Hoisting hook equipped with safety latch		
8	Crown block assembly secured		
9	Transfer elevators in good condition		
10	Crew members not permitted to ride traveling block		
11	Circulating hose secured to gooseneck and swivel		
12	Power swivel secured		

13	Hoisting line inspected daily		

4. MUD PUMP

S.No.	Condition	STATUS	
		OK	NEED ATTENTION(DETAILS)
1	All mud pump guards are secured and in good condition.		
2	All mud pump fitting & connections are properly secured and in good condition.		
3	Pressure relief valve installed, tested & in good working condition.		
4	Relief lines, high pressure lines, secured/anchored		
5	Ends of mud vibrator hose properly anchored.		
6	Adequate lighting(illumination level) provided		
7	Approved lighting as per hazardous area classification for the location available		
8	High pressure fitting used as per design pressure system		
9	Pumps, piping, hoses, valves and other fittings are maintained in good operating condition		
10	Calibrated Pressure gauze are in use		
11	Dampener tested at regular intervals		
12	Lubrication system on plunger are in working condition		
13	Oil pressure gauge on mud pump are working properly		
14	Verify placement of emergency stops/switch on pumps		
15	Area around mud pump, not slippery, no uneven surface,		

5. MUD HANDLING EQUIPMENTS

S.No.	Condition	STATUS	
		OK	NEED ATTENTION(DETAILS)
A.	SHALE SHAKER		
1	Body & base for cracks and corrosion		
2	Baskets for cracks and corrosion		
3	Vibrator motor mounting for proper tightness		
4	Vibrator motor belt guards in position		
5	Starter switch properly earthed		
6	Emergency shut off system		
B.	DESANDER		
1	All flanges and connections for proper tightness		
2	All pipes for corrosion		
3	Proper mounting/anchoring of the unit		
4	Frame/structure for corrosion/damage		
C.	DESILTER		
1	All flanges & connections for proper tightness		
2	All piping for corrosion		
3	Anchoring/mounting of the unit		
4	Alignment of discharge line		
5	Frame/structure for corrosion/damage		
D.	DEGASSER		
1	Proper alignment of vent line		
2	Guard over coupling between motor and vacuum pump		
3	Proper anchoring of the unit		
4	Condition of the skid		

6. MUD MIXING AREA

S.No.	Condition	STATUS	
		OK	NEED ATTENTION(DETAILS)
1.	Bagged material properly stacked		
2.	Assessment for respirator use conducted, documented and available.		
2a.	Adequate personal protective equipment available: □ Rubber Gloves □ Apron □ Face Shield □ Goggles □ Respirator: □ mask □ Full Face □ Other:_____		

2b.	Employees using all required PPE		
3.	Personal protective equipment properly stored		
3a.	"PPE Required" warning signs erected (Grouped or individual signs)		
3b.	Chemical hazard warning signs erected		
4.	Personal protective equipment properly maintained and in a clean & sanitary condition		
5.	Eye wash station available		
5a.	Emergency Shower available		
5b.	Eye wash provides a minimum continuous flow		
5c.	Emergency Shower provides a minimum continuous flow		
5d.	Eye wash/emergency shower location identified with visible sign		
5e.	Eye wash/emergency shower access free from obstructions		
6.	Eye wash station/emergency shower in working order		
7.	Eye wash station/emergency shower in a clean & sanitary condition		
8.	Eye wash station/emergency shower providing clean water supply		
9.	Adequate ventilation in the closed area		
10.	Elevated loading door opening protected		
11.	Approved lighting for the location available		
12.	Adequate lighting provided		
13.	General housekeeping		
14	MSDS are displayed in bilingual at strategic locations		

7. MUD TANKS & PITS

S.No.	Condition	STATUS	
		OK	NEED ATTENTION(DETAILS)
1	Adequate stairs with handrails		
2	Adequate walkways and guardrails		
3	Guardrails installed on all raised platforms, walkways, etc above 1.8 meter		
4	Walkways free from obstruction and/or damage		
5	Guardrails provided on crossovers		
6	"PPE Required" warning signs erected (grouped or individual signs)		
7	Chemical hazard warning signs erected		

8	Shale shaker properly guarded		
9	Explosion proof equipment, fixtures and wiring used in the Vicinity of the shale shaker area		
10	Agitator shafts & couplings properly guarded		
11	Mud guns properly secured		
12	Jetting hoses properly secured		
13	Desander Unit in good condition		
14	Explosion proof equipment, fixtures and wiring used in the vicinity of the Desander.		
15	Desilter Unit in good condition		
16	Explosion proof equipment, fixtures and wiring used in the vicinity of the Desilter		
17	Degasser Unit in good condition		
18	Drive belts and shafts guarded		
19	Approved lighting for the location installed		
20	Adequate lighting provided		
21	Assessment for respirator use conducted, documented and available.		
22	Adequate personal protective equipment available: □ Rubber Gloves		

	□ Apron □ Face Shield □ Goggles □ Respirator: □ mask □ Full Face □ Other:_____		
23	Employees using all required PPE		
24	Personal protective equipment properly stored		
25	Personal protective equipment properly maintained and in a clean & sanitary condition.		
26	Stairways and ladders secured		
27	Eye wash station in close proximity		
28	Emergency Shower* available in close proximity (* especially when caustic is used, but not limited to)		
29	Eye wash/emergency shower location identified with visible sign		
30	Eye wash/emergency shower access free from obstructions		
31	Eye wash station/emergency shower in working order		
32	Eye wash station/emergency shower in a clean & sanitary condition		
33	Eye wash station/emergency shower providing a clean water supply		
34	General Housekeeping		
35	All unused floor holes covered		

36	Electric wiring in good condition		
37	Data plates on equipment legible		
38	Lubrication system of agitator are maintained		

8. AIR COMPRESSOR

S.No.	Condition	STATUS	
		OK	NEED ATTENTION(DETAILS)
1	Dirty – oil/dust etc. on compressor		
2	Oil leaks on compressor		
3	V-belt drive not guarded		
4	Guard does not cover back side		
5	Safety valve not locked or sealed or not calibrated		
6	Drain valve not accessible & Drain water from air compressor.		
7	Compressor due for pressure test (5-yearly to 1,5 x MPOP)		
8	Electric cord/plug not in good condition		
9	Have a lubrication regime? It should include greasing (motors), oil top-up (compressor, in-line lubricators etc) and oil replacement		
10	Check drive belts (where fitted) Check the tension and condition of drive belts regularly		
11	Clean air and oil filters Ensure air and oil filters are kept free of dirt and debris		