Operation, Inspection, Maintenance, and Repair of Drilling and Well Servicing Structures

API RECOMMENDED PRACTICE 4G
FOURTH EDITION, APRIL 2012

ERRATA, SEPTEMBER 2013
ADDENDUM 1, AUGUST 2016

AMERICAN PETROLEUM INSTITUTE

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Upstream Segment

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Foreword

Users/owners may require a period of time to bring existing structures into conformance with new criteria. Due to the number of structures involved and the limited availability of qualified inspectors, the date of the first inspection for existing structures should remain flexible.

This standard shall become effective on the date of publication. The forms in annexes A through D are intended for free exchange between owners/operators of the equipment or users of API 4G.

Shall: As used in a publication, “shall” denotes a minimum requirement in order to conform to the publication.

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Suggested revisions are invited and should be submitted to the Standards Department, API, 1220 L Street, NW, Washington, DC 20005, standards@api.org.

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Operation, Inspection, Maintenance, and Repair of Drilling and Well Servicing Structures

1 Scope

1.1 Objective

This document provides guidelines and establishes recommended procedures for inspection, maintenance, and repair of items for drilling and well servicing structures, in order to maintain the serviceability of this equipment. The information in this document should be considered as supplemental to, and not as a substitute for, the manufacturer's instructions and the recommendations in API 54.

1.2 Structures Covered

Items of drilling and well servicing structures covered by this document include:

— masts/derricks and accessories;

— substructures and accessories.

NOTE 1 Crown block sheaves and bearings are covered under API 8B.

NOTE 2 Offshore masts, derricks, substructures and accessories are not under the scope of this document relative to 6.2.4, Category IV inspection requirements.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API Specification 4F, *Drilling and Well Servicing Structures*

AISC 335-89 [1], *Specification for Structural Steel Buildings—Allowable Stress Design and Plastic Design*

ASNT SNT-TC-1A [2], *Recommended Practice for Personnel Qualification and Certification in Non-Destructive Testing*

AWS D1.1 [3], *Structural Welding Code*

3 Terms, Definitions, and Abbreviations

For the purposes of this document, the following terms, definitions and abbreviated terms apply.

3.1 Terms and Definitions

3.1.1
certification
The act of endorsing as meeting set standards or requirements.

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1 American Institute of Steel Construction, One East Wacker Drive, Suite 700, Chicago, Illinois 60601, www.aisc.org.
2 American Society for Nondestructive Testing, 1711 Arlingate Lane, P.O. Box 28518, Columbus, Ohio 43228, www.asnt.org.
3 American Welding Society, 550 NW LeJeune Road, Miami, Florida 33126, www.aws.org.

3.1.2
critical area
A highly stressed region of a primary load-carrying component as defined by the manufacturer or a qualified person.

3.1.3
derrick
A semi-permanent structure of square or rectangular cross-section having members that are latticed or trussed on all four sides.

3.1.4
equipment performance
Operational capability of a piece of equipment relative to expected or predetermined parameters or standards.

3.1.5
fish plate
Either one or two steel plates that are welded or bolted to the webs or flanges of adjacent rails or beams on opposite sides to strengthen a member.

3.1.6
inspection
Comparison of equipment conformity to predetermined standards, followed by a determination of action required, if any.

3.1.7
load test
A procedure wherein a load is applied under controlled and monitored conditions to verify the serviceability of equipment.

3.1.8
maintenance
Actions, including inspection; adjustments; cleaning; lubrication; testing; and expendable parts replacement necessary to maintain the serviceability of the equipment.

3.1.9
manufacturer
A term denoting individuals or companies who make or process equipment or materials covered by this standard.

3.1.10
mast
A structural latticed tower of rectangular cross-section with an open face comprised of one or more sections and then raised to the operating position.

NOTE 1 If the unit contains two or more sections, it may be telescoped or unfolded during the erection procedure.

NOTE 2 The mast may or may not be guyed.

3.1.11
owner
An individual, legal entity or organization holding legal title to the equipment.

3.1.12
primary load
The load which a structure is designed to resist during transportation, erection, survival or operation.

NOTE This can be dead load, hook load, rotary load, setback or rod load, environmental load, or a combination of these.

3.1.13
primary load carrying components
Those components of the covered equipment through which the primary load is carried.

3.1.14
qualified person
A person who, by possession of a recognized degree, certificate, or professional standing, or who by knowledge, training, or experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the subject.

3.1.15
serviceability
The condition of a piece of equipment at any point in time that affects the ability of the equipment to perform its function(s) as intended.

3.1.16
testing
Actions that are carried out on a piece of equipment to determine if it can perform a required function.

3.1.17
turn-of-nut method
Procedure whereby the specified pretension in high-strength bolts is achieved by rotating the fastener component a predetermined amount after the bolt has been snug tightened.

3.1.18
users
Individuals or companies responsible for the use of equipment or material, or implementing recommended practices.

3.2 Abbreviated Terms

ASNT	American Society of Nondestructive Testing
ASTM	American Society of Testing & Material
AWS	American Welding Society
CAWI	Certified Associated Welding Inspector
CWI	Certified Welding Inspector
H_2S	hydrogen sulfide
IPS	improved plow steel
IWRC	independent wire rope core
MPI (MT)	magnetic particle inspection
NDT	nondestructive testing
OEM	original equipment manufacturer
PT	liquid penetrant
RT	radiographic testing
SWL	safe working load
UT	ultrasonic testing

4 General Principles

4.1 Procedures

4.1.1 General

Users/owners should establish written procedures for inspection, maintenance, and repair of each item of equipment or may utilize the written recommendations from the equipment manufacturer. Actions may be initiated based on, but not limited to, one or more of the following criteria:

— specific time intervals;

— measurable wear limits;

— non-performance of equipment;

— environment;

— experience (history);

— regulatory requirements;

— equipment damaging incident.

4.1.2 User/Owner Procedure Development

If the manufacturer of the equipment no longer exists or is unable for any reason to provide suitable recommendations, the user/owner should develop inspection, maintenance and repair procedures using applicable API and/or industry recommended practices and standards.

4.1.3 Background Information

Assembly drawings, drawings identifying critical areas, and acceptance criteria should be made available to the inspector for a Category IV inspection. In the absence of assembly and/or critical area drawings, all areas of primary load carrying components shall be considered critical. This data shall be used by the inspector to adapt the inspection procedure. In addition, the users/owners may provide the history of repair, if available.

4.2 Personnel Qualifications

4.2.1 General

Inspection, maintenance, and repair procedures should be carried out by a person who, by possession of a recognized degree, certificate, or professional standing, or who by knowledge, training, or experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the subject. Inspectors should be familiar with the type of equipment to be evaluated.

4.2.2 Welder Performance Qualifications

Welders on derrick and mast repairs shall be certified in accordance with AWS D1.1 or equivalent and should have experience in mast/derrick maintenance. All welding completed should be in accordance with the requirements of AWS D1.1 or equivalent.

4.2.3 Category II Inspections

Personnel undertaking Category II inspections will be individuals designated by the owner/user company who have adequate experience and knowledge in masts/derricks. These individuals will typically be experienced field superintendents, engineers, rig supervisory personnel.

4.2.4 Category III Inspections

The individual conducting the Category III inspection must possess adequate knowledge and experience in the inspection criteria specified for Category III inspections in 6.2.3 and as set forth in 4.2.1. The individual supervising the Category III inspection must possess adequate knowledge and experience. Typical persons qualified to supervise the inspection could be an engineer, NDT technician, ASNT Level II Technician certified per ASNT specification SNT-TC-1A, or a senior operations person (Rig Superintendent, Rig Manager, or Operations Management), designated by the owner/user company or others, provided they meet the above criteria of experience, training and knowledge.

4.2.5 Category IV Inspections

The Category 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. In addition, Category IV inspectors should satisfy the requirements of Category III inspectors.

NDT inspectors for a Category IV inspection would be required, as a minimum, to have certification as an ASNT Level II Technician per ASNT specification SNT-TC-1A, or the equivalent.

Personnel performing Category 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.

4.3 Training

Proper training of personnel continues to be one of the most critical considerations in the care of a masts/derricks. This includes the rig personnel, mechanics, and welders, as well as the individuals providing inspection. Field personnel should be trained to conduct visual inspections as required for Category, I, II and III inspections. Training programs will assist field personnel to identify existing problems and ensure that all equipment involved will operate in the manner for which it was designed.

5 Use and Maintenance

5.1 General

Maintenance of equipment consists of actions such as adjustments, cleaning, lubrication, and replacement of expendable parts. The complexity of these activities and the safety risk involved should be considered in the assignment of appropriate resources such as facilities, and equipment.

In addition to the procedures developed in accordance with 4.1, the manufacturer should define any special tools, materials, measuring and inspection equipment, and personnel qualifications necessary to perform the maintenance.

The manufacturer has used care in design and selection of material for his drilling or well servicing structure. The structure should give satisfactory performance when used within the stipulated load capacities and in accordance with instructions. Every crew member involved in erecting and lowering the structure should be given instructions and training in those operations they are directly involved in.

5.2 Loading

The safe operation of drilling and well servicing structures depends on whether the foundation is adequate for the load imposed (see Section 11). Environmental and dynamic loads should be considered. The design load for foundation requirements should be the sum of the weight of the drilling or well servicing structure, the weight of the machinery and equipment on it, the maximum hook or rotary load of the structure, forces due to external guywire loading, and the maximum setback load (see Section 15).

During erecting and lowering operations utilizing the rig drawworks, the slowest practical line speed should be used.

Loads due to impact, jarring, acceleration, and deceleration may be indicated by fluctuation of the weight indicator. The operator should keep the indicator readings within the nameplate hook load capacity rating.

Some rig designs require that the mast base structure be restrained against uplift from the application of mast hook load.

5.3 Bolted Structure

5.3.1 General

Each part of a bolted structure is designed to carry its share of the load. Parts omitted or improperly placed may contribute to the failure of the structure. During erection of bolted structures, bolts should be left loose enough, in way of erection, to allow proper fit of adjacent mast/derrick members without distortion and locked in stress. This procedure permits correct alignment of the structure, which results in proper load distribution. At completion of erection, all bolts should be checked for proper torque. Periodically, all bolts should be checked for proper torque.

Suitable instructions regarding the proper installation of clamps, pins and bolts used for tie downs shall be developed for existing structures by a qualified person utilizing manufacturer's guidelines when available. Tie down components incorporating bolts which are expected to be tensioned multiple times shall be designed with specified pretension no greater than 50 % of the bolt material minimum ultimate strength times its nominal cross-sectional area. Clamp installation instructions shall include pretension values and tolerances. Bolt tensioning shall be achieved using calibrated tensioning methods. Bolts that are specified to be pretensioned to a higher value than 50 % of the bolt material minimum ultimate strength shall only be used once.

The length of bolts shall be such that the end of the bolt will be flush with or outside the face of the nut when properly installed.

While it may the responsibility of the manufacturer to give guidelines on erection and bolt installation, it is the responsibility of those performing the actual work that are accountable.

5.3.2 Bolt Pretensioning

The use of the turn-of-nut method is always acceptable for use on bolts which are not to be reused. Reuse of bolts is acceptable if so specified in the manufacturer's instructions or by a professional engineer. This method yields a more consistent pretension without the need for calibration. AISC's Research Council on Structural Connections document *Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts* may be used as a reference in addition to AISC 335-89.

5.4 Racking Platforms

A well-constructed pipe racking support, which is designed to prevent pipe from falling, should be provided in the mast/derrick. Pipe-racking fingers should be kept straight and secured with a safety device.

The working platform should be made of a nonskid material and should not extend into the travel path of the hook and block, swivel, top drive system, and motion compensator. If the platform is not constructed of nonskid material, it may be applied to the surface as necessary.

Fall protection should be properly secured and provided at all times.

Racking platforms may be made of special high-strength steel; care should be taken to ensure that equivalent metals are used in repair.

5.5 Changes in Rig Location

When a rig is moved to a new environment, the rig should be reviewed by a qualified person to ensure that the structures meet all required design criteria and structural safety level requirements for the new environment.

6 Inspection

6.1 General

The objective of these inspections is to detect defects.

The existence of cracks or mechanical damage can indicate severe deterioration and impending failure. Their detection, identification, and evaluation require accurate inspection.

Prompt attention may be required to determine if it is necessary to remove the equipment from service immediately or to conduct the appropriate repair.

Inspection results from Category III and Category IV inspections should be documented and maintained (see 9.1).

Any significant manufacturing defects discovered should be repaired or replaced, and reported to the manufacturer. The following routine checks as applicable should be made at the appropriate intervals.

a) Inspect all welds, particularly in erecting mechanism, for cracks.

b) Inspect erecting mechanism for any other signs of deformity.

c) Follow the manufacturer’s instructions when checking hydraulic circuits and when bleeding air from scoping and raising rams before each lowering operation. Make sure there is an adequate supply of hydraulic fluid. Precautions should be taken to remove all air from the hydraulic system.

d) Hydraulic cylinders, pipework, and hoses should be checked for leaks. Seals and hoses should be checked for cracks and/or wear. Repair of hydraulic cylinders should always be done by qualified personnel.

e) Wire rope, including operating lines, raising lines, and guylines, should be inspected for kinks, broken wires, or other damage. Make certain that guylines are not fouled and that other lines are in place in sheave grooves before and during each raising or lowering operation.

f) Check load transfer mechanisms, guides and scoping ram stabilizers in telescoping masts for free operation and good condition before raising or lowering operation. Keep mechanisms and guides clean and properly lubricated. Make sure scoping ram stabilizers move into proper positions as the top section is telescoped up. After the top section is scoped into the working position, check to see that the load transfer mechanisms are fully engaged.

g) Check unit for level and check foundation and supports for correct placement before erecting operation. Level the unit in accordance with manufacturer’s recommendations.

h) Check wear and lubrication of crown sheaves.

i) Check lubrication and condition of bearings in all sheaves, sprockets, pins, etc., which are part of the erection mechanism.

j) Check folding ladders for proper position prior to access by personnel and for free operation before lowering operation.

k) During drilling or servicing operation, make scheduled inspections of all bolted connections to ensure that they are tight.

l) Load transfer mechanisms should be checked frequently for proper locking position, preferably on each tour during operations. Where possible, the load transfer mechanism should have a positive lock to prevent disengagement. To develop its rated load capacity, the axis of the structure must be in alignment throughout its length. It is important that load transfer mechanisms be maintained in such condition as to ensure structure alignment. It is suggested to paint the load transfer mechanisms a bright, contrasting color in order to assist rig personnel in locating and inspecting these items.

6.2 Inspection Categories

6.2.1 Category I

Visual observation of the mast/derrick and substructure by rig personnel during operations for indications of inadequate performance.

6.2.2 Category II

Category I inspection plus a more thorough inspection of, but not limited to, load bearing areas and sheaves for cracks, damage, corrosion, loose or missing components and premature wear. This more detailed inspection should be performed during rig up operations.

6.2.3 Category III

A thorough visual inspection of all load bearing components and members should be conducted to determine the condition of the mast/derrick and substructure and documented on the checklist in Annex A, Annex B, Annex C, or Annex D as applicable. The completed (and signed) checklist, as well as any major repairs completed, are to be documented in the permanent rig file. Inspections on well servicing, truck or trailer mounted masts should include observation of rig up/rig down operations.

6.2.4 Category IV

A Category III inspection, plus 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.

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-arounds, tong hangers, etc.

All welds (100 %) shall be visually examined.

All welds in critical areas shall be inspected using magnetic particle (MPI), liquid penetrant (PT) or ultrasonic testing (UT) in accordance with AWS D1.1. Welds on galvanized structures may require different inspection techniques and intervals. Cracks are generally identified through visual inspection on a galvanized mast/derrick.

6.3 Frequency of Inspection

The user/owner of the equipment should develop schedules of inspection based on experience, the manufacturer's recommendations, and one or more of the following factors:

— environment;

— load cycles;

— regulatory requirements;

— operating time;

— testing;

— repairs.

The inspection types and frequency in Table 1 are recommended.

Table 1—Inspection Types and Frequencies

Category	Frequency	Documentation
I	Daily	Optional
II	At Rig Up	Optional
III	Every 730 operating days[1]	Equipment File
IV	Every 3650 operating days[1]	Equipment File

[1] One operating day equals 24 operating hours.

The recommended frequencies in Table 1 apply for equipment in use during the specified period. In corrosive environments (humidity, salt, H_2S, 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.

Mast/derricks and substructures on mobile offshore drilling units (including drillships, semi-submersibles, or jack-ups) are exempt from the requirements of a Category IV inspection. Category IV inspections are required for rigs that are disassembled for transport from one drilling location to another drilling location, such as those used on fixed platforms or tension-leg platforms.

The beginning of the inspection frequency period starts with the manufacture of a structure and is reset after the highest applicable category inspection is performed. The time remaining until a structure's next inspection shall not be affected by the issuance of a new revision of API 4F.

6.4 Acceptance Criteria

Acceptance criteria should be established based on experience and manufacturer's recommendations. Worn equipment that does not meet the acceptance criteria should not be accepted for operation.

6.5 Rejected Equipment

Rejected equipment shall be marked and removed from service.

7 Repair

7.1 General

Structural repair of a drilling or well servicing structure shall be carefully planned prior to initiating work. The manufacturer or qualified person (see 4.2.1) shall be consulted for approval of materials and methods, utilizing accepted engineering practices. to supervise the required repairs.

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

a) Repair or replace any damaged members in accordance with Table 2.

b) 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.

c) Fixtures and accessories are preferably attached to structures by means of suitable clamps or bolted foundations.

d) 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.

e) Girts, braces, and other members shall always be in place when the structure is under load.

f) All damage may be repaired in the field. Major damage should be repaired in a shop-like environment and in accordance with the OEM or equivalent specifications.

g) Replacement materials, pins, and bolts should meet OEM specifications or equivalent.

7.2 Corrosion

As a guideline, corrosion damage reducing the cross-sectional area of a member of 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:

a) fill pockets/cavities with weld metal and grind flush;

b) fish plate the damaged region and seal weld or remove the damaged area and re-plate;

c) replace the entire member.

Following repair, the entire area should be recoated.

7.3 Fire and Heat Exposure

Following an exposure to temperatures exceeding 500 °F (260 °C), 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.

Table 2—Inspection Criteria

Deviation	Rejection Criteria
Legs	1/4 in. (6.4 mm) bow in 10 ft (3 m)
Braces	1/2 in. (12.7 mm) bow in 10 ft (3 m)
Overall alignment of structure	3/4 in. (19.1 mm) out of square
Pins	1/16 in. (1.6 mm) under specified diameter
Pin holes (I.D.)	3/16 in. (4.8 mm) over specified pin diameter (for pins less than 3 in. [76.2 mm] diameter) 1/4 in. (6.4 mm) over specified pin diameter (for pins 3 in. [76.2 mm] diameter or greater)
Corrosion	10 % reduction in cross sectional area
Structural members and wire rope	Sharp kink or bend in a local area
Connections and fittings	Loose connections or fittings
Bolts, pins and safety keys	Missing components or assemblies
Structural members	Missing members
Sheaves, rollers, and bearings	Do not turn freely, have cracks detected, sheave groove out of gage, or groove depth greater than allowed by sheave manufacturer
Structural members	Line cuts or abrasions from wire rope
Exposure to heat	In excess of 500 °F (260 °C)
NOTE Components displaying deviations should be considered for repair/replacement. This list is for guidance only. Specific components may have different rejection criteria based on OEM specifications.	

8 Modification/Upgrade

8.1 Planning

Structural modification 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 (see 4.2.1) utilizing accepted engineering practices should be employed to supervise the required repairs and/or modification.

When undertaking structural modifications of a drilling or well servicing structure, use welding procedures approved by the manufacturer or the qualified person directing the repairs or modifications as applicable. Drilling and well servicing structures may use high strength steel, which requires specific welding electrodes and welding techniques.

8.2 Design and Modification

Design modifications shall take into account their impact on the operating capacities of the drilling structure. Design modification and fabrication shall be performed by a qualified person in accordance with API 4F.

Fixtures and accessories are preferably attached to structures by means of suitable clamps or bolted foundations. Do not drill, weld, or burn any member without first obtaining approval of the manufacturer or a qualified person.

The designer of modifications to drilling structures shall take into account the impact of such modifications on operating capacities, environmental loads, erection loads, transportation loads, lifting load, structural overturning and foundation requirements, and other conditions as may be applicable. Fabrication associated with such modifications shall be done under the governance of a qualified quality assurance program in accordance with the instructions of the designer of the modifications.

8.3 Padeyes

Padeyes mounted on structural members or beneath crown frames should be designed and fabricated in accordance with API 4F. It is recommended that padeyes be identified with a SWL rating. Holes should be machine made. Welds should be NDT.

8.4 Lifting Eyes

Drilling rig masts incur the most damage when they are being handled. The use of lifting eyes will greatly reduce damage. Lifting eyes should be designed in accordance with API 4F. Lifting eyes are the designated position at which the mast should be handled by a crane or gin pole truck. Each lifting eye should be designed to bear a given load. The lifting eyes on a mast should be clearly marked and personnel should be made aware of their importance. Figure 1 provides some typical lug designs, which may be employed at the designated lifting eyes following the mast inspection. These schematics are provided for reference only and actual designs and placement shall be designed by a qualified person.

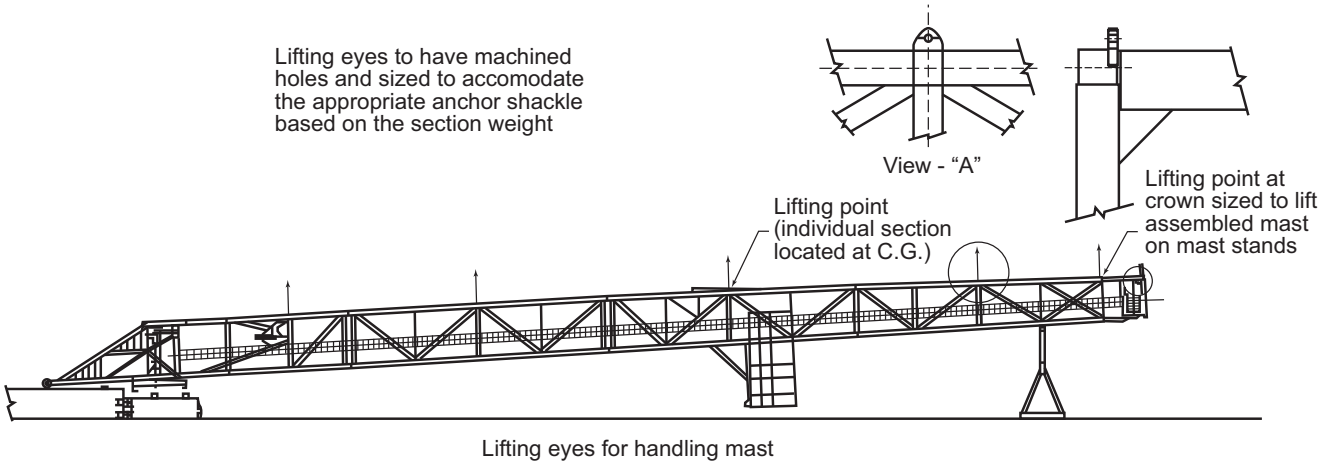


Figure 1—Typical Mast Lifting Lugs

9 Documentation and Records

9.1 Inspection and Repair Records

The user/owner should maintain and retain an equipment file containing pertinent information regarding the mast and substructure. Electronic records are permissible. The file should include the following.

a) Records of Category III and Category IV inspections. Annex A, Annex B, Annex C, and Annex D include forms which may be useful for documentation of these inspections.

b) Description of mast/derrick and or substructure including the following:

1) type and style, serial number, PSL and specifications;

2) name of manufacturer and date of manufacture;

3) clear height;

4) maximum rated static hook load, in pounds, with guylines if applicable, for stated number of lines to traveling block;

5) maximum combined rated static rotary and rated setback capacity on substructure;

6) list of components and assembly drawings; critical areas should be clearly defined.

c) Documentation of all repairs or modifications should be retained, and may include the following:

1) complete documented results of any inspection reports;

2) date and documentation of all repairs performed;

3) significant defects (type, dimensions) reported;

4) location and extent of repairs;

5) NDT methods and results;

6) primary load carrying components replaced or modified;

7) date and location of repairs;

8) copy of NDT inspection;

9) copy of NDT inspectors and welders qualifications;

10) material certifications and traceability as applicable;

11) assembly drawings and documentation of all modifications;

12) the date and the name of the qualified person(s) involved in the inspection, maintenance, repair or modification.

9.2 Identification/Traceability

Equipment serial number or identification markings provided by the manufacturer should be maintained on the equipment. Replacement of missing nameplates should be controlled and issued by the manufacturer.

Identification of equipment should be verified by the manufacturer in order to replace a missing nameplate.

Identification markings should be provided by the user/ owner for unidentified equipment. Serial numbers or identification markings should be recorded and retained.

9.2.1 Name Plate

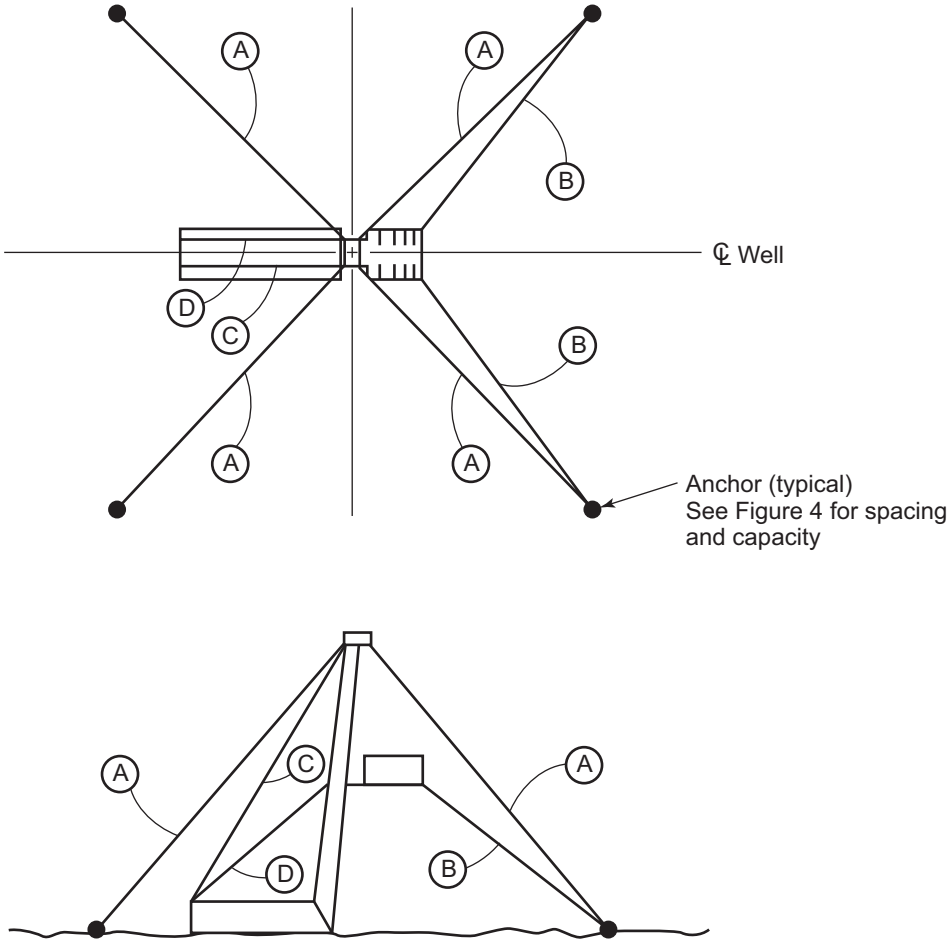
Masts and derricks should have a permanent nameplate attached to the structure indicating the following:

— name of manufacturer;

— model number and serial number, rating including static hook load capacity with number of lines strung to the traveling block;

— if guying is applicable, denote the recommended guying patterns;

NOTE If the manufacturer’s guying requirements are not denoted on the nameplate, the mast should be guyed in conformance with Figure 2.



Guyline	Recommended Size	Recommended Pretension	Sag
External Guy A	5/8 in.	1000 lb (373 kg)	See Figure above
External Guy B	9/16 in.	500 lb (187 kg)	See Figure above
Internal Guy C (2)	7/8 in.	1500 lb (560 kg) each	3 in. (76 mm)
Intermediate Guy D (2)	5/8 in.	1000 lb (373 kg) each	3 in. (76 mm)

NOTE 1 All guywires should be 6 × 19 or 6 × 37 class, regular lay, IPS, IWRC.

NOTE 2 Guywire catenary or sag may be used to estimate pretension, see Figure 3.

NOTE 3 See Figure 4 for anchor spacing and capacity.

NOTE 4 Intermediate Guywires D are recommended at option of manufacturer only.

Figure 2—Recommended Guying Pattern

9.2.2 Substructures

Substructures should have a permanent nameplate attached to the structure indicating the following:

— name of manufacturer;

— model number and serial number;

— combined rotary and setback capacity.

10 Unidentified Equipment—Load Rating Determination

10.1 Procedure

Inspection and engineering practice is the process required to determine a load rating for a well servicing or drilling structure of unknown manufacture. The process shall include the following steps:

a) initial inspection to survey member sizes and geometry and determine the condition of the structure;

b) structural analysis in accordance with API 4F to establish a load rating;

c) repairs and refurbishment to obtain full structural integrity;

d) final inspection;

e) attachment of identification nameplate;

f) documentation.

10.2 Qualification

Load ratings determination should be performed by a professional engineer who has successfully demonstrated the ability to perform structural analysis.

11 Foundation Requirements

11.1 General

The minimum design load for foundation requirements should be the sum of the weight of the drilling or well servicing structure, the weight of the machinery and equipment on it, the maximum anticipated hook or rotary load of the structure, forces due to external guywire loading, environmental forces (i.e. wind and waves, as applicable), and the maximum setback and rod load. Small settlements at the beginning of rig-up on a location are normal. Do not use the external guywires for plumbing the mast since neither the mast nor the guying system is intended for this purpose. Rig foundations and guywire tensions should be checked daily. The following conditions are reason to discontinue operations until the cause of the discrepancy is located and corrected:

a) there is large relative movement between the mast support structure and the rotary/setback support structure when the slips are set and the load is removed from the mast, or vice versa;

b) the empty traveling block does not hang over or near the well center and/or the mast support structure is not level;

c) the mast support structure or substructure subsides more on one side than the other with the application of load, and/or the guywire on one side becomes noticeably tighter when the tension in the guywire on the opposite side becomes noticeably less;

d) visual inspection of a guywire anchor reveals damage or movement.

11.2 Leveling and Shimming

Manufacturers are responsible for providing guidelines with respect to the leveling of structures and the use of shims. Shims present from the manufacturer should not be removed without the manufacturer's guidance. Shims required for the conditions of the location should be installed according to the manufacturer's instructions.

The following are conditions which may indicate the mast and/or substructure need to be leveled:

a) the empty traveling block does not hang over well center;

b) the mast or substructure subsides more on one side than the other with application of load;

c) a guy wire indicates an increase in tension where an opposite guy wire indicates a corresponding decrease in tension;

d) the drill string not hanging in the center of the rotary table makes setting slips difficult;

e) there is a relative movement of the mast support structure and the rotary support structure when slips are set and load is removed from the mast.

12 Raising/Bridle Line Inspection and Replacement

Three principal factors, which may limit the life of a raising line, are wear, corrosion, and damage. Wear is a function of the number of times a mast or substructure is raised. Corrosion is related to time and environmental conditions. Damage bears no relation to either wear or corrosion, and may occur at any time. The following points may be useful in determining inspection and replacement procedures.

a) Mast and/or substructure raising lines should be inspected before raising or lowering. Rusty raising lines should be inspected and replaced as necessary. Areas adjacent to end connection should be examined closely for any evidence of corrosion.

b) A line showing kinking, crushing, or any other damage resulting in distortion of the rope should be replaced.

c) Replacement of raising lines should be based on inspections and number of lifts.

d) Raising lines should be maintained in a well-lubricated condition. The field lubricants should be compatible with the original lubricant, and to this end the rope manufacturer should be consulted. The object of the rope lubrication is to reduce internal friction and to prevent corrosion.

e) Raising lines should have suitable fittings to prevent the rope from being bent over sharp edges and damaged.

f) Raising lines should be protected from abrasion caused by normal movement created during operations. The use of drillpipe rubbers and tying-back the bridle line may be considered.

g) In a multi-part wire rope substructure raising system, lines should be removed from service when any of the following conditions exist:

   — six (6) or more broken wires in one rope lay;

   — three (3) or more broken wires in one strand in one rope lay;

h) A mast raising line with any broken wires should be replaced.

13 Guying for Portable Masts with Guylines

13.1 General

Any mast designed to utilize guywires for mast stability should have all applicable guywires in position prior to commencing work. The number, placement, and size of guywires should meet the following criteria, as applicable.

a) Mast manufacturer's recommendations are preferred.

b) The guying data shown in Figure 2 can be used for reference, if applicable.

c) When Figure 2 or mast manufacturer's guying patterns cannot be utilized because of obstructions at the well site location (such as roads, pits, energized power lines, etc.), other guying patterns may be utilized provided they are based upon the technical recommendations of a qualified person. These recommendations should include a determination of guywire loads for well site specific conditions including hook load, wind load and foundation adequacy. The guying pattern should be available at the well site location.

The guywires should be 6×19 or 6×37 class regular lay, IPS (minimum), IWRC wire rope (see API 9B), not previously used in any other application.

13.2 Standing Ropes

Wire rope used as standing ropes, such as guylines, escape lines, and pendant lines should be removed from service when any of the following conditions exist:

— three (3) broken wires are found within one (1) lay length;

— two (2) broken wires are found at the end connection in the strand valley.

Other conditions to consider for removal of wire rope from service are:

— marked corrosion appears;

— corroded wires are observed at end connections;

— end connections are corroded, cracked, bent, worn, or improperly applied;

— evidence of kinking, crushing, cutting, cold working, or bird caging is observed.

13.3 Frequency of Inspection

All guylines should be visually inspected at least once each day when in use. Guylines should be thoroughly inspected once each month and a record made of the monthly inspection, designating any noted defects. See API 9B for recommendations on application, care, and use of wire rope. Other conditions for removal of wire rope from service are:

a) marked corrosion appears;

b) corroded wires at end connections;

c) end connections are corroded, cracked, bent, worn, or improperly applied;

d) evidence of kinking, crushing, cutting, cold working, or bird caging is observed.

13.4 Guywire End Terminations and Hardware

Guywire end terminations should be made in accordance with good guywire practice and the current edition of API 9B. The guywires should never be turned back over small radius eyes when making an end termination. Wire rope thimbles or appropriately sized sheaves should be used to turn back the guywire ends. When wire rope clips are used, double saddle type clips are recommended and should be installed in accordance with the clip manufacturer's recommendations including applying proper torque to the nuts.

NOTE When a sheave is used in place of a thimble for turning back the rope, add one additional clip.

When guying patterns other than those recommended by the mast manufacturer are used, the brackets used to attach the guywires to the mast or tubing board should be checked to make sure they have sufficient capacity for the maximum anticipated loads.

Guywire hardware such as shackles, turnbuckles, walking boomers, chain come-a-longs, load binders, etc., that remain in the live guywire system should have safe working load capacities that meet or exceed 40% of the breaking strength of the guywire. The handles on walking boomers, etc., should be positively secured to prevent accidental release. The use of grab hooks or open hooks on guywire terminations is not recommended.

13.5 Pretension of Guywires

The catenary or "sag" in the guywire may be used to estimate proper pretension. Figure 3 can be used as a guide to determine appropriate pretension values.

14 Guywire Anchors for Portable Masts with Guylines

14.1 General

Any type of anchor that meets the following spacing and capacity criteria, as applicable, is acceptable.

a) Mast manufacturer's recommendations.

b) In absence of mast manufacturer's recommendations or where mast manufacturer's recommendations cannot be utilized because of obstructions at the well site location (such as roads, pits, energized power lines, etc.), then the values shown in Figure 4 are recommended.

c) Anchors designed to support the guywire loads determined in accordance with 13.1 are acceptable when used with guywire patterns developed in that same section. The minimum verified capacity of guywire load(s) imposed on the anchor is defined in Figure 4.

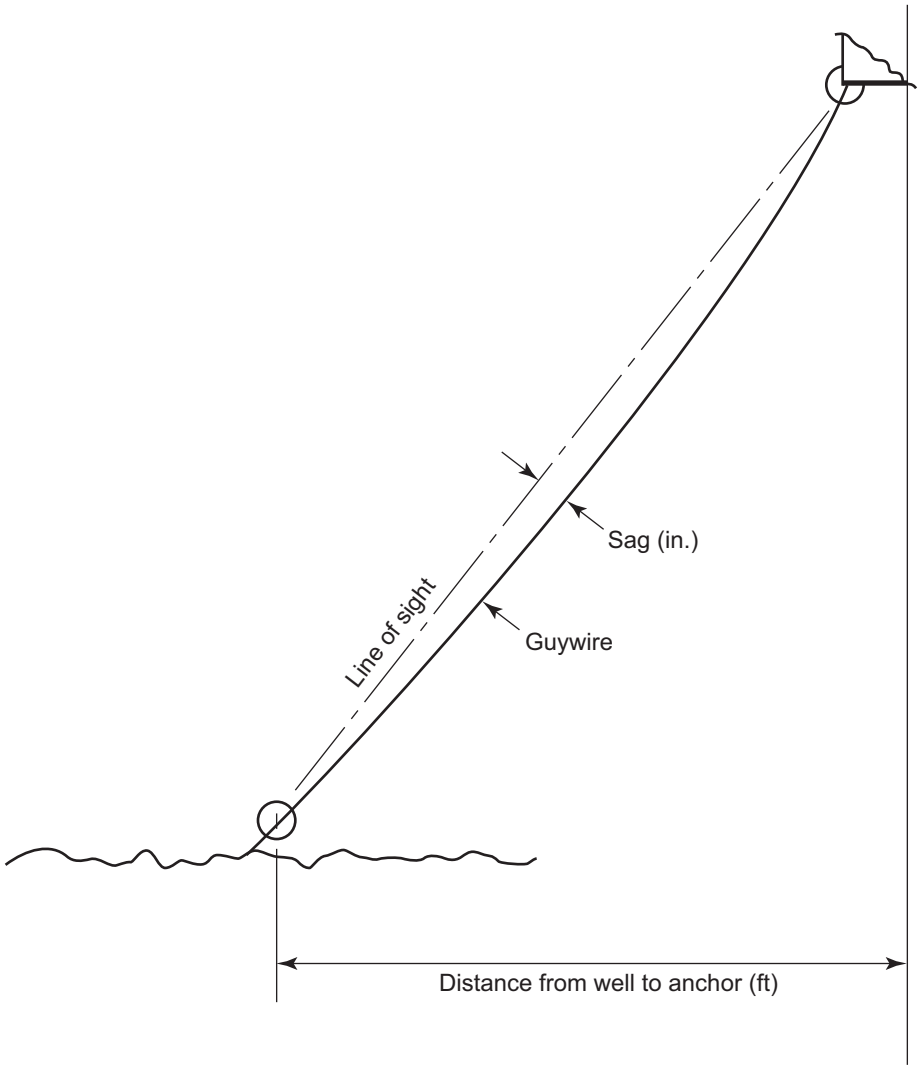
d) Requirements of applicable regulations.

e) Anchors should be structurally designed by qualified persons utilizing accepted engineering practices. Steel components should be protected against corrosion.

14.2 Capacity Verification

The capacity of each permanent anchor should be verified within 24 months prior to commencing work and should be rechecked if changes occur that would decrease the capacity of the anchor. The capacity may be verified by pull testing or other methods based upon accepted engineering practices that yield equivalent results to pull testing.

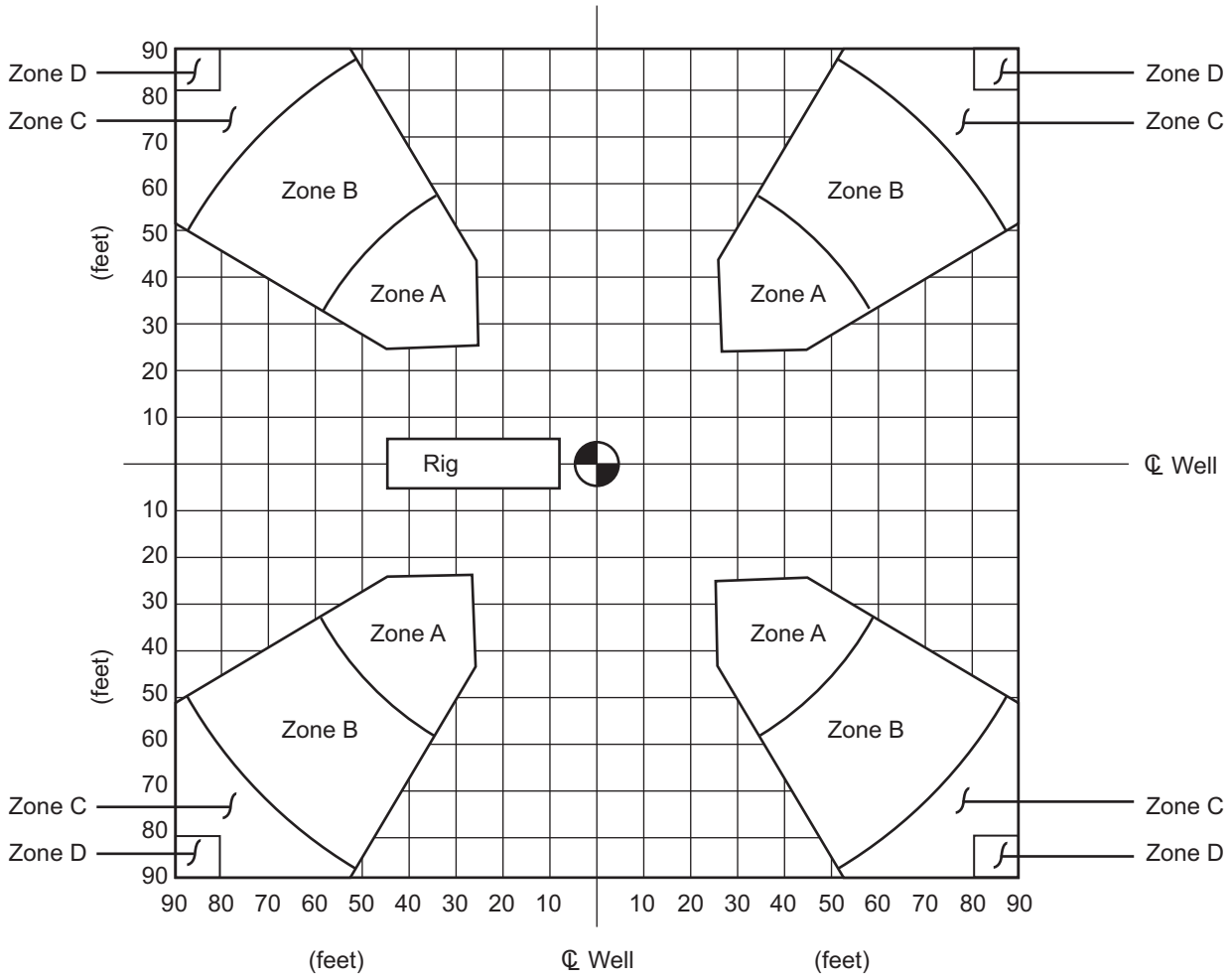
Anchors need to be retested to verify anchor capacity if changes occur such as deformation, or damage.



Distance to Well Anchor ft (m)	Guywire Sag in. (mm)					
	Pole Mast		Single Mast		Double Mast	
	Tubing Board Guy	Crown-ground Guy	Tubing Board Guy	Crown-ground Guy	Tubing Board Guy	Crown-ground Guy
40 (12)	—	4 (102)	4 (102)	4 (102)	6 (152)	5 (127)
60 (18)	—	6 (152)	8 (203)	6 (152)	12 (305)	8 (203)
80 (24)	—	10 (254)	15 (381)	10 (254)	17 (432)	11 (279)
100 (30)	—	16 (406)	22 (559)	16 (406)	26 (660)	15 (381)
120 (37)	—	18 (457)	32 (813)	18 (457)	32 (813)	21 (533)

NOTE These figures represent pretensions of 1000 lb. in crown-ground guywires and 500 lb. in tubing board guywires.

Figure 3—Guywire Sag (Catenary)



Zone	Anchor Capacity (Tons)		
	Double Mast	Single Mast	Pole Mast
A	15.6	7.0	7.0
B	11.5	5.0	5.0
C	9.0	5.0	5.0
D	7.4	5.0	5.0

Figure 4—Anchor Spacing and Capacity Criteria

14.3 Alternative Anchoring Practices

Properly designed substructures and base beams have been designed and approved by the manufacturer and used as anchorage for mast guywires. In such cases, dead weight of equipment and fabricated components such as padeyes determine anchor capacity. The capacity of such items can be determined through engineering calculations. Base beam anchor pull testing is not necessary but calculations should be done by the manufacturer of the anchor or a professional engineer.

Manufacturers of screw-in type anchors have correlated anchor capacity to torque required to install the anchor. This “torque method,” when used in accordance with the anchor manufacturer’s instructions, is a valid method for

determining anchor capacity. Screw-in anchors will be installed and verified utilizing a mechanical method (pull-tested or shear-torque method).

Anchors need to be retested to verify anchor capacity if changes occur such as deformation, or damage.

14.4 Pull Testing and Site Preparation

Where pull testing is utilized to verify anchor capacity, the following should apply.

a) The direction of pull should be applied to the anchor in the plane of the anchor and the wellhead at an angle, which approximates the guywire angle.

b) The test pull should be applied for at least two (2) minutes after all anchor movement has stopped. Anchors should be tested by devices equipped with chart recorders to provide a permanent record of the pull test.

c) Devices used to measure and/or record the amount of pull should be calibrated annually or when damaged/repaired by a qualified independent equipment service owner/user company. Current records of calibration should be maintained with the equipment by the party responsible for the pull test equipment.

Anchors should be installed such that liquids drain away from the anchor shaft. Soil should be mounded up and tightly packed around the anchor shaft to help keep fluids away from subsurface anchor components.

14.5 Responsibilities of Contractor, Operator, and Testing Company

The rig contractor shall be responsible for:

— insuring that anchor capacities are verified prior to attaching guywires to the anchors, that the verification is less than 24 months old and that anchor spacing and capacity is suitable for the mast guying pattern and anticipated loading;

— maintaining all guywires and end terminations in good working condition;

— inspecting anchors for damage or deterioration prior to rigging up;

— inspecting surface ground conditions that might indicate reduced anchor capacity;

— properly aligning the rig in relation to the wellhead and anchors;

— placing a visible marker on each guywire;

— replacing soil around anchor in accordance with 14.4.

The well site owner/operator shall be responsible for the following.

— Installing anchors at each well site in accordance with 14.1.

— Providing anchor capacity verification in accordance with 14.2.

— Replacing anchors that are damaged or excessively deteriorated or that fail anchor capacity verification.

— A permanent file record for anchors, which are installed or tested, should be maintained. The file should include dates of installation, each capacity verification, pull test charts and the name and telephone number of the party conducting the capacity verification.

— The most current records of capacity verification should be on a weather resistant tag securely attached to every anchor that has been tested. The tag should indicate the capacity of each anchor and the date of the capacity verification.

— Placing a visible marker on each anchor furnished, installed or specified by the well site owner/operator.

The party conducting capacity verification on anchors shall be responsible for the following.

— Maintaining test equipment in good working condition.

— Providing required records to the well site operator/owner, and/or contractor as applicable. Installation of weatherproof tag following each pull test. The tag should indicate the capacity of each anchor and the date of the capacity verification.

— Maintain all testing equipment in good working condition and calibrate the pull testing equipment a minimum of once per year or following damage/repair.

15 Foundations for Masts and Substructures

15.1 Foundations and Supplemental Footing

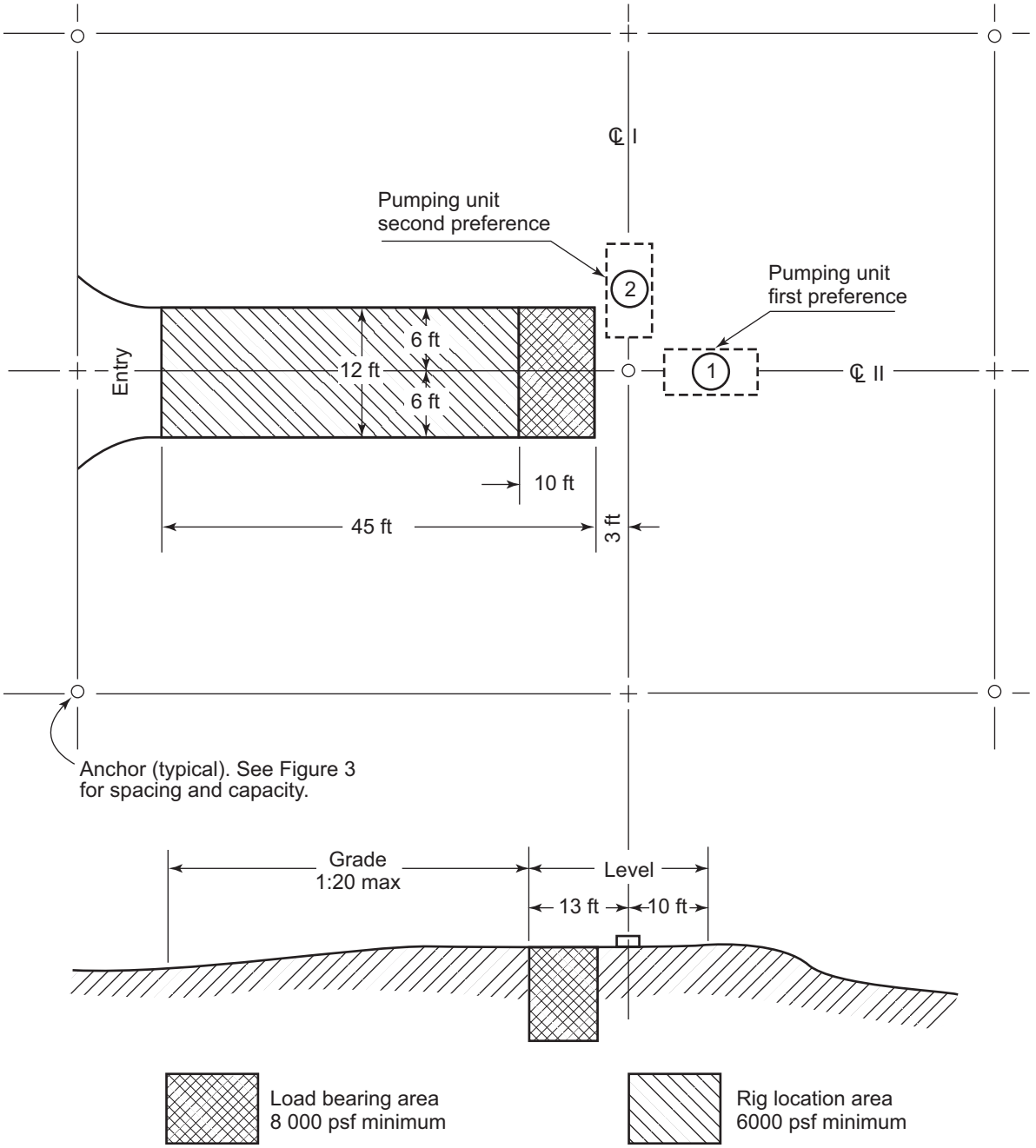
Adequate foundations are an essential element in providing stability for masts, substructures and rig carrier support points. Foundation design shall consider safe bearing capacity of local ground conditions, concentrated loads at mast, substructure and rig carrier support points, supplemental footing required to safely distribute concentrated loads to the ground, and location preparation.

Location sites for drilling and servicing rigs should be graded and adequately drained. They should be constructed and maintained by the site owner/leasee so that oil, water, drilling fluid and other fluids will drain away from the working area. Drainage ditches passing beneath load bearing members in contact with the ground reduce effective bearing area and tend to reduce the ability of adjacent ground to bear load. The routing of ditches under load bearing structural members should be avoided. Wet conditions will significantly reduce the safe bearing capacity of soil. A recommended location preparation to provide ground conditions necessary for safe operation of truck or trailer mounted masts is shown in Figure 5.

The safe bearing capacity of local ground conditions may be determined from Table 3 or from appropriate soil core tests, penetrometer test, suitable soil test and analysis methods, or empirical tests and data. Where surface conditions are used to determine safe bearing capacity, care must be exercised to insure that the soil is homogeneous to a depth at least twice the width of supplemental footing used to support the concentrated load. Underlying soft soil layers to this depth should be used to determine safe bearing capacity rather than firmer surface soil.

Supplemental footing must be provided to distribute the concentrated loads from the mast, substructure and rig carrier support points to the ground. The manufacturer’s load distribution diagram indicates the location of these concentrated loads and their magnitude for maximum loading conditions. If manufacturer’s load distribution diagram is not available, or for loading conditions less than maximum, supplemental footing should be designed to carry the hook load encountered plus the gross weight of mast and mast mount, the traveling equipment, and the vertical components of guywire tensions under loading conditions, and to carry the mast and mast mount weight during mast erection.

The area and the stiffness of the supplemental footing must be such that concentrated loads are distributed to the ground without exceeding the safe bearing capacity of the soil. Steel beams and/or timbers used to construct supplemental footing should be designed so that applicable stresses in the member(s) are within allowable limits. Timbers should be free of excessive knots and free of splits.



NOTE 1 Load bearing area: compacted sand or gravel requiring picking for removal or better base. Safe bearing capacity desired—min., 8000 psf, level and drained.

NOTE 2 Rig location area: may grade away from well along centerline II at max. drop of 1:20. Should be level across grades parallel to centerline I. Safe bearing capacity desired—min., 6000 psf. Allow maneuvering entry for drive in or back in. Drainage of entire area required.

Figure 5—Portable Mast Location Preparation

Table 3—Safe Bearing Capacity of Soils[a]

Soil Type	Bearing Capacity lbf/ft^2 (kPa)
Solid ledge of hard rock, such as granite, trap, etc.	50,000 (2394)
Sound shale and other medium rock requiring blasting for removal	20,000 (958)
Hard pan, cemented sand and gravel difficult to remove by picking	16,000 (766)
Soft rock, disintegrated ledge; in natural ledge, difficult to remove by picking	10,000 (479)
Compact sand and gravel requiring picking for removal	8,000 (383)
Hard clay requiring picking for removal	8,000 (383)
Gravel, coarse sand, in natural thick beds	8,000 (383)
Loose, medium, and coarse sand, fine compact sand	3,000 (144)
Medium clay, stiff but capable of being spaded	4,000 (192)
Fine loose sand	2,000 (96)
Soft clay	Less than 2,000 (96)

[a] Values taken from Marks' Mechanical Engineers' Handbook.

15.2 Wellhead Cellars

Wellhead cellars at a location site may present special considerations for safe operation of a portable mast. Earthen cellars have the potential for cave-in. They also fill with rain, well bore fluids or other fluids that can seep into the ground under the mast supplemental footing and reduce the safe bearing capacity of the soil. Earthen cellar walls lined with timbers have the same seepage potential. Large concrete cellars may require special steel beams to span the cellar in order to provide suitable mast support. These conditions should be studied by a qualified person to insure that adequate mast foundation is provided.

16 Low-temperature Operations

The exposure to low temperature during mast lowering and raising operations may increase the possibility of failure. These operations have been accomplished successfully in temperatures as low as –50 °F (–45.6 °C). Low temperature operations may be accomplished by a program of closely controlled inspection and handling procedures. This should reduce damage and impact loading during raising and lowering operations. Each user/owner of the equipment should define the critical temperatures for limiting the use of the equipment, if possible in consultation with the manufacturer.

The following recommended practices are included for reference.

a) To the extent possible, schedule mast raising and lowering operations to take place at the "warmest" time of the day; take advantage of any sunlight or predictable atmospheric conditions. Take into account wind velocity factors.

b) Make use of any practical, available means to warm sections of the mast, such as using high-pressure steam or hot air blowers to heat the points of attachment between the mast and its base.

c) Take up and loosen mast-raising lines several times to assure the free movement of all parts.

d) Warm up engines and check the proper functioning of all machinery to assure that there will be no malfunctions, which would result in sudden braking or jarring of the mast. Mast travel, once begun, must be slow, smooth, and continuous.

e) Inspection and repair as provided in Section 6 and Section 7 are extremely critical under low temperature conditions.

f) Welding should not be done when the ambient temperature is below 0 °F (–17.8 °C). All steel grades that are commonly used in the fabrication of oilfield structures require preheat when the parts being joined are less than 32 °F (0 °C). Several steel grades require preheat, controlled interpass temperature and post weld heat treatment even if the material is above 32 °F (0 °C). Check with the manufacturer of the structure before welding.

Annex A
(informative)

Drilling Mast Visual Inspection Form

The form in this annex is intended for free exchange between owners/operators of the equipment or users of this document.

Drilling Mast
Category III/IV - Visual Field Inspection Form

Type of inspection performed (check one box only):

☐ Category III Inspection ☐ Category IV Inspection

Mast—A structural tower comprised of one or more sections and then raised to the operating position. If the unit contains two or more sections, it may be telescoped or unfolded during the erection procedure.

PURPOSE & SCOPE OF INSPECTION: This report form and inspection procedure was developed as a guide for making and reporting field inspection in a thorough and uniform manner. The procedure is intended for use by operating personnel (or a designated representative) to the extent that its use satisfies conditions for which an inspection is intended. More detailed and critical inspections may be scheduled periodically, or ordered to supplement a program of these inspections; if masts are used in the upper range of their load limits, or if structures may have been subjected to critical conditions which could effect safe performance. This form is provided strictly as a guide, and the API accepts no liability whatsoever for its use or scope.

MARKING DAMAGE: At the time of inspection, damaged sections or equipment must be clearly and visibly marked so that needed repairs may be made. A bright, contrasting spray paint is suggested for this. When repairs are made, the visible markings should be removed by painting over them. It is also necessary for the inspector to write "None" when no damage markings are needed, as this is his indication that the item has passed inspection. It is recommended that inspection be made with assistance of manufacturer's assembly drawing and operating instructions. For items not accessible or that do not apply, draw a line through the item pertaining to the component.

Company: _____ Rig #: _____

Date: _____

Location: _____ Mast Manufacturer: _____

Date of Manufacture: _____

Manufacturer's Drawing Available for Use in Inspection: Yes: _____ No: _____

Manufacturer's Rating: _____ Height: _____

Mast Serial #: _____

Mast Type: Telescoping: _____ Cantilevered: _____

Mast Position: Disassembled: _____ Standing: _____ Lying down: _____

Mast Nameplate on Structure: Yes: _____ No: _____

Component Numbers Present: Yes: _____ No: _____

Inspected By: _____ Representing: _____

DRILLING MASTS

Items that do not need attention should be checked to indicate that the item was inspected. Items that are not applicable should be marked in the box as "NA" (not applicable). Items that are warped, worn, damaged, cracked welds, rusted, bent, in need of repair or replacement, or otherwise in need of further attention, mark an "**X**" in the box and provide comments on the inspected items.

✓	OK	**X1**	Requires immediate attention
NA	Not applicable	**X2**	Requires attention next move
U	Unable to access	**X3**	Requires attention next maintenance
M	Missing	**X4**	Requires attention when convenient

Provide comments regarding inspected items.

COMMENTS REGARDING INSPECTED ITEMS

1.0 Crown Assembly

Make/Model: _____

1.1 Sheaves

Number of Sheaves: _____ Main Cluster Sheave Diameter: _____

Fast Line Sheave Diameter: _____

Condition:

- [ ] Sheaves: _____
- [ ] Grooves in Gage: _____
- [ ] Spacers or Seals: _____
- [ ] Grease Fittings: _____
- [ ] Bearings: _____
- [ ] Drilling Line Guards:

1.2 Crown Platform

- [ ] Decking: _____
- [ ] Holes Covered: _____
- [ ] Safety Gate: _____
- [ ] Ladder Access: _____
- [ ] Handrails: _____
- [ ] Frame Straight: _____
- [ ] Welds: _____
- [ ] Bolts and Nuts: _____

1.3 Crown Support Beams:

- [ ] Beam Straight: _____
- [ ] Pins & Bolts: _____
- [ ] Safety Pins/Keepers: _____
- [ ] Welds: _____

1.4 Additional Sheave Assemblies in Crown:

Name: _____

- [ ] Condition: _____

1.5 Pad-eyes Under the Crown Platform:

- [ ] SWL Marked: _____
- [ ] Welds: _____
- [ ] Pin Holes _____

COMMENTS REGARDING INSPECTED ITEMS

1.6 Fall Arrest/Climbing Assist Device Mounting:

- ☐ Support Pole:
- ☐ Base:
- ☐ Sheave Attachment:
- ☐ Weight Bucket Attach:
- ☐ Welds:

1.7 Crown Saver Block(s):

- ☐ Safety Mesh:
- ☐ Safety Cable:
- ☐ Block(s) Condition:
- ☐ Attachment Strapping:
- ☐ Strapping Welds:

Number of Visible Marks Applied:

2.0 Mast Legs:

2.1 Front Leg, Drillers Side:

- ☐ Leg Straight:
- ☐ Pin Connections:
- ☐ Pin Hole(s):
- ☐ Pins:
- ☐ Safety Pins/Keepers:
- ☐ Welds:

2.2 Front Leg, Off Drillers Side:

- ☐ Leg Straight:
- ☐ Pin Connections:
- ☐ Pin Hole(s):
- ☐ Pins:
- ☐ Safety Pins/Keepers:
- ☐ Welds:

2.3 Rear Leg, Drillers Side:

- ☐ Leg Straight:
- ☐ Pin Connections:
- ☐ Pin Hole(s):
- ☐ Pins:
- ☐ Safety Pins / Keepers:
- ☐ Welds:

2.4 Rear Leg, Off Drillers Side:

- ☐ Leg Straight:
- ☐ Pin Connections:
- ☐ Pin Hole(s):
- ☐ Pin(s):
- ☐ Safety Pins/Keepers:
- ☐ Welds:

Number of Visible Marks Applied:

COMMENTS REGARDING INSPECTED ITEMS

3.0 Spreaders (Back Panel Trusses)

- [ ] Members Straight: _____
- [ ] Bolts: _____
- [ ] Pin/Bolt Hole(s): _____
- [ ] Pins: _____
- [ ] Safety Pins/Keepers: _____
- [ ] Welds: _____

Number of Visible Marks Applied: _____

4.0 Girt(s) and Bracing:

- [ ] Members Straight: _____
- [ ] Welds: _____

Number of Visible Marks Applied: _____

5.0 Mast Feet or Pivots

- [ ] Condition: _____
- [ ] Pin Hole(s): _____
- [ ] Pins: _____
- [ ] Safety Pins/Keepers: _____
- [ ] Welds: _____

Number of Visible Marks Applied: _____

6.0 Deadline Anchor Mounting: (Reference API RP 8B)

- [ ] Supports: _____
- [ ] Bolts: _____
- [ ] Anchor Mounting Welds: _____
- [ ] Brass Inserts: _____

Number of Visible Marks Applied: _____

7.0 A-Frame/Gin Pole

7.1 Driller's Side Legs:

- [ ] Leg Straight: _____
- [ ] Pin Hole(s): _____
- [ ] Pins: _____
- [ ] Safety Pins/Keepers: _____
- [ ] Welds: _____

7.2 Off Driller's Side Legs:

- [ ] Leg Straight: _____
- [ ] Pin Hole(s): _____
- [ ] Pins: _____
- [ ] Safety Pins/Keepers: _____
- [ ] Welds: _____

7.3 Spreaders or Trusses:

- [ ] Members: _____
- [ ] Welds: _____

7.4 Upper Connections:

- [ ] Members: _____
- [ ] Welds: _____

		COMMENTS REGARDING INSPECTED ITEMS
7.5	Lower Connections:	
☐	Pin Connections:	
☐	Pin Hole(s):	
☐	Pins:	
☐	Safety Pins/Keepers:	
☐	Welds:	
Number of Visible Marks Applied:		

See Section 10.0 for Raising Sheave Check List.

8.0 Working Platforms:

8.1	Pipe Racking Platform:	
☐	Frame Straight:	
☐	Pin Hole(s):	
☐	Pins:	
☐	Safety Pins/Keepers:	
☐	Frame Welds:	
☐	Working Platform:	
☐	Landing Platform:	
☐	Handrails:	
☐	Ladder Access:	
☐	Fingers Straight:	
☐	Finger Welds:	
☐	Finger Safety Line(s):	
☐	Hoist Mounting:	
Number of Visible Marks Applied:		
8.2	Casing Stabbing Board:	
☐	Frame Straight:	
☐	Welds:	
☐	Handrails:	
☐	Working Platform:	
☐	Hoisting Assembly:	
☐	Hoist Mounting:	
☐	Lower Travel Stops:	
☐	Pin or Bolt Holes:	
☐	Pins or Bolts:	
☐	Safety Pins/Keepers:	
Number of Visible Marks Applied:		
8.3	Tubing Support/Belly Board:	
☐	Frame Straight:	
☐	Welds:	
☐	Handrails:	
☐	Pin Holes:	
☐	Pins:	
☐	Safety Pins/Keepers:	
☐	Support Cables:	
☐	Cable Connections:	
Number of Visible Marks Applied:		

COMMENTS REGARDING INSPECTED ITEMS

9.0 Ladders:

- ☐ Vertical Rails Straight:
- ☐ Rails in Alignment:
- ☐ Ladder Stand Offs:
- ☐ Stand Off Connections:
- ☐ Rail Welds:
- ☐ Rungs:
- ☐ Rung Welds:
- ☐ Rung Spacing:
- ☐ Access at Rig Floor:
- ☐ Cage:
- ☐ Toe Clearance:

Number of Visible Marks Applied:

10.0 Raising and Telescoping System

10.1 Raising Line System—Refer to API Spec 9B, for Specifications:

- ☐ Wireline:
- ☐ Wireline—Sockets:
- ☐ Pins:
- ☐ Safety Pins/Keepers:
- ☐ Sheaves Turn Freely:
- ☐ Sheaves:
- ☐ Grooves in Gage:
- ☐ Spacers or Seals
- ☐ Grease Fittings:
- ☐ Bearings:
- ☐ Line Guards:
- ☐ Welds:
- ☐ Equalizer Assembly:

Number of Visible Marks Applied:

10.2 Hydraulic or Telescoping System:

Hydraulic Cylinders—Raising:

- ☐ Seals:
- ☐ Main Ram:
- ☐ Cylinder Hinge Points:
- ☐ Hinge Pin Hole(s):
- ☐ Hinge Pins:
- ☐ Safety Pins/Keepers:
- ☐ Hydraulic Hoses:
- ☐ Hose Connections:
- ☐ Bleed Valve:

Hydraulic Cylinder(s) Telescoping:

- ☐ Seals:
- ☐ Main Ram:
- ☐ Cylinder Hinge Points:
- ☐ Pin Hole(s):
- ☐ Pins:
- ☐ Safety Pins/Keepers:
- ☐ Hydraulic Hoses:
- ☐ Hose Connections:
- ☐ Cylinder Stabilizers:
- ☐ Bleed Valve:
- ☐ Lubrication:

	COMMENTS REGARDING INSPECTED ITEMS
Mast Guides:	
☐ Cleaned:	
☐ Lubricated:	
Number of Visible Marks Applied:	

11.0 Locking Device & Seats—Telescoping Masts:

☐ Pin Hole(s):	
☐ Pins:	
☐ Safety Pins/Keepers:	
☐ Bars/Dogs or Pawls:	
☐ Seats:	
☐ Mechanism:	
Number of Visible Marks Applied:	

12.0 Tong Counterweights:

☐ Guides:	
☐ Weight Device:	
☐ Sheaves/Shafts:	
☐ Wirelines:	
☐ Cable Clamps:	
☐ Welds:	
Number of Visible Marks Applied:	

13.0 Miscellaneous Sheave Assemblies:

☐ Clevis/Shackle:	
☐ Mast Pad-eye:	
☐ Sheaves:	
☐ Bearings:	
☐ Shafts:	
☐ Sheave Bolt:	
☐ Side Plate Bolts:	
☐ Bolt Safety Pins:	
☐ Grease Fittings:	
☐ Safety Line:	

14.0 Mast Boom Assembly:

☐ Mounting Brackets:	
☐ Sheaves:	
☐ Boom Pole:	
☐ Support Cable/Clamps:	
☐ Bolts/Nuts:	
☐ Sheave Shaft:	
☐ Bolt Safety Pins:	
☐ Grease Fittings:	
Number of Visible Marks Applied:	

15.0 Ancillary Equipment:

15.1 Mud Line Clamps:

☐ Pipe Clamps:	
☐ Leg Clamps:	
☐ Welds:	
☐ Bolts/Nuts:	

COMMENTS REGARDING INSPECTED ITEMS

15.2 Gas Vent Line Clamps:
- [ ] Pipe Clamps:
- [ ] Leg Clamps:
- [ ] Welds:
- [ ] Bolts/Nuts:

15.3 Climber Assist System: (See User's Manual for Specific Inspection Requirements)
- [ ] Cable:
- [ ] Cable Attachments:
- [ ] Counter Weight:
- [ ] Sheave/Control Descent Device:

15.4 Fall Arrest System: (See User's Manual for Specific Inspection Requirements)
- [ ] Cable:
- [ ] Cable Attachments:
- [ ] Device Attachment:
- [ ] Sheave/Control Descent Device:

15.5 Mast Escape Device: (See User's Manual for Specific Inspection Requirements)
- [ ] Mast Attachment:
- [ ] Cable:
- [ ] Device Condition:

15.6 Windwalls/Frames and Attachments
- [ ] Frame Condition:
- [ ] Frame Welds:
- [ ] Frame Bolts/Pins
- [ ] Metal Wall Sections:

15.7 Topdrive Mounting System:
- [ ] Rail(s):
- [ ] Pad-eyes:
- [ ] Mounting Brackets:
- [ ] Pins/Bolts:
- [ ] Safety Pins/Keepers:
- [ ] Cables:
- [ ] Block Dollies:
- [ ] Welds:

16.0 Corrosion (refer to Section 7.2):

17.0 Paint/Coating

☐ Condition:

18.0 Comments, Sketches, and/or Pictures:

Inspector's Signature **Date:**

Owner Representative Signature: **Date:**

Annex B
(informative)

Well Servicing Masts Visual Inspection Form

The form in this annex is intended for free exchange between owners/operators of the equipment or users of this document.

Well Servicing Masts (Guyed, Carrier\Trailer Mounted)
Category III/IV - Visual Field Inspection Form

Type of inspection performed (check one box only):

☐ Category III Inspection ☐ Category IV Inspection

PURPOSE & SCOPE OF INSPECTION: This report form and inspection procedure was developed as a guide for making and reporting field inspection in a thorough and uniform manner. The procedure is intended for use by operating personnel (or a designated representative) to the extent that its use satisfies conditions for which an inspection is intended. More detailed and critical inspections may be scheduled periodically, or ordered to supplement a program of these inspections; if masts are used in the upper range of their load limits, or if structures may have been subjected to critical conditions which could effect safe performance. This form is provided strictly as a guide, and the API accepts no liability whatsoever for its use or scope.

MARKING DAMAGE: At the time of inspection, damaged sections or equipment must be clearly and visibly marked so that needed repairs may be made. A bright, contrasting spray paint is suggested for this. When repairs are made, the visible markings should be removed by painting over them. It is also necessary for the inspector to write "None" when no damage markings are needed, as this is his indication that the item has passed inspection. It is recommended that inspection be made with assistance of manufacturer's assembly drawing and operating instructions. For items not accessible or that do not apply, draw a line through the item pertaining to the component.

Company: _____ Rig #: _____

Date: _____

Location: _____ Mast Manufacturer: _____

Manufacturer's Drawing Available for Use in Inspection: Yes: _____ No: _____

Manufacturer's Rating: _____ Height: _____

Mast Serial #: _____

Mast Type: One Piece _____ Telescoping _____ Folding _____

Mast Position: Standing _____ Lying down _____ Disassembled _____

Mast Nameplate on Structure: Yes: _____ No: _____

Inspected By: _____ Representing: _____

GUYED MAST

Items that do not need attention should be checked to indicate that the item was inspected. Items that are not applicable should be marked in the box as "NA" (not applicable). Items that are warped, worn, damaged, cracked welds, rusted, bent, in need of repair or replacement, or otherwise in need of further attention, mark an "**X**" in the box and provide comments on the inspected items.

✓	OK	X1	Requires immediate attention	Provide comments regarding inspected items.
NA	Not applicable	X2	Requires attention next move	
U	Unable to access	X3	Requires attention next maintenance	
M	Missing	X4	Requires attention when convenient	

COMMENTS REGARDING INSPECTED ITEMS

1.0 Crown Assembly

1.1 Sheaves

Number of Sheaves: _____ Main Cluster Sheave Diameter: _____

Hoisting Line Size: _____ Fast Line Sheave Diameter: _____

Condition:

	Main Sheaves:	
	Fastline Sheaves:	
	Sandline Sheaves:	
	Grooves in Gage:	
	Bearings:	
	Seals:	
	Line Guards:	
	Grease Fittings:	
	Center Pin Locks:	
	Winch Line Sheaves:	
	Retracting Line Sheaves:	
	Sheave Material Type:	Cast Iron _____ Fab Steel _____ Phenolic Resin _____

Number of Visible Marks Applied: _____

2.0 Crown Block Structure

	Crown Railing:	
	Crown Frame:	
	Safety Gate:	
	Guyline Support Eyes:	
	Loadline Support Eyes:	
	Sheave Pedestal Mounts:	
	Crown Decking:	
	Fall Protection Mount:	
	Fall Protection Device:	

Number of Visible Marks Applied: _____

3.0 Upper Mast Section

	Operator's Side Front Leg:	
	Operator's Side Rear Leg:	
	Off Side Front Leg:	
	Off Side Rear Leg:	
	C Sections:	
	Diagonal Bracing:	
	Back Bracing:	
	Rod Basket Mounts:	
	Tubing Board Mounts:	
	Upper Latch Assembly (Lo	
	Cotter Keys in Place:	
	Ram Stabilizers:	
	Mast Lighting Mounts:	

Number of Visible Marks Applied: _____

COMMENTS REGARDING INSPECTED ITEMS

4.0 Lower Mast Section

- [ ] Operator's Side Front Leg:
- [ ] Operator's Side Rear Leg:
- [ ] Off Side Front Leg:
- [ ] Off Side Rear Leg:
- [ ] C Sections:
- [ ] Diagonal Bracing:
- [ ] Back Bracing:
- [ ] Lower Latch Assembly (Lock):
- [ ] Cotter Keys in Place:
- [ ] Mast Hinge Points:
- [ ] Stand Pipe Mounts:
- [ ] Block Hanging Assembly:
- [ ] Leg Adjustment Screws:
- [ ] Rating Tags in Place:
- [ ] Telescoping Cylinder Stabilizers:

Number of Visible Marks Applied:

5.0 Tubing Board

- [ ] Tubing Board Frame:
- [ ] Frame Hinge Points:
- [ ] Tail Gate Hinge Points:
- [ ] Left Support Line Anchor:
- [ ] Right Support Line Anchor:
- [ ] Diving Board:
- [ ] Hand Rails:
- [ ] Fingers:
- [ ] Safety Cables on Fingers:
- [ ] Support Cables:

Number of Visible Marks Applied:

6.0 Rod Basket

- [ ] Rod Basket Frame:
- [ ] Rod Racks (fingers):
- [ ] Load Line Anchor Points:
- [ ] Rod Rack Hinge Points:
- [ ] Support Cables:

Number of Visible Marks Applied:

7.0 Pipe Racking Platform (Drilling Applications):

- [ ] Frame Straight:
- [ ] Pin Hole(s):
- [ ] Pins
- [ ] Safety Pins/Keepers:
- [ ] Frame Welds:
- [ ] Working Platform:
- [ ] Landing Platform:
- [ ] Handrails:
- [ ] Ladder Access:
- [ ] Fingers Straight:
- [ ] Finger Welds:
- [ ] Finger Safety Line(s):
- [ ] Hoist Mounting:

Number of Visible Marks Applied:

COMMENTS REGARDING INSPECTED ITEMS

8.0 Base Mast Section

- ☐ Base Section Structure:
- ☐ Diagonal Supports:
- ☐ Turnbuckles:
- ☐ Hinge Points:
- ☐ Push Points:
- ☐ Mast Locking Device:
- ☐ Support Beam:
- ☐ Angle Adjustment Screws:
- ☐ Load Adjustment Screws:

Number of Visible Marks Applied:

9.0 Main Hydraulic Ram/Raising Cylinder
(Shall be inspected during rig-up/rig-down operation.)

- ☐ Cylinder Hinge Points:
- ☐ Hydraulic Connections:
- ☐ Hydraulic Hoses:
- ☐ Hinge Pins:
- ☐ Retaining Pins or Locks:
- ☐ Main Ram:
- ☐ Seals:
- ☐ Bleed Valve:

10.0 Telescoping Hydraulic Ram/Cylinder

- ☐ Cylinder Push Points:
- ☐ Hydraulic Connections:
- ☐ Hydraulic Hoses:
- ☐ Connecting Pins:
- ☐ Retaining Pins or Locks:
- ☐ Telescoping Ram:
- ☐ Seals:
- ☐ Bleed Valve:

11.0 Ladders:

- ☐ Vertical Rails Straight:
- ☐ Rails In Alignment:
- ☐ Ladder Stand Offs:
- ☐ Stand Off Connections:
- ☐ Rail Welds:
- ☐ Rungs/Welds:
- ☐ Rung Spacing:
- ☐ Access at Rig Floor:
- ☐ Toe Clearance:

Number of Visible Marks Applied:

12.0 Tong Counterweights (Drilling Applications):

- ☐ Guides:
- ☐ Weight Device:
- ☐ Sheaves/Shafts:
- ☐ Wirelines:
- ☐ Cable Clamps:
- ☐ Welds:

Number of Visible Marks Applied:

COMMENTS REGARDING INSPECTED ITEMS

13.0 Miscellaneous Sheave Assemblies:

- ☐ Clevis/Shackle:
- ☐ Mast Pad-eye:
- ☐ Sheaves:
- ☐ Bearings:
- ☐ Shafts:
- ☐ Sheave Bolt:
- ☐ Side Plate Bolts:
- ☐ Bolt Safety Pins:
- ☐ Grease Fittings:
- ☐ Safety Line:

Number of Visible Marks Applied:

14.0 Carrier Components

- ☐ Dead Line Anchor:
- ☐ Rear Jack Beam:
- ☐ Front Jack Beam:
- ☐ Load Line Tiedowns:
- ☐ Load Line Turnbuckles:
- ☐ Load Line Condition:
- ☐ Load Line Size:
- ☐ Tubing Line Condition:
- ☐ Proper Jack Stands:

Number of Visible Marks Applied:

15.0 Corrosion (refer to Section 7.2):

16.0 Paint /Coating

- ☐ Condition:

17.0 Should additional inspection or NDT be performed? _____ If so, please explain: _____

18.0 Special Comments and/or Pictures:

Inspector's Signature: _____ **Date:** _____

Owner Representative Signature: _____ **Date:** _____

Annex C
(informative)

Drilling Derrick Visual Inspection Form

The form in this annex is intended for free exchange between owners/operators of the equipment or users of this document.

Drilling Derrick
Category III / IV - Visual Field Inspection Form

Type of inspection performed (check one box only):

☐ Category III Inspection ☐ Category IV Inspection

Derrick—A semi-permanent structure of square or rectangular cross-section having members that are latticed or trussed on all four sides. This unit must be assembled in the vertical or operation position, as it includes no erection mechanism.

PURPOSE & SCOPE OF INSPECTION: This report form and inspection procedure was developed as a guide for making and reporting field inspection in a thorough and uniform manner. The procedure is intended for use by operating personnel (or a designated representative) to the extent that its use satisfies conditions for which an inspection is intended. More detailed and critical inspections may be scheduled periodically, or ordered to supplement a program of these inspections; if derricks are used in the upper range of their load limits, or if structures may have been subjected to critical conditions which could effect safe performance. This form is provided strictly as a guide, and the API accepts no liability whatsoever for its use or scope.

MARKING DAMAGE: At the time of inspection, damaged sections or equipment must be clearly and visibly marked so that needed repairs may be made. A bright, contrasting spray paint is suggested for this. When repairs are made, the visible markings should be removed by painting over them. It is also necessary for the inspector to write "None" when no damage markings are needed, as this is his indication that the item has passed inspection. It is recommended that inspection be made with assistance of manufacturer's assembly drawing and operating instructions. For items not accessible or that do not apply, draw a line through the item pertaining to the component.

Company: _____ Rig #: _____

Date: _____

Location: _____ Derrick Manufacturer: _____

Date of Manufacture: _____

Manufacturer's Drawing Available for Use in Inspection: Yes: _____ No: _____

Manufacturer's Rating: _____ Height: _____

Derrick Serial #: _____

Derrick Type: Bolted ____ Welded _____

Type Rig: Platform ____ Jackup _____ Submersible _____

Semi-submersible ____ Drill Ship _____

Nameplate on Structure: Yes: ____ No: _____

Component Numbers Present: Yes: ____ No: _____

Inspected By: _____ Representing: _____

DERRICK

Items that do not need attention should be checked to indicate that the item was inspected. Items that are not applicable should be marked in the box as "NA" (not applicable). Items that are warped, worn, damaged, cracked welds, rusted, bent, in need of repair or replacement, or otherwise in need of further attention, mark an "**X**" in the box and provide comments on the inspected items.

✓	OK	**X1**	Requires immediate attention
NA	Not applicable	**X2**	Requires attention next move
U	Unable to access	**X3**	Requires attention next maintenance
M	Missing	**X4**	Requires attention when convenient

Provide comments regarding inspe

COMMENTS REGARDING INSPECTED ITEMS

1.0 Crown Assembly

Make/Model: _____

1.1 Sheaves

Number of Sheaves: _____ Main Cluster Sheave Dia: _____

Fast Line Sheave Dia: _____

Condition:

- [ ] Sheaves: _____
- [ ] Grooves in Gage: _____
- [ ] Spacers or Seals: _____
- [ ] Grease Fittings: _____
- [ ] Bearings: _____
- [ ] Drilling Line Guards: _____

1.2 Crown Platform _____

- [ ] Decking: _____
- [ ] Holes Covered: _____
- [ ] Safety Gate: _____
- [ ] Ladder Access: _____
- [ ] Handrails: _____
- [ ] Frame Straight: _____
- [ ] Welds: _____
- [ ] Bolts and Nuts: _____

1.3 Crown Support Beams: _____

- [ ] Beam Straight: _____
- [ ] Pins & Bolts: _____
- [ ] Safety Pins/Keepers: _____
- [ ] Welds: _____

1.4 Additional Sheave Assemblies in Crown:

Name: _____

- [ ] Condition: _____

1.5 Pad-eyes Under the Crown Platform:

- [ ] SWL Marked: _____
- [ ] Welds: _____
- [ ] Pin Holes _____

COMMENTS REGARDING INSPECTED ITEMS

1.6 Fall Arrest/Climbing Assist Device Mounting:
- ☐ Support Pole:
- ☐ Base:
- ☐ Sheave Attachment:
- ☐ Weight Bucket Attach.:
- ☐ Welds:

1.7 Crown Saver Block(s):
- ☐ Safety Mesh:
- ☐ Safety Cable:
- ☐ Block(s) Condition:
- ☐ Attachment Strapping:
- ☐ Strapping Welds:

1.8 A-Frame/Gin Pole:
- ☐ Frame Legs:
- ☐ Bolt Connections:
- ☐ Welds:
- ☐ Access Platform:
- ☐ Ladder:
- ☐ Pad-eyes:

1.9 Top Beams/Water Table:
- ☐ Frame:
- ☐ Welds:
- ☐ Bolt Connections:

Number of Visible Marks Applied:

2.0 Derrick Legs:

2.1 Front Leg, Drillers Side:
- ☐ Leg Straight:
- ☐ Bolt Connections:
- ☐ Splice Connections:
- ☐ Welds:

2.2 Front Leg, Off Drillers Side:
- ☐ Leg Straight:
- ☐ Bolt Connections:
- ☐ Splice Connections:
- ☐ Welds:

2.3 Rear Leg, Drillers Side:
- ☐ Leg Straight:
- ☐ Bolt Connections:
- ☐ Splice Connections:
- ☐ Welds:

2.4 Rear Leg, Off Drillers Side:
- ☐ Leg Straight:
- ☐ Bolt Connections:
- ☐ Splice Connections:
- ☐ Welds:

Number of Visible Marks Applied:

COMMENTS REGARDING INSPECTED ITEMS

3.0 Girts & Braces:

- ☐ Members Straight:
- ☐ Bolt Connections:
- ☐ Welds:

Number of Visible Marks Applied:

5.0 Pedestals, Base Plates:

- ☐ Condition:
- ☐ Anchor Bolts:
- ☐ Welds:

Number of Visible Marks Applied:

6.0 Working Platforms:

6.1 Pipe Racking Platform:

- ☐ Frame Straight:
- ☐ Pin Hole(s):
- ☐ Pins
- ☐ Safety Pins/Keepers:
- ☐ Frame Welds:
- ☐ Working Platform:
- ☐ Landing Platform:
- ☐ Handrails:
- ☐ Ladder Access:
- ☐ Fingers Straight:
- ☐ Finger Welds:
- ☐ Finger Safety Line(s)
- ☐ Hoist Mounting:

Number of Visible Marks Applied:

6.2 Casing Stabbing Board:

- ☐ Frame Straight:
- ☐ Welds:
- ☐ Handrails:
- ☐ Working Platform:
- ☐ Hoisting Assembly*:
- ☐ Hoist Mounting:
- ☐ Lower Travel Stops:
- ☐ Pin or Bolt Holes:
- ☐ Pins or Bolts:
- ☐ Safety Pins/Keepers:
- ☐ Ladder Access:

Number of Visible Marks Applied:

*** See user's manual for specific inspection requirements.**

6.3 Tubing Support/Belly Board:

- ☐ Frame Straight:
- ☐ Welds:
- ☐ Handrails:
- ☐ Pin Holes:
- ☐ Pins:
- ☐ Safety Pins/Keepers:

Number of Visible Marks Applied:

COMMENTS REGARDING INSPECTED ITEMS

6.4 Fourble Platform:

- ☐ Handrails:
- ☐ Decking:
- ☐ Bolt Connections:
- ☐ Welds:
- ☐ Safety Gates:

Number of Visible Marks Applied:

7.0 Ladders:

- ☐ Vertical Rails Straight:
- ☐ Rails in Alignment:
- ☐ Ladder Stand Offs:
- ☐ Stand Off Connections:
- ☐ Rail Welds:
- ☐ Rungs:
- ☐ Rung Welds:
- ☐ Rung Spacing:
- ☐ Access at Rig Floor:
- ☐ Cage:
- ☐ Toe Clearance:

Number of Visible Marks Applied:

8.0 Tong Counterweights:

- ☐ Guides:
- ☐ Weight Device:
- ☐ Sheaves:
- ☐ Wirelines:
- ☐ Cable Clamps:
- ☐ Welds:

Number of Visible Marks Applied:

9.0 Miscellaneous Sheave Assemblies:

- ☐ Clevis/Shackle:
- ☐ Derrick Pad-eye:
- ☐ Sheaves:
- ☐ Bearings:
- ☐ Shafts:
- ☐ Sheave Bolt:
- ☐ Side Plate Bolts:
- ☐ Bolt Safety Pins:
- ☐ Grease Fittings
- ☐ Safety Line:

10.0 Ancillary Equipment:

10.1 Mud Line Clamps

- ☐ Pipe Clamps:
- ☐ Leg Clamps:
- ☐ Welds:
- ☐ Bolts/Nuts:

COMMENTS REGARDING INSPECTED ITEMS

10.2 Gas Vent Line Clamps:
- ☐ Pipe Clamps:
- ☐ Leg Clamps:
- ☐ Welds:
- ☐ Bolt/Nuts:

10.3 Climber Assist System: (See User's Manual for specific inspection requirements.)
- ☐ Cable:
- ☐ Cable Attachments:
- ☐ Counter Weight:
- ☐ Sheave/Control Descent Device:

10.4 Fall Arrest System: (See User's Manual for specific inspection requirements.)
- ☐ Cable:
- ☐ Cable Attachments:
- ☐ Device Attachment:
- ☐ Sheave/Control Descent Device:

10.5 Derrick Escape Device: (See User's Manual for specific inspection requirements.)
- ☐ Derrick Attachment:
- ☐ Cable:
- ☐ Device Condition:

10.6 Windwalls, Heat Shields, Frames and Attachments
- ☐ Frame Condition:
- ☐ Frame Welds:
- ☐ Frame Bolts/Pins:
- ☐ Metal Wall Sections:

10.7 Topdrive Mounting System:
- ☐ Rail(s)
- ☐ Pad-eyes:
- ☐ Mounting Brackets:
- ☐ Pins/Bolts:
- ☐ Safety Pins/Keepers:
- ☐ Cables:
- ☐ Block Dollies:
- ☐ Welds:

10.8 V-door Rollers/Guides
- ☐ Rollers:
- ☐ Grease Fittings:
- ☐ Welds:
- ☐ Bolts & Nuts:
- ☐ Brackets:

11.0 Corrosion (refer to Section 7.2):

12.0 Paint / Coating

☐ Condition:

13.0 Comments, Sketches, and/or Pictures:

Inspector's Signature: _____ **Date:** _____

Owner Representative Signature: _____ **Date:** _____

Annex D
(informative)

Substructure Visual Inspection Form

The form in this annex is intended for free exchange between owners/operators of the equipment or users of this document.

Substructure
Category III/IV - Visual Field Inspection Form

Type of inspection performed (check one box only):

☐ Category III Inspection ☐ Category IV Inspection

PURPOSE & SCOPE OF INSPECTION: This report form and inspection procedure was developed as a guide for making and reporting field inspection in a thorough and uniform manner. The procedure is intended for use by operating personnel (or a designated representative) to the extent that its use satisfies conditions for which an inspection is intended. More detailed and critical inspections may be scheduled periodically, or ordered to supplement a program of these inspections; if substructures are used in the upper range of their load limits, or if structures may have been subjected to critical conditions which could effect safe performance. This form is provided strictly as a guide, and the API accepts no liability whatsoever for its use or scope.

MARKING DAMAGE: At the time of inspection, damaged sections or equipment must be clearly and visibly marked so that needed repairs may be made. A bright, contrasting spray paint is suggested for this. When repairs are made, the visible markings should be removed by painting over them. It is also necessary for the inspector to write "None" when no damage markings are needed, as this is his indication that the item has passed inspection. It is recommended that inspection be made with assistance of manufacturer's assembly drawing and operating instructions. For items not accessible or that do not apply, draw a line through the item pertaining to the component.

Company: _____ Rig #: _____

Date: _____

Location: _____ Manufacturer: _____

Date of Manufacture: _____

Manufacturer's Rating: _____ Height: _____

Substructure Serial #: _____

Substructure Type: Box on Box _____ Self Elevating _____

Telescoping _____ Offshore _____

Substructure Position: Elevated: _____ Lowered: _____ Disassembled: _____

Manufacturer's Drawing Available: Yes: _____ No: _____

Assembly Drawings Used in Inspection: Yes: _____ No: _____

Nameplate on Structure: Yes: _____ No: _____

Component Numbers Present: Yes: _____ No: _____

Inspected By: _____ Representing: _____

SUBSTRUCTURES

Items that do not need attention should be checked to indicate that the item was inspected. Items that are not applicable should be marked in the box as "NA" (not applicable). Items that are warped, worn, damaged, cracked welds, rusted, bent, in need of repair or replacement, or otherwise in need of further attention, mark an "**X**" in the box and provide comments on the inspected items.

✓	OK	**X1**	Requires immediate attention
NA	Not applicable	**X2**	Requires attention next move
U	Unable to access	**X3**	Requires attention next maintenance
M	Missing	**X4**	Requires attention when convenient

Provide comments regarding inspected items.

		COMMENTS REGARDING INSPECTED ITEMS
1.0	**Shoes, Pedestals:**	
	Pin Connections:	
	Pin Holes:	
	Bolt Connections:	
	Bolt Holes:	
	Pins/Bolts:	
	Safety Pins:	
	Support Beams:	
	Welds:	
Number of Visible Marks Applied:		

2.0	**Floor Area:**	
	Floor Plates:	
	Handrails & Toe Boards:	
	Handrail Connections:	
	Setback Material:	
	Floor Bracing:	
	Welds:	
Number of Visible Marks Applied:		

3.0	**Sub-Spreaders and Rotary Beams:**	
	Rotary Beams:	
	Spreaders:	
	Pin Connections:	
	Pin Holes:	
	Pins:	
	Pad-eyes:	
	Welds:	
Number of Visible Marks Applied:		

4.0	**Deadline Anchor Mounting:**	
	Supports:	
	Bolts:	
	Flooring:	
	Breakover Assembly:	
	Handrails:	
	Welds:	
Number of Visible Marks Applied:		

		COMMENTS REGARDING INSPECTED ITEMS
5.0	**Substructure Components:**	
	Beams Straight:	
	Cross Braces:	
	Pin/Bolt Holes:	
	Pin/Bolts:	
	Safety Pins:	
	Pull Back Posts:	
	Drawworks Tiedowns:	
	Welds:	
	BOP Anchor Pad-eyes:	
	Pad-eyes:	
Number of Visible Marks Applied:		

6.0	**Engine Foundation:**	
	Support Beams:	
	Cross Braces:	
	Pin/Bolt Holes:	
	Pins/Bolts:	
	Safety Pins:	
	Pad-eyes:	
Number of Visible Marks Applied:		

7.0	**Engine Foundation Spreaders:**	
	Beams:	
	Cross Braces:	
	Pins / Bolt Holes:	
	Pins / Bolts:	
	Safety Pins:	
	Welds:	
Number of Visible Marks Applied:		

8.0	**BOP Trolley Beams:**	
	Beams:	
	Pin Holes:	
	Pins:	
	Safety Pins:	
	Welds:	
Number of Visible Marks Applied:		

9.0	**Raising Equipment:**	
	Pin Connections:	
	Pin Holes:	
	Pins:	
	Wirelines:	
	Sheaves:	
	Bearings:	
	Seals:	
	Grease Fittings:	
	Hydraulic Winches:	
	Hydraulic Cylinders:	
	Hydraulic Hoses:	
	Cylinder Hinge:	
Number of Visible Marks Applied:		

COMMENTS REGARDING INSPECTED ITEMS

10.0 Stairs/Landings/Flooring/Handrails:

- ☐ Welds:
- ☐ Pin/Bolt Holes:
- ☐ Pins/Bolts:
- ☐ Floor Plating:
- ☐ Stair Tread Spacing:
- ☐ Handrail Sockets:

Number of Visible Marks Applied:

11.0 Paint/Coating

- ☐ Condition:

12.0 Skidding Equipment

- ☐ Pad-eyes:
- ☐ Pins:
- ☐ Beam Clamps:
- ☐ Jacks:
- ☐ Jacking Motors:
- ☐ Jacking Rack:

13.0 Corrosion (refer to Section 7.2):

14.0 Comments, Drawings, and/or Pictures:

Inspector's Signature: _____ **Date:** _____

Owner Representative Signature: _____ **Date:** _____

Bibliography

[1] API Recommended Practice 9B, *Application, Care, and Use of Wire Rope for Oil Field Service*

[2] API Recommended Practice 8B, *Recommended Practice for Procedures for Inspections, Maintenance, Repair, and Remanufacture of Hoisting Equipment*

[3] API Recommended Practice 54, *Occupational Safety for Oil and Gas Well Servicing Operations*

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