GUIDELINES FOR SAFE RIG- UP AND RIG- DOWN OF DRILLING AND WORK-OVER RIGS

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“GUIDELINES FOR SAFE RIG-UP AND RIG-DOWN OF DRILLING AND WORK-OVER RIGS”

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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 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 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 scale 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 Hydrocarbon Value Chain. 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. Standardisation in design philosophies and operation and 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, emphasised the need for the industry to review the existing state- of- the-art in designing, operating and maintaining oil and gas installations.

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 was prepared by the Functional Committee on “Guidelines for Safe Rig-Up and Rig-Down of Drilling and Work-Over Rigs”. The document is based on the accumulated knowledge and experience of industry members, 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 substitute for the judgement of responsible and experienced Engineers.

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 “Guidelines for Safe Rig-up and Rig-down of Drilling and Work-Over Rigs”,

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This standard in no way supersedes the statutory requirements like Factories Act, OMR, CCE etc.
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The document is intended to supplement rather than replace the prevailing statutory requirements.
COMMITTEE ON
“GUIDELINES FOR SAFE RIG-UP AND RIG-DOWN OF DRILLING AND WORK-OVER RIGS”

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GUIDELINES FOR SAFE RIG UP & RIG DOWN OF DRILLING/WORK-OVER RIGS

1.0 Introduction:

Drilling rigs are deployed at pre-determined well site to carry out drilling of well and after completion and testing of the well, the rig is transported to a new location. For work-over jobs, relatively smaller capacity rigs are used. These rigs are also moved to new well site after accomplishing the assigned job. Rigs of different type and specifications are used depending upon various factors like well depth, loads/tools that are likely to be handled. Specifications of all associated equipment like power packs, compressors, mud pumps, tanks, etc. change according to the rig.

A number of activities like dismantling of rig and equipment, their loading/unloading, transportation & erection and commissioning at new site are involved. This document has been prepared to provide general guidelines for the users for safe operations in carrying out these activities keeping in view the associated risks.

2.0 Scope:

This document covers safety aspects that need to be considered for movement of rig from one location to another and lays down general guidelines for safe rigging and De-rigging operation including safe transportation of Drilling/Work-over rig and equipment. The user should develop its own system based on the guidelines provided in the document and manufacturer’s recommendations.

3.0 Rig-Up & Rig down:

The following major activities are involved in rig release at one location to erection & commissioning it rig at new well site.

1. Site selection and Orientation.
2. Site preparation.
3. Rig Release/De-rigging
4. Route survey.
5. Transportation.
6. Rigging up.
7. Skidding (In case of cluster locations)

Guidelines/practices to be followed in each activity for safe rig up and rig down operation of Drilling/Work-over Rigs are covered in detail.

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3.1 Site selection/Orientation

While selecting site for Drilling, following points should be considered. At Work-over locations, site of the well being fixed, orientation and other relevant points should be taken care of.

i. Applicable statutory clearances like those from DGMS(Director General of Mines Safety), State Pollution Control Boards, forestry, aviation (DGCA/Air Force) shall be obtained.

ii. Necessary clearance from airport authorities (Civil/Airforce) shall be obtained in case the site is in line with the landing and take off funnel of aircrafts.

iii. Layout of existing oil & gas pipelines near the proposed well site should be considered.

iv. At the time of stacking, no electrical overhead lines should pass through the site and these lines and transformers should be minimum 30 metres (as per OMR) away from well mouth.

v. Filled in ponds should not be selected for deploying Drilling Rigs.

vi. Minimum inter-distances of well, oil pit and roads etc. should be followed as per OMR.

vii. Access to the site should preferably be in line with the center line of the well (except where not possible like in hilly terrain) and the orientation of the location should facilitate construction of approach road.

viii. At the time of stacking, normal wind direction should be observed. Area for the flare pit should preferably be in the down-wind side.

ix. In case additional land is required for cluster locations, it should be selected on the front side i.e. towards the Catwalk side.

3.2 Site preparation:

Site preparation is an important aspect as heavy equipment are placed and handled during rig erection, drilling/work-over operations, dismantling of the rig. Relevant points that need to be considered for site preparation at new location/existing locations are:

a. Site should be inspected and reviewed to ensure that its layout is suitable for the type of rig being deployed.

b. Site should be hardened based on the soil strength of the Site to bear the load of the equipment and movement of heavy transport vehicles. Soil investigation needs to be carried out for any new site.

c. Type and strength of foundation for Rig structure should be designed based on bearing capacity of the soil and rig specifications.

d. Level shall be maintained for sub-base / Derrick leg foundation as well as foundation for the auxiliary equipment like PCRs (Power Control Rooms), power packs, mud pumps, mud tanks and other equipment.

e. Where concrete slabs are used as foundation for auxiliary equipment, like – power packs, mud pumps etc., the entire slabs should be at the same level and ground should be

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strong enough to support the load. (Slabs should be placed in such a way the area below the skid should increase).

f. Concrete slabs for mud tanks should be of adequate strength to support mud tanks filled with maximum anticipated specific gravity.

g. Anchors / Dead-man for various systems should be grouted as per laid down norms and these should maintain safe distance from power transmission lines.

h. Drainage should cover the entire site and all drains should be below the ground level.

i. Dimension and type of effluent pits, cutting retainer pits and water oil separators should conform to OISD -GDN -217.

j. Entire site should be fenced with an entry for equipment and personnel.

k. The site layout should be designed in such a way that the vehicles like Diesel & water tankers, Cranes, trucks carrying mud chemicals, Cementing Units & Silos and logging units can be placed and maneuvered as required.

l. Layout should be made in such a way that all the equipment are accessible by crane.

m. Anchor of Topman Escape Device landing shall be at a distance not less than 45 m (for rigs working in pipe stand of triples)from Derrick base or equal to height of Derrick up to monkey board from ground level, whichever is more.

n. Topman Emergency Escape line path and landing point should be clear of any obstruction and safe / clear exit should be ensured.

o. In a cluster-drilling site, all flow lines of the adjacent wells should be buried safely to avoid damage during working and placement of equipment/movement of vehicles.

p. Suitable provision around the diesel tank area to contain the spillage should be made.

q. Cable trays should be used wherever applicable. Provision for bunching and passing cables through protective conduit should be made while crossing roads/passage.

r. Walkways across effluent pits should be made along the well centerline for derrick type of rigs.

s. Proper platform should be erected for barite/chemical loading.

t. During excavation of ground, adequate precautions should be taken to ensure that oil/gas pipe lines, water pipelines and electrical/telecommunication cables laid below are not damaged.

u. All provisions/practices of inspection/fitment of electrical equipment/cables and their earthing etc. should be fulfilled/followed as per IE rules and relevant OISD Standards.

3.3 Route Survey:
Route survey should be conducted prior to rig shifting and the following aspects should be taken into consideration.

a. Width and strength of the road

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b. Strength of the bridges and culverts
c. Height of the distribution/transmission lines
d. Clearances under the bridge structures
e. Railway crossings and traction lines
f. Radius of curvature on turnings
g. Obstruction due to trees/branches
h. Crossing points availability/requirement
i. Traffic in the cities en-route at peak hours etc.

In case, any problem related to above aspects is noticed, it should be rectified before commencing rig shifting. Route survey should be carried out with the participation of following concerned personnel

- Rig In-charge
- Electrical Engineer
- Civil Engineer
- Logistics personnel
- Land acquisition man
- In-charge rig building

3.4 De-rigging:

Once the rig is released from existing location, preparations for moving the rig are made. De-rigging is done prior to lowering of mast. Checklist should be prepared and followed for checks/inspections with sequence of operations required to be undertaken prior to lowering of Mast, keeping in view the type of rig and associated equipment. Guidelines that need to be followed in general are:

i) All activities should be supervised by competent person(s).

ii) Before the rig release, loads such as Drill collars, Drill pipe string, Drilling B.O.Ps, tool-bins etc. may be transported to the new location during Production Testing. However, equipment necessary to handle any emergency situation arising during production testing shall not be dismantled/removed from the site until testing/well completion is over.

iii) Any person working at a height and not protected against fall from height by other means shall use approved safety belt which shall be attached by means of a lifeline to a fixed anchor and adjusted to allow a drop not exceeding 1.8 m in case of fall.

iv) It shall be ensured that all related cables are de-energised before disconnecting.

v) De-pressurisation of air/water/mud lines before disconnecting shall be ensured.

vi) All debris around the Mud Tanks should be cleaned before they are lifted.

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vii) Dead end anchor shall be inspected for proper tightness of the bolts and missing/loose brass sleeve.

viii) Pins/bolts shall be checked for any cracks, deformation, wear etc and holes for ovality. Missing pins of mast and sub-structure, if any should be checked. These shall be replaced by recommended pins only.

ix) It shall be ensured that lock-clips of all pin connections are in place.

x) Stand pipe and other hoses should be secured and all lines (Topman Emergency Escape Device, Fall prevention, guy lines etc) should be removed.

xi) All long hanging lines, cat lines, sand lines should be tied to the mast so that these do not entangle with block and tackle system.

xii) All tong counter weights shall be removed.

xiii) It shall be ensured that there is no loose item on any mast member.

xiv) Mast sling lines (bull lines) shall be inspected as detailed in Annexure-1.

xv) The casing line should be inspected for proper reeving with sufficient length on drum, corrosion, broken wires, reduction in dia. etc.

xvi) Tackle system should be checked for free rotation of pulleys and their guards.

xvii) The guide rollers of the casing line on the mast should be fixed wherever applicable.

xviii) Mast raising and lowering sheaves and jumping guards shall be inspected.

xix) Proper functioning of the clutches, friction brake & Eddy Current Brake, weight indicator, quick release valves, brake of the heavy duty winch etc shall be ensured.

xx) Ensure that the mast snubbing system is functioning properly. The snub line (wherever applicable) should be inspected for corrosion, kink etc.

xxi) It shall be ensured that snub line is of sufficient length and without any joints.

xxii) The front area shall be cleared completely to make sure that there is sufficient place for dozer, mole tractor for snubbing the mast wherever hydraulic snubbing system is not available.

xxiii) It should be ensured that the Diving Board(Monkey Board), stabbing board, railings, racking fingers etc. are folded wherever applicable.

xxiv) Check all the hydraulic and pneumatic system for proper functioning. Ensure hydraulic system is free of air.

xxv) Check for missing bolts of mast roller steel section wherever applicable.

xxvi) Sufficient fuel in day-tank should be ensured before raising and lowering of mast

xxvii) All shims used for leveling should be removed wherever applicable. Ensure the leveling bolts are tightened to proper torque.

xxviii) Remove / change the direction of the air winch which may entangle with the dead line of the system during the course of mast lowering.

xxix) Ensure that unnecessary items are removed from the floor.

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xxx) Ensure that bottom box’s rear and front extensions (wherever applicable) are fitted and are properly bolted.

xxxi) Fill up water in the Bottom Boxes wherever applicable.

xxxi) Bottom box extensions should have full contact with the foundation.

3.4.1 Lowering Down Mast

i. Raising and lowering of mast should preferably be done in day light.

ii. Existing well and Cluster Well, if any shall be properly protected with sand bags/iron cage prior to lowering/raising the mast.

iii. All un-associated persons shall be kept away from the mast lowering process.

iv. Derrick floor should be free of all unwanted materials prior to lowering of the mast.

v. Before lowering the mast, it shall be ensured that no person is working on the mast including Giproles / A-frames etc.

vi. Lowering/raising of mast / derricks should only be done by a designated experienced person who is well conversant with the procedures.

vii. No one shall be allowed below the mast during lowering. Mast can be stopped at any stage if at all any job needs to be done below the mast during lowering process.

viii. All the sheaves should be observed for proper rotation during lowering. Watch for any obstruction during lowering operation.

ix. It shall be ensured that the front sub-base spreader bracing (wherever applicable) is in place before rigging down mast. This bracing is opened up after rigging up to facilitate placement of catwalk and V-ramp.

x. It shall be ensured that casing line and mast sling lines are free from any entanglement with mast members.

xi. While raising or lowering gin pole, crew (topman) should take position opposite to the resting of Gin pole.

xii. Maintenance people should be kept alert at PCR (for electrical rigs) and engines during operation.

xiii. Two experienced men should stay on the brake while lowering Mast. Before lowering Mast, ensure that all unnecessary persons are stationed at safe place. The person operating the brake while lowering the Mast should always follow the instructions of the Drilling In-charge or person authorized for the job.

xiv. For Electrical rigs, while lowering mast, both the draw-work motors should be engaged. Although one motor is sufficient for lowering, in the event of friction

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brake failure, the full load of mast may not be lifted by single motor in an emergency.

xv. Mast should be lowered at slowest possible speed. Application of brakes at any stage should not create any jerk. During lowering check for rotation of the pulleys, any fouling, hook load and other parameters. If any abnormality is observed, operations should be stopped. Suitable actions should be taken after due assessment.

xvi. Mast should not be lowered without weight indicator in operation. Ensure that Drill-o-meter is showing correct weight and proper scale is fitted while lowering / raising. Monitor the weight while lowering / raising up. Extreme care should be taken while snubbing the mast. Sling lines should never be allowed to fall off their pulleys.

xvii. Once the Mast is lowered, power can be switched off and dismantling of the system can be carried out as per procedure.

xviii. The mast should be rested on bigger stand till the racking board, dolly board, BOP trolley beams etc. are removed.

xix. The mast should be placed on high stand (horse) and it should be ensured that the weight of the mast is properly distributed to avoid any deformation.

xx. As far as possible, brake shoes should not be replaced prior to lowering and raising of the Mast. If it becomes necessary to replace the shoes, proper break-in of shoes shall be ensured.

3.4.2 Retracting Telescopic part & tilting down of Mast

In telescopic type of mast, all checks and procedures (whichever applicable) mentioned in section 3.3.1 should be followed. Some additional guidelines are as follows:

a) Before commencing retracting telescopic mast, it should be checked and ensured that:
   - All guy-ropes are freed from their anchors.
   - Working platform or sub-structure has been dismantled/ removed.
   - Sufficient oil level in hydraulic tank & oil strainer is clean.
   - Hydraulic oil pressure gauge is functioning properly.
   - All hydraulic hoses of the Telescopic Ram/Rams for any leakage & mast locks for any visible cracks.
   - Non return valves of the Telescopic ram/rams are functioning.
   - The telescopic ram/rams are free of any trapped air. If not, bleed all trapped air.
   - Centralizers are closing or not while retracting the Mast. Telescopic ram should never be extended if centralizers malfunction
   - Springs and levers of Mechanical Type mast locking device are working satisfactorily.

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b) Recommended pressure limits prescribed by the manufacturer should not exceed while disengaging the Mast locks.

c) While retracting the Telescopic ram/rams the Travelling Block should be picked up in order to prevent it from hitting the well head.

d) Travelling Block should be against the supporting girders/tray when the telescopic ram/rams are fully retracted. If not, the same should be adjusted.

e) Before tilting down the Mast, it should be ensured that the mast is free from any locking device.

f) It should be ensured that the mast has properly rested on its supports. If not, tilt up & lower again.

g) The mast should be harnessed immediately after tilting.

3.5 Load handling and Transportation:

a) All loading/unloading and handling of equipment shall be done under the supervision of competent person(s).

b) For any type of Rig dimensional details, weight with regard to transportation should be well documented. Loads should be assigned to transport fleet sequentially.

c) Proper transport fleet should be chosen based on equipment dimensions and weight and route selected. More care needs to be undertaken in this respect for Hilly terrain.

d) Fitness certificates of transport equipment should be checked before commencing shifting.

e) Night loading and unloading of equipment should only be allowed when sufficient illumination is provided.

f) Equipment shall not be loaded on under capacity trailers/trucks.

g) Equipment shall not be handled by under capacity cranes.

h) Loads shall not be allowed to be lifted by cranes without extending out-riggers fully. Operating instructions for cranes/hoisting equipment as per OISD-Std.205/203 shall be followed.

i) Dragging of load directly with crane boom shall not be allowed.

j) Out-rigger jacks of cranes either shall not be placed on Sub-Base foundation or on auxiliary equipment foundation.

k) Planks / concrete slabs should be provided below the out-rigger jacks of cranes based on the weight of the equipment lifted and soil condition. While hoisting or lowering, the crane operator should follow the signals of the in charge of operation or his authorized personnel who has experience of the job. Never allow any other person to give signal to the crane operator.

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I. Hooks for lifting should be engaged only on lifting lugs/eyes provided on the equipment being lifted.

![Lifting beam](image)

Wrong

Right

Figure-1

I. During lifting the load, it should be ensured that slings do not touch any part of the load to be lifted to avoid distortion/damage. If required, lifting beam for lifting such loads equipment like PCR house, power packs, mud-pumps, diesel tanks should be used as illustrated in the figure-1.

m. Persons not associated with the operation directly should not be allowed in the vicinity of the lifted load. Tug lines should be used for handling loads while lifting/placing.

n. All slings should be periodically inspected for corrosion, kinks, twists, breakage of lines etc. as stipulated in OISD Std. 187.

o. Nobody shall be allowed to sleep or rest below oil field truck, crane, or any transport equipment.

p. Before starting transportation of equipment, operator should ensure that nobody is under the vehicle. If, any work is undertaken beneath the chassis, warning sign should be displayed and battery should be disconnected and chokes/wedges should be placed against the wheels to prevent accidental movement of the vehicle.

q. Reversing lights and horn should be provided on all cranes, tractors and trailers.

r. All loads should be properly secured with proper load binding material during transportation.

s. Special care should be taken in handling and transportation of critical equipment like B.O.P.s, and control unit, choke manifold. Locking screws of B.O.P. rams should be inside (in closed position) and ring groove should be protected.

t. The equipment with liquid variables inside the tanks e.g. mud, Diesel etc. shall not be lifted and transported.

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u. No loose material should be stored inside PCR, engine room, compressor shed, bunk houses.

v. Any opening provided on trailer like for keeping spare wheel should be covered with plate.

w. Trailer speed should not cross the acceptable limits especially while moving with heavy loads. The engine of the trailer’s horse should preferably be fitted with speed governors.

x. All panel doors of PCR and electrical controls should be closed tightly.

y. Minimum clearance from overhead lines to the transporting equipment shall be maintained as per IE Rule No. 77 to 80. In case, minimum clearance required can not be met, then power lines shall be de-energised.

3.6 Rigging up:

Rig-up operation is done at new location. Guidelines for safe rig-up operation are:

i. Ensure all equipment have been received at site in good condition without any damage.

ii. All provisions/practices of inspection/fitment of electrical equipment/cables and their earthing etc. should be fulfilled/followed as per IE rules and relevant OISD – Standards/GDN.

iii. It should be ensured that batteries are kept fully charged and in healthy condition for use at new location.

iv. All stairways should be secured and fitted in such a way that steps remain horizontal.

v. Angle of V-ramp with the catwalk shall be as recommended by the manufacturer to prevent sliding of pipes when rested on the ramp.

vi. Stoppers on catwalk to prevent sliding down of tubular from ramp shall be provided.

vii. Stoppers on pipe rack to prevent rolling down of tubulars shall be fitted.

viii. It should be ensured that proper toe board around derrick floor is fitted.

ix. Derrick members should be inspected as per OISD Std.202 for any damage. Defective members should be repaired/replaced, if any defect is detected.

x. Modifications on mast should never be done without fully knowing its implications. If any modification/repair is required, it shall be done with proper engineering with authorization. Modifications/Major repairs shall be documented.

xi. While assembling mast section, proper working platforms should be used. Ladders with U-hooks should be used to prevent its accidental slippage.

xii. Draw-works foundation shall be inspected. Plates(wherever applicable) and bolts of recommended grade only shall be used for fixing the draw-works.

xiii. It shall be ensured that proper bracket and clamp are fitted on right brace of the mast for anchoring Topman Escape line to enable safe embarking of the topman.

xiii. Proper functioning of aviation light/flasher should be ensured before raising mast.

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xiv. Provision for anchoring all high pressure lines should be made.

xv. All tanks shall be covered with anti-skid gratings. Railings should be fitted around these, walkways and stairways.

xvi. Mud channels should be adequately supported.

xvii. Working floor area shall be checked for gaps. If found any should be covered.

xviii. It shall be checked that safety clamps with chain are installed on drilling and cementing lines of stand pipe.

xix. While fixing railings around Derrick floor and other areas, it should be ensured that these are fitted with toe-board towards the working floor so that the gap between toe-board and the floor is minimum.

xx. All spark arrestors of mud mump, genset engines and B.O.P. control unit engine should be checked and serviced.

xxi. For any hot/cold jobs undertaken, OISD standard 105 shall be followed.

3.6.1 Placement of mobile rig outfit:

   a. Place outfit on pad as per measurement of that rig
   b. Place stabiliser beam (for supporting the jacks) on concrete pad or on concrete slabs.
   c. Check stabiliser beam for proper level.
   d. Extreme care should be taken (in work over rigs) in not hitting well head/X-mas tree while maneuvering the rig for placement.
   e. After placement of the rig, stoppers (Chokes) shall be placed against rear tyres.
   f. It should be ensured that transmission is shifted from road to hoist and it is locked.

3.6.2 Raising of Mast:

Prior to erection, all equipment should be placed in their designated places so that crane movement is minimised after erection of the mast. After assembly of all the components of the mast and substructure and inspection of the functioning of the power system it may be cleared for erection. All the points as mentioned in Rigging down and Lowering of the mast are applicable while raising. Additional checks/precautions to be taken while raising mast are as follows:

i) Before raising mast, it shall be ensured that:
   - all the guards of hoisting / lifting sheaves are in proper position.
   - all service pulleys hung from crown block frame are secured with lock devices.
   - the condition of wooden blocks and clamps at crow’s nest. Replace if necessary.
   - Mast lifter sheaves are checked and serviced.
   - Mast equaliser pulley is checked and serviced
   - all the pin connections are greased.
   - Rear mast shoe stoppers for any crack. If any crack is noticed, it should be repaired.

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ii) Crown block, traveling block and rotation of the sheaves shall be checked. Free rotation of pulleys and gap between sheaves and guards should be checked. Reversing of traveling block at every rig-up should be done to even out wear of pulleys.

iii) Minimum two engines should be used in case of AC – SCR, diesel – mechanical rigs with swing lift mast and three engines with DC-DC rigs in running condition for raising the mast.

iv) Air pressure and flow rate of cooling water to Draw-works and ECB(Eddy Current Brake) shall be checked.

v) Lift the mast from assembling stand about 6 inches and hold for 5 minutes and observe for:
   - Any gap between foundation and sub-base at the rear end
   - Any cracks on the foundation
   - Oil leakage
   - Any other abnormality.
   Suspend operation if any abnormality is observed. Necessary action after due assessment should be taken. If everything is O.K., lower the mast & place it on the assembly stand. Test the friction brake as well as the Auxiliary Brake (Eddy Current Brake/Hydromatic) while lowering mast.

vi) If satisfied, lift the mast slowly with power and put it on rig stand (horse shoe) for installing BOP trolley beam, racking board and belly board. This procedure is to be adopted for Brahmam rigs. For other rigs mast has to be put from assembly stand to the bigger stand with crane only.

vii) Raise the mast at the slowest possible speed.

viii) Observe the lifter mechanism sheaves for hindrances in rotation, failures and load on the drill-o meter.

ix) With the help of either hydraulic snubber or snub line, bring the mast to the position slowly. Sudden fall in position may cause vibrations in the mast and great strain is put on pins at the base of the mast. There should be perfect co-ordination between the men on the brake and the sling line operator.

x) Once the mast is rested on A-frames, do not keep sling lines slack.

xi) Never allow the personnel on A-frame unless the mast comes to position.

xii) Always wait until the mast comes to complete rest before going up the A-frames to put the mast stay pins.

xiii) Do not leave mast rested on A-frames without securing it with pins.

xiv) Align the mast by putting shims, if required, under one leg at a time.

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3.7 Skidding / Dragging of Mast and sub-structure:

Sometimes rigs are skidded by a few meters for drilling a new location in the same site without dismantling the structure. Following should be checked / ensured for skidding operation:

i. Skidding gear should be appropriately grouted.

ii. There should not be any gap between the main sub-base foundation and the anchor foundation.

iii. Check for missing pins, nut bolts and lock clips of Mast and Sub-structure.

iv. Length of main air hose of draw-works, electrical cables for power control and lights etc. should be increased accordingly.

v. Dismantle kill line, choke line, pump discharge line.

vi. Check the correct size of wire-rope and number of clamps on the wire-loops.

vii. Check the condition of wire ropes.

viii. Extend the footprint of the sub-structure to the new foundation. The movement of the rig should follow the footprint by proper steering.

ix. Check movement of pulleys

x. Never allow induced movement of sub-structure braces.

xi. No person should be allowed to stand below substructure when the rig is in movement and those not directly connected with the work, should move away to safe distance.

xii. When sub-structure spreader bracing is removed, skid the rig at the slowest possible speed and refit the spreader beam.

xiii. Once it passes the drilling cellar pit, put the sub-base spreader back in place.

xiv. Never allow skidding line to touch any sub-structure members

xv. Never drag the rig with any set back weight.

xvi. Driller’s cabin should either be rigged down or secured properly to prevent toppling during skidding.

xvii. One experienced person should monitor the traveling block while skidding to avoid hitting the crown block inadvertently.

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4.0 Personal Protective equipment:
   All personnel working for rig up/rig down and transportation should use proper type of
   PPEs like helmet, safety shoes, safety belts, hand gloves, goggles etc.as prescribed in
   OISD Std. 155

5.0 Hand Tools:
   a. Only appropriate tools should be used
   b. Sledge hammer should always be pulled towards open jaw side
   c. Tools should never be carried up/down mast. Tools along with components including
      nuts, bolts, cleats should be lowered safely or carried upward in single bundle or
      bags.

6.0 Spudding / Pre-operation conference:
   Spudding/Pre-operation conference should be held in accordance with OISD standard
   190 and records thereof should be maintained. All concerned persons should attend it.
   All safety aspects should be discussed and shortcoming if any should be overcome
   before commencing operations. The minutes of the meeting should be documented.

7.0 Documentation:
   For effective monitoring of rig and equipment and deciding about the frequency of
   inspection/turn around following documents should be maintained
   A. Log book for the Mast & Substructure should be maintained with following information for
      future reference and records.
      - Written down operating instructions and procedures for all activities
      - Technical data and other details pertaining to the Mast & Substructure.
      - Details of movement of the rig from one location to the other location.
      - Record of NDT inspection, repair and painting
      - Brief description of operation carried out during the earlier operations with special
        mention of complications like stuck up, fishing, blow outs, accidents etc and summary
        of the findings.
      - Any modification / replacement / repair of M&S(Mast and Sub-Structure).
   B. Visual inspection records are to be maintained as per OISD standard 202
   C. Log book for all rig equipment associated with the rig should be maintained.
   D. Record of transport equipment and accessories used for rig transportation.

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8.0 References:
- API-4F – Specification for Portable Masts
- API-4F – Specifications for Drilling and Well Servicing Structures
- Oil Mines regulations-1984
- Indian Electricity Rules
- OISD Std/RP/GDN:
  105 – Work permit System
  155 - Personal Protective Equipment
  187 - Use and care of Wire-ropes
  190 – Derrick Floor Operations
  202 – Inspection of Drilling and work-over Rig mast & Sub-structure
  203 – Operation, Maintenance and Inspection of Hoisting Equipment
  205 – Crane Operation. Maintenance and Testing(Upstream)
  217 – Environment protection on Drilling rigs.

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Annexure-1

Bull line shall be visually inspected before lowering/raising mast.

**Mast sling line (Bull line) protection**

1. Sling line should be hung to the mast after raising it.
2. Sling line shall be coated with grease or wrapped with oil paper if rig needs to stand for a longer time.
3. Sling line should be transported in exclusive containers.
4. Sling line should not be stored on ground to avoid corrosion.

**Mast sling line (Bull line) rejection criterion**

1. If there is any incidental damage like cutting of strands by crawler or by falling objects
2. Sling line if used as earthing for welding purpose.
3. Any indication of corrosion.
4. If sling line becomes brittle with broken wires or there is reduction in nominal diameter.
5. Any cracks or deformations developed on the spelters.
6. After every five years of operations in coastal areas.
7. After every seven years of operation in other areas.
8. If sling lines are either shorter or longer than the actual length.

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**RIG MOVE PLAN**

NAME OF THE KMS. : ________________

EXISTING LOCATION : ________________

WELL DEPTH : ________________

TYPE OF WELL : EXPLORATORY / DEVELOPMENT

DISTANCE : 

RIG TYPE : 

NEW LOCATION

Unwanted material to be shifted before Rig Release:

a) Drill String
b) Drill Collars
c) Standby Equipment
d) 13 5/8” x 21 ¼” BOP Stacks
e) Drilling Tool Bins

Note: No material which will effect the safety of operations should be dismantled / transported prior to Rig release.

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The above programme is only indicative. The user should develop his/her programme according to the requirement and progress. Checklists for all critical activities involved should be developed and used. These checklists which are to be inspected/checked by the competent person and signed by him with remarks are illustrated. The user should develop its own checklists for all critical activities.

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