

Oil and Gas Well Inspection



This page intentionally blank

OSHAcademy Course 904 Study Guide

Oil and Gas Well Inspection

Copyright (c) 2017 Geigle Safety Group Inc.

No portion of this text may be reprinted for other than personal use. Any commercial use of this document is strictly forbidden.

Contact OSHAcademy to arrange for use as a training document.

Special thanks to the U.S. Centers for Disease Control and Prevention (CDC), National Institute for Occupational Safety and Health (NIOSH) for providing *Rig Check*, and NIOSH Publication 2011-204c which is the primary document used for this course.

This study guide is designed to be reviewed off-line as a tool for preparation to successfully complete OSHAcademy Online Course 904.

The final exam will contain questions taken from each module quiz. We hope you enjoy the course and if you have any questions, feel free to email or call:

OSHAcademy

15220 NW Greenbrier Parkway, Suite 230

Beaverton, Oregon 97006

www.oshatrain.org

instructor@oshatrain.org

Disclaimer

This document does not constitute legal advice. Consult with your own company counsel for advice on compliance with all applicable state and federal regulations. Neither Geigle Safety Group, Inc., nor any of its employees, subcontractors, consultants, committees, or other assignees make any warranty or representation, either express or implied, with respect to the accuracy, completeness, or usefulness of the information contained herein, or assume any liability or responsibility for any use, or the results of such use, of any information or process disclosed in this publication. GEIGLE SAFETY GROUP, INC., DISCLAIMS ALL OTHER WARRANTIES EXPRESS OR IMPLIED INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Taking actions suggested in this document does not guarantee that an employer, employee, operator or contractor will be in compliance with applicable regulations. Ultimately every company is responsible for determining the applicability of the information in this document to its own operations. Each employer's safety management system will be different. Mapping safety and environmental management policies, procedures, or operations using this document does not guarantee compliance regulatory requirements.

Revised: May 8, 2018

This page intentionally blank

Contents

Course Introduction	1
Module 1 – Emergency Response Inspection Topics.....	2
Emergency Response Plan	2
Locations	2
Directions	3
Latitude/Longitude (Lat/Long)	3
Dialing Instructions	3
Emergency Equipment.....	3
Location/Use	3
Man Basket	3
Bloodborne Pathogen Kit.....	4
Fire Blankets.....	4
Recommended for Remote Sites	4
Trauma Kit.....	4
Alarms and Shutdown.....	4
Manufacturer Instructions.....	4
Alarms	5
Testing Alarms.....	5
Testing Emergency Shutdown Devices	5
Crown Savers and Floor Savers	5
Smoke Alarms	5

Testing Plans and Protocols	6
Fire Extinguishers	6
Location.....	6
Type.....	6
Nameplate.....	6
Seals	6
Tag.....	6
Condition.....	7
Eye Wash Stations.....	7
Location.....	7
Type.....	7
Nameplate.....	8
Seals	8
Tag.....	8
Full.....	8
Condition.....	8
Gauge	8
First Aid Kits	8
Location.....	9
Type.....	9
Access.....	9
Placard.....	9
Seals	9
Card.....	9

Condition.....	9
Restock.....	9
Module 1 Quiz.....	10
Module 2: Electrical Systems and Machine Guarding	12
Energy Isolation	12
Equipment/Location	12
Electrical Sources	12
Multiple Electrical Sources.....	12
Auto Start Equipment	12
Stored Energy.....	13
Chemical Injection Systems	13
Electrical Systems.....	13
Area Type (Classification).....	14
Ground Fault Circuit Interrupters	15
Machine Guarding.....	15
Module 2 Quiz.....	17
Module 3: Hand and Power Tools	19
Hand Tools	19
Location and Type.....	19
Hammers.....	19
Pipe Wrenches	19
Striking Wrenches	19
End Wrenches	20
Cutting Tools	20

Chain Tongs.....	20
Shovels and Rakes.....	20
Power Tools.....	20
Storage	20
Air Tools	21
Locations	21
Electrical.....	21
Attachments.....	21
Wear Parts	22
Storage	22
Air Tools	22
Module 3 Quiz.....	23
Module 4: Fall Protection	25
Harness and Lanyard.....	25
Location.....	25
Labeling.....	25
Harness Straps	25
Harness Hardware.....	26
Lanyard.....	26
Retractable Lifelines.....	26
Location / Type	26
Anchor Points.....	26
Hanger Hardware.....	26
Access Points.....	27

End Connections	27
Cable Condition.....	27
Storage & Tag Lines.....	27
Date of Last Service.....	27
Module 4 Quiz.....	28
Module 5: Stairways and Walkways	30
Stairways and Landings.....	30
Location	30
Angle.....	30
Handrails	30
Support Structure	30
Landings.....	30
Stair Treads	31
Handrails and Guardrails.....	31
Location	31
Handrails	31
Guardrails.....	32
Gratings and Walkways.....	32
Gratings	32
Attachment	32
Condition	32
Load Rating.....	32
Walkways	33
Attachment	33

Condition	33
Load Rating.....	33
Module 5 Quiz.....	34
Module 6: Lines and Slings.....	36
Auxiliary Hoisting Lines	36
Location / Type	36
Cable Condition.....	36
Sheaves	36
Routing.....	36
Line Guides.....	37
End Connections	37
Static Hanging Lines	37
Location.....	37
Type.....	37
Cable Condition.....	37
Wire Rope or Cable Clips	38
Installation	38
Routing.....	38
End Connections	38
Synthetic Web Slings.....	38
Location and Type.....	39
Inspection.....	39
Module 6 Quiz.....	41
Module 7: Lines and Slings (Continued)	43

Wire Rope or Cable Slings	43
Location and Type	43
Inspection.....	43
Chain Slings	44
Location and Type	44
Inspection.....	44
Shackles.....	45
ocation and Type.....	45
Module 7 Quiz.....	47
Module 8: Ladders and Platforms.....	49
Fixed Ladders	49
Location/Use	49
Anchor Points.....	49
Side Rails and Rungs.....	49
Landings	49
Fall Protection	50
Portable Ladders	50
Location/Use	50
Feet & Levelers	50
Visible Rating.....	50
Fixed Platforms	51
Location/Use	51
Support Structure	51
Hinges & Attachments	51

Working Surface.....	51
Guard Rails	51
Module 8 Quiz.....	52
Module 9: Hoses, Pins and Keepers.....	54
Hose and Fittings.....	54
Hose	54
Service Rating.....	54
Hose Body	54
End Fittings.....	54
Hose Runs.....	55
Storage	55
Third Party Equipment	56
Safety Chain and Whip Check	56
Hose	56
Safety Chains and Cables (Hobbles).....	56
Whip Checks.....	56
Pins and Keepers.....	57
Location/Type/Number	57
Pin Diameter	57
Pin Length	57
Pin Condition.....	57
Pin Installation	57
Safety Pins.....	58
Safety Bolts	58

Module 9 Quiz.....	59
Module 10: Chemical Hazards	61
Safety Data Sheets (SDS).....	61
Chemical Storage Locations	61
Document Dating	61
Right to Know Information	61
Requests.....	62
Chemical Storage	62
Chemical Storage Locations	62
Stored as Instructed	62
Compatibility.....	62
Signs and Postings.....	63
Containers and Marking.....	63
Spill Reporting and Clean Up	63
Compressed Gas	63
Module 10 Quiz.....	65
Module 11: Other Areas	67
Falling Objects.....	67
Rig Location.....	67
Mast or Derrick	67
Racking Board	68
Traveling Equipment	68
Substructure.....	69
Derrick or Drill Floor	69

Housekeeping	70
Location.....	70
Walking & Working Surfaces	70
Stairs & Ladders	70
Eating Areas	70
Portable Water.....	70
Toilet Facilities	71
Common Areas.....	71
Waste Disposal.....	71
Oil Leaks & Overflows	71
Tubular Storage.....	72
Location on Rig.....	72
Racks	72
Stops and Chocks	72
Stripping.....	73
Thread Protectors	73
Heavy Pipe.....	73
Down Hole Tools	73
Load Path Welds	73
Rig Component	74
Substructure.....	74
Mast Shoes and A-Legs	74
Mast Structure	75
Raising Line Sheaves	75

Crown Base	75
Module 11 Quiz.....	76
Endnotes	78

Course Introduction

Companies in the onshore Oil and Gas Industry operate and/or develop oil and gas fields as a part of upstream oil and gas activities, sometimes referred to as exploration and production. Such activities may include:

-) Exploring for crude petroleum and natural gas;
-) Drilling, completing, servicing and equipping wells;
-) Operating separators, emulsion breakers, de-silting equipment, and field gathering lines for crude petroleum and natural gas; and
-) Performing other activities in preparing oil and gas up to the point of shipment from the producing property.

According to the Bureau of Labor Statistics (BLS), the oil and gas extraction industry has an annual occupational fatality rate of 27.5 per 100,000 workers (2003-2009) - more than seven times higher than the rate for all U.S. workers.

This course was developed as a source of information and practical training tool for rig workers to conduct effective safety inspections of on-shore drilling rigs to reduce the injury and illness rate and to help companies operate more efficiently. The course will also help the student develop an effective Rig Safety Inspection Program for tools and equipment commonly found on rotary and workover rigs. Each inspection topic includes instructions for assessing and recording the condition of the equipment.

Module 1 – Emergency Response Inspection Topics

Emergency Response Plan

It's important to inspect your company's Emergency Response Plan (ERP) to ensure the plan is up-to-date, properly posted, complete and at the current rig location. For more information see: OSHA's 29 CFR 1910.38, Emergency Response Plan.

Ensure that each well has a formal written ERP, which includes simple instructions for notifications in the event of a rig-based emergency.

Notification protocols for medical emergencies, fire on the rig or location, gas release or loss of well control, or a security breach should all be included.

In most cases there will be contingency plans in place for the well that address notifications for long-term events that include notification of government agencies and outside well control expertise. These contingencies can be noted in the working plan but should not complicate the posted action plan.

Locations

Make sure you write down the locations of posted and current emergency response plans. These should be in central locations such as the:

-) rig doghouse
-) change house
-) rig supervisor's office
-) company man's office
-) rig camp

In addition, check that the response plan is posted anywhere emergency communications may be made, including the Rig Supervisor's truck, and the guard shack.

Directions

Check that the posted plan includes VERY clear turn-by-turn instructions that can be read to the EMS operator. It should start with directions from the closest town and give accurate mileage, land marks, turns, road names, etc.

Latitude/Longitude (Lat/Long)

Confirm that the latitude (lat) and longitude (long) coordinates are posted for possible helicopter operations.

Check that a short description of the designated landing zone is included for briefing the pilot.

Dialing Instructions

Check that clear, simple instructions on how to use designated emergency radio and satellite phone systems are posted. The number of the emergency phone should be posted and someone should remain next to the communication device once a call has been made to provide information to return calls from responders.

Emergency Equipment

Be sure to inspect emergency equipment to ensure that the equipment is stored properly and ready for use. For more information see: 29CFR1910.1030 and 29CFR1910.151.

Inventory the emergency equipment found on your rig. Emergency equipment for personal injury should include a man rescue basket (also called a Stokes litter), a bloodborne pathogens kit, fire blankets, and for remote sites an automatic external defibrillator and a trauma kit.

Location/Use

Write the location and use of each collection of emergency equipment. Check that emergency equipment is stored by hanging them up or placing them in a designated rack where they will not be damaged by other rig activities.

Man Basket

Check that there is a man rescue basket or Stokes litter available, rigged and ready for use. It should have a 4-point lifting harness securely attached. An emergency blanket in a waterproof plastic bag along with safety straps should be attached to the basket. The basket should be stored in a manner that protects it from damage.

Bloodborne Pathogen Kit

Check that there is a kit available for the cleanup and disposal of blood or other potentially infectious bodily fluids. Look through the kit to ensure that it contains rubber gloves, face shield, absorbent materials, plastic bags, and disinfectants. Mark any missing items in the comment section and notify your supervisor.

Fire Blankets

Check for fire blankets treated with gel for burns and flash fires. Read the maintenance card of any larger units for information on manufacturer's recommended maintenance. Do the maintenance if needed and note it on the container.

Recommended for Remote Sites

AED (Automatic External Defibrillator) units have become more common and require some training to familiarize employees as to the proper use of the device. This training is often included in CPR courses. If training has been provided, check that the names of trained employees are posted where the unit is stored.

Trauma Kit

Check that the site has a trauma kit and that it contains all the items listed on the inventory. This may include: large trauma dressings, splinting materials, cervical collar, and a 15-min. oxygen bottle designed for use by non- medically trained personnel. Check that all items are clean, undamaged and ready for use.

Alarms and Shutdown

It is very important to ensure that alarm and shutdown systems are functioning properly. For more information see: 29CFR1910.37, 29CFR1910.38, and 29CFR1910.165

Manufacturer Instructions

Every effort should be made to inspect and maintain these systems as instructed by the manufacturer. Installation, care, and maintenance should all be available in the equipment information package. Beyond function and readiness checks, testing protocols and adjustments should be carried out by competent, trained personnel.

Alarms

Rig emergency alarms may be automatic or operated by personnel from various locations manually. Whichever the case, the alarms should be heard throughout the rig and on the location. The alarms should be distinctive and easy to identify as to their purpose. Alarms that work in conjunction with lights should be visible from the entrance of the location. It is a good practice to include a wind direction indicator in close proximity to the lights. All employees should be trained to activate manual alarms and understand what triggers automatic alarms.

Testing Alarms

Manual alarms can be tested during drills and during crew training sessions. Position crew members around the rig to provide feedback as to coverage and volume of the alarms. Whenever possible, test alarms with test gas to ensure proper calibration and sensitivity. You should never claim a false alarm as a function test.

Testing Emergency Shutdown Devices

Emergency shut-down devices (ESD) that will close off the combustion air should be installed on all the rig's diesel engines. It is important to understand just how a particular ESD functions BEFORE you attempt to test it. Engine shutdowns or rig savers may damage engine components if they are engaged when the engine is running at speed. Careful plans should be made with the mechanics to develop a test protocol that will ensure the functionality of the devices without damaging the engine. In most cases these devices can be checked with the engine shut down. Manual engine shutdown devices that shut off the fuel to the engines can also be tested while the engine is shut down.

Crown Savers and Floor Savers

These devices can be tested by slowly pulling into the actuator. Here again, accidentally tripping the device should not be recorded as a test. The system must be functioned so that the proper adjustment can be verified. Crown and floor savers should be function tested at the start of each tour and after line slip or cut.

Smoke Alarms

Smoke alarms in trailers and out buildings should be function tested monthly or following a rig move. Note on the inspection form when batteries are changed each year.

Testing Plans and Protocols

Each rig should have a written plan for calibrating and testing alarms and shutdown devices. The inspection should include a review of these documents to ensure new equipment and or rig modifications have not altered the function of the devices.

Fire Extinguishers

Be sure to inspect all fire extinguishers to ensure that extinguishers are available and ready for use. For more information see: 29CFR1910.157, National Fire Protection Association Standard 10, and American Petroleum Institute (API) Recommended Practice 54.

Location

Write the location of each fire extinguisher on the form. The location should protect the unit from damage or contamination during normal rig operations and from the environment, and be easily accessible in case of emergency. Fire extinguishers should be stored off the deck (ground) to reduce corrosion to the bottom.

Type

Write the brand and type of extinguisher on the form. This will ensure that the extinguishers are in the correct locations.

Nameplate

Check that the nameplate that faces outward, is clear and legible, and includes operating instructions.

Seals

Check the seal or other tamper indicator on the trigger which provides an indication if the unit has been used or damaged. If the seal is broken or missing, the unit must be fully serviced and resealed.

Tag

Check that the yearly inspection tag is marked with the year and month of the last recharge inspection. If the tag is missing, or if the unit is in need of its annual inspection, it should be removed from use and a servicing should be scheduled.

Condition

Inspect the exterior of the unit for damage and corrosion. Pay close attention to the bottom of the tank for rust and corrosion as this area tends to be susceptible to water and chemical damage if it has been stored on the floor. Remember to store extinguishers off the deck. The hose should be checked to see that it is properly installed, undamaged, and clear. The trigger assembly should also be checked for damage and serviceability.

-) FULL (visual indicator): Inspect the pressure gauge and check that the needle is in the green and charged. Also check to see that the gauge is not bent or broken.
-) FULL (dry chemical type): Take the unit out of the rack and tip the unit back and forth to determine if it has loose powder inside. Occasionally it may be necessary to invert and tap the base to loosen the powder. Use your hand, or a rubber mallet to tap the extinguisher.
-) WHEEL UNIT: Check the condition of the tires, the carriage, the hose and nozzle.

Eye Wash Stations

Eye wash stations are required to be available to employees anywhere that potentially harmful corrosive materials are present, such as caustic soda. The stations can be handheld bottles or permanent fountain-type wash stations. Units should be easily accessible and near work areas. Stations should be mounted off the ground or floor and covered if in an area where mud and chemicals could damage them. There should not be anything hanging on the station or obstructing it.

Location

Write the location for each station on the form. The location should be in close proximity to chemical handling areas and readily accessible in time of emergency. Regulations vary on how close the station should be to work areas, but ANSI specifies 10 seconds from the hazard-or about 55 feet. The location should protect the unit from normal rig operations and the environment, and provide easy access. If located where mud, dust, or chemicals can contaminate the eyewash station, a cover should be placed over it to protect it and be easy to remove in an emergency.

Type

Write the type of station on the form, for example “15-minute flood” or “hand held bottle”.

Nameplate

Check that the eye wash unit has a nameplate that faces outward, is clear and easy to read, and includes operating instructions.

Seals

Check that the condition of the seal to see if the unit has been used or damaged. If the seal is broken, the unit must be fully serviced and resealed.

Tag

Check the yearly inspection tag is marked with the year and month of the last required flushing, or refill. If the tag is missing, or the solution's expiration date has passed, the unit should be serviced or removed from use until it can be serviced.

Full

Check that the unit is filled to the indicated full mark. They should be filled with the manufacturer provided solution. Hand held bottles must be full and with an unbroken seal. If the seal is broken, the bottle should be replaced with a new bottle with an unbroken seal.

Condition

Inspect the exterior of the unit for damage and leakage, pay close attention to the eye wash nozzles and ensure they are clean and ready for operation. The unit should be clean and ready for use with no tools or trash stored in the basin.

Gauge

For pressurized units, inspect the pressure gage and check that the needle is in the green and the unit is charged. Also check to see that the gauge is not bent or broken.

First Aid Kits

Of course, it's essential to check first aid kits to ensure that first aid supplies are available and ready for use. For more information see: 29CFR1910.151(b) and ANSI Z308.1-2009.

First aid kits should contain supplies such as bandages, gauze, antiseptic wipes, tweezers, first aid tape, plastic gloves, and a cold compress. Supplies should be appropriate for the number of workers onsite.

Location

Write the location of each kit on the inspection form. The first aid kits should be in a location making them readily accessible in time of emergency. The location should also protect the kit from damage or contamination during normal rig operations and from the environment.

Type

Write the type of kit on the form, for example “10-unit box” or “30-unit cabinet”, or the manufacturer's model or ID number can be used.

Access

Check that the first aid kit is mounted off the ground or floor and covered if it is in an area where it could come into contact with mud, liquid, dust, or chemicals. Kits should be visible at all times.

Placard

Check that the placard or sign faces outward and is clear and easy-to-read.

Seals

Check that sterile items such as bandages and medications are individually wrapped and have not been used or damaged. If the seal is broken, the item must be disposed of and replaced.

Card

Check that the first aid kit has a yearly inspection card marked with the year and month of the last refill inspection. This card should include an inventory of the contents and should have an area on the back to date and initial for monthly inspection.

Condition

Inspect the exterior of the kit for damage, pay close attention to the lid seal and ensure there is no leakage and/or rust on the interior. The kit should be clean and ready for use.

Restock

Check that the kit is properly filled with items noted on the inventory card. Any items that have been used, exceeded the expiration date, or sterile items with seals broken, must be replaced. If the kit needs to be restocked, check the box on the form and list the needed items in the comment section.

Module 1 Quiz

- 1. Emergency Response Plans should be posted in centralized areas like any of those listed below, except the ____.**
 - a. rig doghouse
 - b. change house
 - c. rig supervisor's office
 - d. rig front entrance

- 2. When checking the man rescue basket or Stokes litter, make sure it is rigged, ready for use, and that it has a ____ lifting harness securely attached.**
 - a. 6-point
 - b. 2-point
 - c. 3-point
 - d. 4-point

- 3. Smoke alarms in trailers and out buildings should be function tested ____ or following a rig move.**
 - a. daily
 - b. weekly
 - c. monthly
 - d. quarterly

- 4. When inspecting fire extinguishers, make sure they are being stored ____.**
 - a. off the deck
 - b. on the deck
 - c. next to electrical panels
 - d. next to tower supports

5. Where should first aid kits be located on a drilling site?

- a. Mounted to the deck or floor
- b. Mounted off the ground or floor
- c. Located in the site office
- d. Located in each vehicle

Module 2: Electrical Systems and Machine Guarding

Energy Isolation

Inspection of effective energy isolation is important to ensure that potential energy sources are labeled and that proper energy isolation methods are being utilized. For more information see: 29CFR1910.147, American Petroleum Institute (API) Recommended Practice 54, and the IADC Health, Safety and Environmental Reference Guide.

Assess if energy isolation equipment (i.e. locks, restraints, and blocks) are being used, worn, and correctly labeled. Rig equipment should be assessed to determine if the proper energy isolation methods are being used.

Additionally, postings, labeling, and warnings should be checked to make sure they are accurate and visible.

Equipment/Location

You will need to list the name and location of each piece of equipment with electrical, stored, chemical injection, or mechanical energy.

Electrical Sources

Check that electrical energy sources are identified by labeling. Lock out devices should be available for each type of power disconnect on the rig. In addition, written instructions should be available for completing lock out on each piece of rig equipment.

Multiple Electrical Sources

Check that the different types of power sources on equipment with multiple power sources are labeled on the machine. Many rig components may have multiple energy sources associated with their operation and maintenance. Traction motors may have a control circuit as well as Direct Current (DC) and Alternating Current (AC) power feeds.

Auto Start Equipment

Check that equipment that starts automatically or, that can be started from a remote location, is properly guarded and clearly marked. Air compressors, hydraulic power units and charge pumps are examples of equipment that can be started remotely or automatically should all be labeled.

Stored Energy

Check that equipment that contains stored energy is labeled. Some hydraulic equipment may have internal accumulators or reservoirs where pressure is stored. Refer to manufacturer's documentation and ensure that labeling on the equipment is complete and visible. Mechanical equipment may have some type of internal "pre-load" such as springs or tension devices that may release energy if the unit is disassembled without the proper precautions. Examples include: valve actuators, mechanical well logging equipment, retractable cable devices, and crown saver devices.

Chemical Injection Systems

Check that chemical injection systems are identified and are included in the isolation procedure for any attached equipment. Some rigs may have chemical injection systems that feed mud products or chemicals directly into the circulating system. Chemical tanks that gravity feed into the mud tanks should also be identified for isolation in the tank cleaning procedure.

Mechanical Energy

Traveling blocks, sheaves hung in the derrick, and pipe tongs are examples of energy hanging in the derrick.

Inventory overhead equipment to identify which must be restrained for maintenance or secondary fall protection. Check that cables or other hang off devices required are adequate for the load they are expected to support. Overhead sheaves must be designed by the manufacturer for overhead use. When making changes, such as adding a rental top drive, the traveling block hang-off device must be analyzed to ensure it is adequate to hold the additional weight.

Electrical Systems

It's important to inspect all aspects of a site's electrical system and equipment to ensure that electrical systems are well documented and include appropriate safety controls. For more information see: 29CFR1910.305, and American Petroleum Institute (API) Recommended Practice 54, 500 and 505.

Electrical systems inspections are usually visual only. An approved electrician is the only person who should modify or repair electrical equipment. Do not "try out" circuits or switches, and always de-energize electrical equipment before performing maintenance work.

Location

List each area of the rig for inspection.

Area Type (Classification)

Inspect classified areas on the rig to ensure that equipment and electrical installation meet the requirements of the designated classification. There should be no non-classified equipment in the area and all cables and conduit should be in good condition. Check for crossover plugs to get from classified outlets to non-classified equipment or cords. These devices should not be used when classified areas are active.

Cords and Cables

Inspect all cable or cord installations to ensure they are correctly routed and are protected from other rig activities that may damage them. Cords should not be run upstairs or ladders or present a tripping hazard for employees. Cords and cables should not be run in rig ditches or across the ground unprotected. Cable trays should be organized and free from debris and not be used for storage shelves. Extension cords should be used for temporary power source only. Extension cords should be inspected before each use and cords that have cuts or crushed protective coating should be removed from service and destroyed.

Conduit and Boxes

All fixed conduit should be securely attached and undamaged. Check ends to ensure they have not been pulled loose from panels or junction boxes. Make sure box covers are properly installed and water-tight.

All unused outlets or plugs should be covered. Electrical conduit and wire racks should not be used to hang or store materials.

Panels and Switches

Electrical panels and switches should not be blocked and must be readily accessible. Panels should not be used for storage shelves or hangers. Doors should be kept closed and latched except when actively working switches and breakers. Breaker panels should have the faceplates securely installed and no wiring should be exposed to employees operating breakers or switches. Switches should be clearly labeled.

Ground Fault Circuit Interrupters

Ground Fault Circuit Interrupters, or GFCI's should be used for all portable or temporary power tools used on the rig. If GFCI breakers are not installed in breaker panels, portable units should be provided that can be placed in line to protect employees from ground shocks when using portable power tools.

Grounding

The rig and its components must be grounded and bonded to ensure a clear path to ground in the event of a short circuit. The ground rods must be installed before starting power generation equipment and not detached until generators are shut down. All buildings and electrical equipment must be bonded to the ground system.

Machine Guarding

It's critical to inspect all machine guards to ensure that mechanical installations around the rig are properly guarded and maintained to eliminate injuries to employees. For more information see: 29CFR1910.212- 219, and American Petroleum Institute (API) Recommended Practice 54.

This inspection should be visual only. An approved electrician is the only person who should modify or repair electrical equipment. Always de-energize electrical equipment before performing maintenance work.

Location

List each area of the rig inspected.

Centrifugal Pumps

Check the electric motor for broken or missing fan guards.

Inspect the coupling area for potential exposure to rotating parts. Coupling guards should be secure and not move when operating. The stuffing box area and shaft should be smooth and free of burrs that could entangle gloves or other clothing.

Agitators and Mud Mixers

Inspect for potential contact. Pay close attention to the area above tank gratings and walkways where hoses or electrical cords could become tangled in couplings. Check chemical mixers or other rotating equipment that may be used for adding chemicals to the mud system for potential contact.

Augers and Conveyors

Cuttings augers and conveyors present unique guarding challenges to protect employees from these powerful machines. Gratings and guards for this type of equipment should be securely fastened. Inspection hatches and cleanouts should be secured and lockout procedures should apply to any service or inspections that require removal or opening of hatches or guards.

Belt Guards

Inspect all belt guards to ensure that they are installed properly and that all bolts and braces are in place and tight. Make sure that there are no worn spots on the guard that would indicate rubbing or chaffing by moving equipment. If guards make noise or if it shows signs of movement, the machine should be shut down and the guard must be repaired immediately.

Winches and Cables

Nip points are created by a cable being wrapped on a drum. Areas where employees may come in contact with the cable should be protected with a guard that only allows room for the cable to enter.

Level wind devices for hoist winches should have a handle that prevents the operator from placing his hand directly on the cable. Sheave guards on the crown block and traveling block should be inspected for abnormal wear and secure attachment to prevent dropped objects.

Labeling and Signs

Equipment that starts automatically or is controlled remotely should have a sign clearly visible that identifies how the equipment is energized. Warning signs should be posted to ensure employees follow proper energy isolation protocol when servicing equipment.

Exclusion Zones

Areas that cannot be effectively guarded should be closed off as an exclusion zone while in operation. For example, under the rotary table during drilling operations and around automated pipe handling systems.

Module 2 Quiz

- 1. When inspecting the company's lockout/tagout program, verify that lock out devices are available for each type of _____ on the rig.**
 - a. power disconnect
 - b. equipment
 - c. mechanical process
 - d. electrical process

- 2. Each of the following pieces of equipment should be listed in the energy isolation program, except _____.**
 - a. injection
 - b. electrical
 - c. chemical
 - d. manual

- 3. While you are conducting an inspection, you should make sure electrical panels and switches are _____ and readily accessible.**
 - a. energized
 - b. located behind materials
 - c. not blocked
 - d. easily recognized

- 4. Which of the following must be installed on a rig prior to starting power generation equipment and not detached until generators are shut down?**
 - a. Ground rods
 - b. lockout device
 - c. GFCIs
 - d. circuit breaker panel

- 5. Areas on a rig that cannot be effectively guarded should be closed off as a/an _____ while in operation.**
- a. no-entry area
 - b. exclusion zone
 - c. prohibited area
 - d. danger zone

Module 3: Hand and Power Tools

Hand Tools

The purpose of this inspection is to ensure that hand tools are maintained and stored properly. For more information see: 29CFR1910.242- 3 and American Petroleum Institute (API) Recommended Practice 54.

Location and Type

List each area of the rig to be inspected where hand tools are stored. For each type of tool follow the instructions below marking the form for: no damage, clean or rust/corrosion, stored properly, properly serviced.

Hammers

The handles should be secure and show no signs of splitting or breaking. The hammer head should not be “mushroomed” or show signs of splitting that may cause splinters to break off during use. Damaged hammer heads should be replaced not repaired.

Do not attempt to trim up a mushroomed hammer head with a torch as this will affect the hardness of the metal and lead to more problems with splinters.

Welded on steel pipe handles should be avoided.

Pipe Wrenches

Inspect all pipe wrenches for damage to the wrench body. Pipe wrenches may have been struck on the back of the head causing cracks or deformation.

The wrench jaws should move freely when the adjustment knob is turned. The jaw hook and heel teeth should be sharp and even.

The retainer pin for the heel should be installed properly as supplied by the manufacturer.

Steel handled wrenches should not show excessive damage or bending to the handle. Aluminum handled wrenches should not have signs of bending or deep gouges from a cheater pipe. This weakens the wrench and may cause it to fail under load.

Striking Wrenches

Examine the box end of the wrench to ensure there are no cracks or broken areas. Wrenches that have been broken should not be welded up, but should be replaced.

The striking area should not be mushroomed to the point that splinters or shards will break off when they are struck.

No home built attachments should be added to the wrench, as this may cause heat damage making the wrench more brittle and prone to breakage.

End Wrenches

Wrenches should not be bent or otherwise deformed. Teeth on box end wrenches should be sharp and well defined.

Jaws on open end wrenches should not be bent or misaligned. End wrenches should not show signs of hammering on the handle as this causes sharp edges and weakens the handle.

Cutting Tools

Cutting tools should be kept sharp and stored where they do not present a hazard. A good supply of replacement blades should be available for knives and saws.

Chain Tongs

Chain tongs are a type of pipe wrench used for hand-tightening various threaded connections around the rig site. It consists of a handle, a set of gripping die teeth, a length of flat chain and a hooking slot where the chain may be adjusted to fit the pipe.

The jaw heads on chain wrenches should be sharp and clean. The retainer should be installed properly and the chain should be flexible and free from side load damage.

Severely bent handles or loose jaws would be reason to take the tongs out of service.

Shovels and Rakes

Wooden handled tools should be free from splinters or broken handles. Shovels should be clean of chemicals or mud that may cause injury to others.

Power Tools

Storage

Power tools should be stored in their original cases if available. Tools should be kept away from moisture and chemicals that could damage motors and plastic parts.

Tools should not be stacked on shelves where employees may have trouble lifting and sorting the tools.

Air Tools

Air tools should be inspected prior to each use and each month. Air tools must be kept oiled and in a dry place to prevent rust. Insure that there is a good supply of whip checks for each air hose connection.

Each tool should be clearly labeled with the manufactures information. In addition, the components attached to the air tool should be properly labeled and compatible with the tool.

Impact wrenches should be equipped with the proper impact type sockets.

Special care should be taken to ensure that grinding disks and stones are rated for the very high RPM developed by air tools.

Locations

List each area where power tools are located. Examine the area considering each issue below.

Electrical

Electrical tools should have the equipment manufacture's label clearly visible. Labeling should include manufacturer's name, model #, voltage requirements, RPM, and warnings.

Inspect the cord where it attaches to the machine. There should be a solid attachment with reinforced strain relief where the wire attaches to the motor. The cord should be 3-pronged or the tool must be double insulated and clearly marked.

Grounded plugs should not have the third pin cut off.

Plugs and cords should be in good condition and free of cracks or breaks.

Fixed power tools should be mounted solidly and protected from accidental contact with the power switch.

Inspect triggers or switches to ensure that they function properly; they should not stick or remain on after release of the trigger. Power on buttons should release quickly once the trigger has been touched.

Attachments

Inspect guards and attachments on power tools to ensure they meet the manufacturers' requirements.

Guards should be original and not be modified or otherwise changed contrary to the manufacturers design.

Handles should be securely installed, and hand and trigger guards functioning properly.

Wear Parts

Wear parts (disks, grinding stones, blades, and bits) should be checked if appropriate for the machine, including RPM rating, belt speed, diameter, and other sizing elements required for safe operation. Never use parts that are not specifically recommended for the power tool you are using.

Attachment mechanisms should not be changed from one tool to another.

Always use the proper size nut, backer plate, or drive wheel recommended by the original equipment manufacturer.

Storage

Power tools should be stored in their original cases if available. Tools should be kept away from moisture and chemicals that could damage motors and plastic parts.

Tools should not be stacked on shelves where employees may have trouble lifting and sorting the tools.

Air Tools

Air tools should be inspected prior to each use and each month. Air tools must be kept oiled and in a dry place to prevent rust. Insure that there is a good supply of whip checks for each air hose connection.

Each tool should be clearly labeled with the manufactures information. In addition, the components attached to the air tool should be properly labeled and compatible with the tool.

Impact wrenches should be equipped with the proper impact type sockets.

Special care should be taken to ensure that grinding disks and stones are rated for the very high RPM developed by air tools.

Module 3 Quiz

- 1. When inspecting hand tools, make sure to check for all the following, except ____.**
 - a. manufacturer's data
 - b. damage
 - c. cleanliness with no rust/corrosion
 - d. properly servicing

- 2. When inspecting electrical plugs, make sure that grounded plugs do not have ____.**
 - a. outdated inspection tags
 - b. more than two pins
 - c. a third pin
 - d. the third pin cut off

- 3. When inspecting air tools on a rig, special care should be taken to ensure that grinding disks and stones are rated for ____.**
 - a. appropriate size
 - b. safe composition for the job
 - c. the very high RPM developed by air tools
 - d. related safety data sheet

- 4. When inspecting tools, ensure hammer heads are not ____ or show signs of splitting that may cause splinters to break off during use.**
 - a. mushroomed
 - b. flat
 - c. pitted
 - d. loose

5. Power tools should be stored in/on _____.

- a. other power tools
- b. their original cases if available
- c. on a shelf
- d. truck tool boxes

Module 4: Fall Protection

Harness and Lanyard

It's very important to conduct this inspection to ensure that only undamaged fall protection equipment is available for use. For more information see: 29CFR1910.66 appendix C, and the ISO standard ICS 13.340.60.

Identify and list all positioning and climbing assist equipment found on the rig (for example, the derrickman's belt, derrick climber belt, etc.). Inspect the equipment; any harness or lanyard that is not in good condition should be tagged "DO NOT USE" and removed from working areas.

Location

Check that harnesses and lanyards are stored in an area that is free from chemical exposure, out of direct sunlight, and away from any damaging heat sources. Soft nylon equipment should never be hung with cables, chains, or other hard iron equipment that may damage the webbing.

Labeling

List each unit separately on the inspection form. Check that all equipment is numbered or otherwise identified so each piece of equipment is unique and easily identifiable. Check that the manufacturer's name, model number, and rating are clear and visible.

Harness Straps

Check that straps are relatively soft and pliable with no signs of hardening. Look for burns caused by chemical or heat that create hard non-flexible areas on the strapping. Look for damaged threads or separation of the fibers that would indicate some type of damage. Look for torn or frayed sewing and stitching. Examine wear areas around fittings and buckles. Thimble eyes should not be deformed, bent, or missing.

Harness Hardware

Inspect all hardware closely for damage and or deformation. Check to see if tongue buckles have been bent or side loaded. Ensure that hardware functions properly and goes together smoothly without undo force.

Lanyard

Check that rope or webbing does not show signs of being “hooked back” on itself. Ropes should be smooth, without knots and should be in unmodified manufacture condition. Any lanyard found to be discolored, knotted, cracked, frayed or have loose fibers, should be replaced. Attached shock-absorbing packs should be free of holes, tears, and stitching should be free of rips or loose strands.

Retractable Lifelines

Be sure to do this inspection to ensure that these critical fall protection devices are functioning properly and installed correctly. For more information see: 29CFR1910.66 App C.

Location / Type

List the location of each retractable lifeline on the rig and note the type of fall protection device. Identification of the model, physical ratings, and an identification number should be clearly visible.

Anchor Points

Check that anchor points for self-retracting lifelines are identified and separate from any point used to suspend an active load (i.e. attaching to a crane hook that is also suspending a load.) The anchor point should be capable of supporting a 5,000-pound load for each employee attached.

Engineering specialists should be available to identify attachment points meeting the requirements of the code. These points should be identified and inspected before each use and following rig up.

Hanger Hardware

Check that hardware used to attach the main body of the retractable lifeline is a positive locking device such as a screw lock carabineer or a 4-part shackle (bolt pin with nut and cotter) attached to an engineered pad eye, an approved strap, or properly installed beam clamp.

Confirm that the attachment point is as close to vertical over the work area to prevent swing injuries.

Access Points

Check that the access point is in an area where employees can easily access the device and safely attach their fall protection. It should not be on a ladder where there is no platform.

End Connections

Check that end connections are undamaged, unaltered, and have a double-locking snap hook that moves freely in the eye. If it has one, check if the slip joint indicator shows if the machine has been put under load. If the unit has stopped a fall, or if any other deficiencies are noted with the end connections, take the unit out of service and return it to an approved service center for repair and recertification.

Cable Condition

Examine the cable by pulling it out fully and inspecting it over its entire length. Check that it is free of rust and broken wires. Let the cable spool up slowly and note any problems while spooling. Check the plastic guide where the cable enters the housing and ensure that it is not worn out and is still protecting the cable from harm.

Storage & Tag Lines

Ensure that the unit is equipped with a tag line so the cable can be stored inside the unit when it is not in use. Make sure that any cover used to keep the unit clean does not interfere with the cable. Full body harnesses should not be left hanging on the life line.

Date of Last Service

Note the last date of service/repair. Service and repair of retractable lifelines should only be done by a manufacturer certified technician. Do not attempt to repair this sensitive safety equipment on the rig.

Module 4 Quiz

- 1. If you find a harness or lanyard that is not in good condition when inspecting fall protection equipment on a rig, what should you do?**
 - a. Tag it "DO NOT USE" and remove from work area
 - b. Tag it "USE CAUTION - DEFECTIVE"
 - c. Inform the derrickman of the condition of the equipment
 - d. Make a note for follow-up inspection of equipment

- 2. When inspecting harnesses and lanyards, which of the following is NOT in compliance with best practices?**
 - a. They are being stored free from chemical exposure
 - b. They are stored out of direct sunlight
 - c. They are being located near damaging heat sources
 - d. They are being properly stored in tool boxes

- 3. When inspecting lanyards on a rig, check for all the following, except _____.**
 - a. webbing is not hooked back on itself
 - b. ropers are smooth without knots
 - c. acceptable number of loose strands is not exceeded
 - d. attached shock-absorbing pack are free of holes

- 4. What action should be taken if any component of fall protection has stopped a fall?**
 - a. Tag it with a warning message
 - b. Take the component out of service
 - c. Carefully use it in the future
 - d. Nothing, if it is rated for multiple falls

- 5. Anchor points should be capable of supporting a _____ pound load for each employee attached.**
- a. 400
 - b. 900
 - c. 2,000
 - d. 5,000

Module 5: Stairways and Walkways

Stairways and Landings

It's important to conduct this inspection to ensure that stairways around the rig are of the proper size and configuration required to provide safe access for employees. For more information see: 29CFR1910.23-24 and OSHA Stairways and Ladders Guide (publication 3124).

Location

List all stairways and landings on the rig to facilitate thorough and accurate inspections and maintenance. Note any problems in the comments section.

Angle

Check that stairways are at least 30 degrees but not more than 50 degrees. Stair treads should be level in all directions.

Handrails

Check that handrails are installed on stairs rising more than 4 treads and are between 30 and 34 inches high measured from the top of the tread to the top of the rail at 90 degrees from the tread surface (straight up). Check that the rails are straight and smooth and are attached securely so they cannot be lifted out and dropped during use.

Where the rail is next to a wall, there should be 3 inches clearance between the rail and any obstruction. Check that all rails have an intermediate rail halfway between the stair tread line and the top rail. All rails should be capable of withstanding a 200-pound load from the top rail in any direction. For guard rails or "bumper" rails on equipment slides, check that they have an additional hand rail inside and are protected from load handling activities that may present a crush injury to personnel using the stairs.

Support Structure

Check that the support structure for the stairs is installed properly with all pins, bolts, and keepers in place. The structure should be solid and level with no large movements during use. Inspect any lifting eyes or fork pockets for damage and note for repair.

Landings

Check that bottom stair landings are a solid level surface with any drainage ditches routed away from landing areas. If pallets are used for stair landings, check that they do not have gaps larger

than 1 inch between the boards. If necessary, the pallet should be covered with solid plywood to prevent trips caused by gaps in the landing surface. Inspect areas where doors or gates open directly onto a stairway. The landing must allow an effective width of at least 20 inches when the door swings open. Check that hand rails around landings are 42 inches high and withstand the 200-pound load test.

Make sure that active hand rails that are part of a stairway/landing system are not used for the storage of tools or equipment. If people can pass underneath the landing, a 4-inch toe board should be along the edge of the landing.

Stair Treads

Check that treads are evenly spaced, consistent throughout the run, clean and have a good non-skid lip. Also check that they are not bent or worn out and are unobstructed by tools or equipment.

Handrails and Guardrails

Conduct this inspection to ensure that rails around the rig are of the proper size and configuration required to provide safe work space for employees. For more information see: 29CFR1910.23 and OSHA Stairways and Ladders Guide (publication 3124)

Location

List all handrails and guardrails on the rig to facilitate thorough and accurate inspections and maintenance. Handrails are intended to protect workers along walkways and landings. Handrails should be installed on any change in elevation that exceeds 30 inches. Handrails on stairs are included in Form 16. In this document, guardrails are intended to protect areas from work activities and are designed to take impact that exceeds the specifications for handrails.

For each location, check the condition of the rail in terms of proper height, mounting, toe board (kick plate), load rating and collision potential. Note any problems in the comments section.

Handrails

Measure the height of the handrail. The standard height for handrails is 42 inches measured from the floor to the top of the rail. Check that each rail is straight, smooth and securely attached. Where the rail is exposed to lifting activities, check that it is safety bolted into the pockets to prevent them from being lifted out and dropped. Confirm that all rails have an intermediate rail halfway between the floor line and the top rail and that they have a toe board at least 4 inches tall to prevent tools from being kicked off the edge.

All rails should be capable of withstanding 200 pounds of force from the top rail in any direction.

Guardrails

Check that the guardrail is securely attached to the main structure of the rig and, if used for pulling or snubbing, it has a load rating marked to indicate the safe operating limit. Check that guardrails designed to protect the driller's or operator's console are configured to protect the operator from broken chains, cables, or loose equipment from the floor.

Gratings and Walkways

This inspection helps to ensure walking and working surfaces around the rig are of the proper size and configuration required to provide safe work space for employees. For more information see: 29CFR1910.23

List all gratings and walkways on the rig and identify their purpose. Inspect each grating and walkway for proper attachment, condition, and load rating.

Gratings

Attachment

Gratings are used as machine or mud pit guards as well as a walking surface. Check that they are secured and do not move when employees walk or step on them. Check that hinged gratings are equipped with a pop-up handle that does not present a trip hazard and that the grating has some way to hold it open to prevent crush injuries from a falling grating hatch.

Gratings covering belt drives, conveyors, or moving machinery must be bolted down securely and identified as needing a lockout/tagout procedure if you need to remove the grating.

Condition

Look for corrosion or rust that may affect the load carrying capacity of the grating panel.

Load Rating

Clearly post the load rating in the area. Load bearing grating should not be bent or broken and should never be covered with boards or plywood intended to reinforce or repair damaged grating.

Walkways

Attachment

Check that walkways used to bridge between rig tanks or other rig components are securely attached at both ends to prevent movement following rig up. Walkways must be bolted or pinned in place with no large gaps in the walking surface. Check that sliding walkways have pin systems to hold them in place. Check that walkways installed above working areas also have a safety cable installed if the potential exists for it to be broken loose by hoisting equipment or other mechanical means.

Condition

Inspect all lifting eyes that are used to position the walkway. They should be in good repair. Also, make sure to lift the walkway level to facilitate installation. Look for corrosion and bent or otherwise damaged sections.

Load Rating

Walkways should never be modified to carry loads they were not designed for. Walkways that carry hoses, electrical cables, or piping systems in addition to foot traffic should be designed to provide a clear walking area and be rated for the loads it will carry.

Module 5 Quiz

- 1. During your rig inspection, verify that stairways are at least _____degrees but not more than _____ degrees.**
 - a. 30, 50
 - b. 10, 20
 - c. 50, 70
 - d. 20, 30

- 2. When inspecting stairs and handrails on the rig, make sure that all handrails are capable of withstanding a _____ load from the top rail in any direction.**
 - a. 5000-pound
 - b. 150-pound
 - c. 1000-pound
 - d. 200-pound

- 3. When inspecting landings on a rig, verify that they allow an effective width of at least _____ inches when the door swings open.**
 - a. 10
 - b. 20
 - c. 30
 - d. 40

- 4. When inspecting landings on a rig, check that hand rails around landings are _____ inches high.**
 - a. 42
 - b. 30
 - c. 36
 - d. 40

- 5. When inspecting on the rig, make sure gratings covering belt drives, conveyors, or moving machinery are ____.**
- a. clipped in place
 - b. bolted down securely
 - c. properly identified with colors
 - d. tagged with identification

Module 6: Lines and Slings

Auxiliary Hoisting Lines

The purpose of this inspection is to ensure that hoisting lines are operating properly.

Location / Type

Note the location and type of each auxiliary hoisting line found on the rig.

Cable Condition

Check the condition of each wire rope.

-) Look for kinks or cuts in the line from being pinched or impacted.
-) Look for crushing of the cable on the drum or anywhere along the line where the internal core may have failed.
-) Look for broken wires along the length of the line and replace as per company guidelines.
-) Look for worn areas along the line. Cables that have rust down inside the strands should be replaced.
-) Note specific problems in comment section.

Sheaves

Check structural members used to support sheave installations for cracks, deformities, and wear. The sheave should hang freely and be able to turn as needed when under load. Inspect the spindle or mandrel in the swivel assembly for wear. Shackles used to hang the sheave must be of the 4-part type with bolt and locking pin. Screw pin type shackles should not be used in overhead applications. Check that safety cables are installed where they do not interfere with the normal operation of the sheave.

Routing

Check that the routing of the hoist cable runs freely without excessive contact with structural components of the mast. Pay particular attention to areas around the racking board and fingers where the cable can become trapped and cause excessive wear to the fingers and cable. Check equipment to see if hoist lines have been in contact with them. Top drive drilling units,

rotary hose and service loop clamps, and stabbing boards can all be damaged by, or cause damage to, hoisting lines.

Line Guides

If used, check to ensure they are not causing undue wear on the cable and that they are performing properly. Screw pin shackles should not be used for line guides on active hoist lines. The pins may be unscrewed by the movement of the cable and result in a dropped object.

End Connections

Check that thimbles and mechanical sleeve fittings are not deformed or bent. Check for broken wires in and around factory installed mechanical sleeve fittings.

Active hoist lines should always have factory installed fittings. If wire rope clips are used on hoist lines, the load rating of the cable should be reduced by 20 percent. Poured socket fittings done with Thermoset resin should be checked for cracks and broken resin in the fitting. Inspect the winch socket to ensure the anchor point is secure and the cable will not come off the drum.

Static Hanging Lines

Conduct this inspection to ensure that static hanging lines are in good condition.

Location

Identify the static lines located on the rig and list them for inspection.

Type

Indicate the type of line including size and manufacturer identification number.

Cable Condition

Look for kinks that may have occurred during rig up, cuts in the line can result from impact by pipe or iron, and crushing of the cable or flat spots along the line where the internal core may have failed. Identify broken wires along the length of the line and replace as per company guidelines.

Look for areas along the line where it may have rubbed against itself or the structure. Cables that have rust down inside the strands should be replaced.

Wire Rope or Cable Clips

Ensure that the size and number are correct for the size of line being used as per manufacturer recommendations. Check the installation if the cable clamps are correct and in compliance with good rigging practices. Make sure that any cable tail will not present a snag hazard or get fouled with other lines or traveling equipment.

Installation

Inspect for cracks, deformities, and wear. Shackles used to hang static lines over work areas should be the 4-part type with bolt and locking pin. Screw pin shackles should not be used to hang static lines overhead.

Routing

Check the routing of the static cable to ensure that it hangs freely without excessive contact with structural components of the mast. Pay particular attention to areas around the girts and racking board where the cable can become trapped.

Check the length of the cable to ensure it has not been smashed by pipe or traveling equipment. Block hanging lines should be tied back out of the way and if the shackle is left attached it should be properly secured to prevent dropped objects.

Temporary installations of top drive drilling units may exceed the load rating on the block hanging line and/or the hanger on top of the traveling block.

Top drive drilling units, rotary hose and service loop clamps, and stabbing boards, can all be damaged by, or cause damage to, static hanging lines.

End Connections

Inspect thimbles and mechanical sleeve fittings for bending or deformities. Check for broken wires in and around factory installed mechanical sleeve fittings. When wire rope clips are used on static lines, the load rating of the cable may need to be reduced. Poured socket fittings done with Thermoset resin should be checked for cracks and broken resin in the fitting.

Synthetic Web Slings

Because cranes, derricks, and hoists rely upon slings to hold their suspended loads, slings are the most commonly used piece of materials-handling apparatus.

The reason we conduct this inspection is to ensure that synthetic web slings are safe for use.

More information on the guidance of safe sling use can be found at:

<https://www.osha.gov/dsg/guidance/slings/tables-figures.html>

Location and Type

Maintain a log of all lifting slings on the rig. Inspections prior to use and each year are required by federal regulation and are part of good safety practice. Slings should be marked by the manufacturer with the safe working load and the date of manufacture.

These tags should not be taken off the sling or otherwise destroyed. If tags are missing, the sling should be removed from service and destroyed.

Slings should be stored in a clean, dry place where they are out of direct sunlight and protected from the weather. In addition, slings should be stored away from heat and chemicals that may harden or damage the fibers. Slings should be hung up and not left on the floor or deck.

Inspection

Check each sling individually for the following conditions: wear, broken stitches, heat damage, chemical damage, holes or tears, cuts or snags, or damage to the end fitting.

-) Mark any damage on the inspection form.
-) Mark the damaged sling and remove it from use.
-) Start with the end eye or fitting.
-) Inspect the chaff guard inside the eye if the sling has one.
-) Look the eye over carefully to determine if it has been stretched or pulled over a large object.
-) See if there is any evidence of knotting or twisting of the eye.
-) Move to the body of the sling looking for signs of snagging, broken threads, tears, or cuts.
-) Make sure the sling has not been tightened around a sharp corner that would cut the fabric.

-) Synthetic web slings are manufactured with a red “tattle tale” yarn woven inside the strap itself. If you can see this red string, it means that the sling has been stretched or otherwise damaged and it should be taken out of service and destroyed.

-) Check for burn marks or melting that may have occurred around welding activities. Slings that are used around welding should be protected from the heat and the sparks and should never be installed on hot iron. Chemical exposure can also burn or harden synthetic slings.

Some companies use a color code system to identify what year a sling was inspected. Some larger slings may last for many years and would need to be inspected, recorded, and color coded for the current year. Use only marking paint recommended by the sling manufacturer to color code slings. Other paints may damage the sling and render it useless.

Module 6 Quiz

1. When inspecting cables on the rig, check for all the following, except _____.
 - a. paint marks
 - b. evidence of crushing
 - c. kinks
 - d. broken wires

2. In your inspection of shackles used on a rig, make sure _____ shackles are not used in overhead applications.
 - a. wood locking
 - b. self-slipping
 - c. 4-part type with bolt and locking pin
 - d. screw pin type

3. Inspections _____ are required by federal regulation and are part of good safety practice.
 - a. daily and annual
 - b. daily and after each use
 - c. prior to use and each year
 - d. continually and quarterly

4. During your inspection of slings on the rig, check for each of the following evidence of damage, except _____.
 - a. wear and excessive heat
 - b. proper documentation
 - c. broken stitches
 - d. cuts or snags

- 5. When inspecting wire rope or cable slings, make sure the sling has not ____.**
- a. been used on the previous rig up
 - b. been tightened around a sharp corner
 - c. been color coded
 - d. been used without safety staff approval

Module 7: Lines and Slings (Continued)

Wire Rope or Cable Slings

It's important to do this inspection to ensure that wire ropes are safe for use. For more information see: 29CFR1910.184 (f) and manufacturer information.

Location and Type

Maintain a log of all lifting slings on the rig. Inspections prior to use and each year are required by law. Good practice instruct that slings should be marked by the manufacturer with the safe working load and the date of manufacture.

Tables of working load by size and type of wire rope should be available in case tags are damaged.

Slings should be stored in a clean, dry place where they are protected from the weather. In addition, slings should be stored away from heat and chemicals that may remove the lubricants from the cable.

Slings should be hung up and should not be hung off the floor or deck.

Inspection

Check each sling individually for the following conditions: wear, broken wires, heat damage, corrosion, kinks or doglegs, eye deformation, or damage to the end fitting.

Mark any damage on the inspection form, mark the sling, and remove it from use.

Start with the end eye or fitting. Inspect the inside of the eye for wear or broken wires. Look the eye over carefully to determine if it has been stretched or pulled over a large object. See if there is any evidence of knotting or twisting of the eye.

Inspect the swaged fittings for cracks or bending, paying close attention to where the wires enter the fitting.

Move to the body of the sling. Does it show any deformation, such as kinking, knots, or crushing? Make sure the sling has not been tightened around a sharp corner that would cut or break the cable.

Ensure that there are not more than five randomly distributed broken wires in one strand in one lay length of rope. If more than 10 broken wires are found in one rope lay or the sling exhibits other damage, it should be taken out of service and destroyed.

Check for burn marks or melting that may have occurred around welding activities. Slings that are used around welding should be protected from the heat and the sparks and should never be installed on hot iron.

Check for corrosion from chemicals or exposure to water.

Look for flattening or crushing of the cable that would indicate damage to the internal wire rope core. Any damage to the internal core would be cause to take the sling out of service.

Some companies use a color code system to identify what year a sling was inspected. Some larger slings may last for many years and would need to be inspected, recorded, and color coded for the current year.

Chain Slings

Conduct this inspection to ensure that chains are in good condition and ready for use. For more information see: 29CFR1910.184 and manufacturer documentation.

Location and Type

Maintain a log of all chain slings on the rig. Inspections prior to use and each year are required by law. Good practice instructs that slings should be marked by the manufacturer with the safe working load and the date of manufacture. These tags should not be taken off the sling or otherwise destroyed.

Chain slings should be stored in a clean, dry place where they are protected from the weather and are away from moving equipment. Chains should be hung up and off left on the floor or deck.

Inspection

Individually check each sling for the following conditions: inner link wear, bent link, stretched chain, gouges, heat damage, cuts or nicks, or damage to the end fitting. Mark any damage on the inspection form, mark the sling, and remove it from use.

Start with the end eye or fitting. Inspect the lift ring if the sling has one. Make sure that the lift eye is not distorted or pulled out of shape.

Look the eye over carefully to determine if it has been stretched or pulled over a large object. See if there is any evidence of welding or cutting of the eye.

Move to the body of the sling for signs of nicks or bent links. Examine links for evidence of over pulling. Look for melting that may have occurred around welding activities.

Chain slings that are used around welding should be protected from the heat and sparks and should never be arced or burned.

Look for wear or damage to end links used to attach the chain to the end fittings. Verify that the keeper pins are in place and that the link swivels and moves freely. Chain slings should not be welded by the link to equipment. A chain sling can be pulled tight down on a load resulting in very dangerous sling angles.

Chain slings should have no more of a sling angle than cable slings used for the same purpose.

Examine end hooks for bending and misalignment. Chain hooks should fit snugly between the links and be sized properly for the chain.

Shackles

You need to do this inspection to ensure that shackles are in good condition and ready for use. For more information see: manufacturer documentation.

Location and Type

List all shackles with manufacturer and load rating. If a color code system is being used for lifting equipment, it should be applied to the shackles also.

Pins

Inspect the pin closely to ensure that the threads and shoulder are in good condition. Threads should not be damaged and components should screw together smoothly by hand pressure only.

If tools are required to force the pin or bolt into the bow of the shackle, then one or more of the components has been damaged and should be taken out of service.

Screw pins should “shoulder up” against the outside face of the shackle ear. Bending along the length of the pin may indicate that the shackle has been over loaded and it should be taken out of service and destroyed.

Four-Part Shackles

These are shackles that include a safety keeper or cotter key that prevents the nut from backing off the pin. The safety keeper or cotter pin should be the proper length and diameter to fit snugly in the hole through the pin.

At no time should the shackle be assembled for use with just the safety pin installed; the nut must be in place and snug with the safety pin installed prior to loading the shackle.

Four-part shackles should be used in permanent or semi-permanent overhead installations and should be inspected weekly to ensure the safety pin and nut are secure and that the shackle has not been damaged by traveling equipment or other contact.

Module 7 Quiz

- 1. When inspecting chain slings, look for all the following indications of physical damage, except _____.**
 - a. discolored mid fittings
 - b. stretching
 - c. gouges
 - d. inner link wear

- 2. When inspecting chain slings, ensure chain slings have no more of a sling angle when lifting than _____ used for the same purpose.**
 - a. synthetic slings
 - b. wire rope slings
 - c. hemp slings
 - d. cable slings

- 3. When inspecting 4-part shackles, ensure that at no time the shackle is being assembled for use with just the _____ installed.**
 - a. safety keeper
 - b. cotter pin
 - c. safety pin
 - d. nut

- 4. What does it mean if tools are required to force the pin or bolt into the bow of the shackle?**
 - a. The pin is the wrong size
 - b. Components have been damaged
 - c. The shackle has been subject to welding heat
 - d. The shackle must be heated

5. _____ should be used in permanent or semi-permanent overhead installations.
- a. Sliding-pin shackles
 - b. Auto-clipping shackles
 - c. Two-Part Shackles
 - d. Four-part shackles

Module 8: Ladders and Platforms

Fixed Ladders

This inspection helps to ensure that fixed ladders around the rig are of the proper size and configuration required to provide safe access for employees. For more information see: 29CFR1910.27 and OSHA Stairways and Ladders Guide (publication 3124).

Keep track of all current fixed ladders on the rig to facilitate thorough and accurate inspections and maintenance. Fixed ladders both outside on the rig and inside of tanks and substructures should be listed for inspection and maintenance.

Location/Use

Write the location of each fixed ladder and its use. This description can be used for identification. Examples of use include: limited access for maintenance or for more regular use during the course of the day.

Anchor Points

Inspect the connection for any cracked welds or bent brackets. Anchor points are places where the fixed ladder attaches to the main structure and can be welded, bolted or a combination of both.

Check that bolts are tight and the connection does not move at the attachment point. Check that the top and bottom of the ladder are attached to prevent movement when getting on and off the ladder.

Side Rails and Rungs

Check that the rungs of the ladder are straight, evenly spaced, and firmly attached to the side rails. Check that rungs are a minimum of $\frac{3}{4}$ inches in diameter for metal ladders and welded solid to the side rails. Any loose or missing rungs should be replaced immediately. Make sure that rungs and side rails are free of burrs and snags that may grab a user's glove.

Landings

Check that all access points to fixed ladders are open and clear of debris. Any signs regarding access to the ladder should be posted at these points. Check that fixed ladder side rails extend at least 3.5 feet above the top level of access. If the top access of the ladder presents a fall hazard, make sure the opening is gated or chained off to prevent falls through the opening.

Fall Protection

For ladders that exceeds 20 feet in unbroken length, make sure some type of fall protection is available. This can be a ladder cage, retractable life line (“SRL”), or cable follower system.

Portable Ladders

Make sure you don’t forget this inspection to ensure that portable ladders around the rig are in good condition and the proper size for safe access for employees. For more information see: 29CFR1910.25- 26 and OSHA Stairways and Ladders Guide (publication 3124).

Keep track of all current portable ladders on the rig to facilitate thorough and accurate inspections and maintenance.

Location/Use

Write the location and general use of each portable ladder on the rig. Portable ladders should be stored close to the point of use if possible. The use may be for limited access or for more regular use during the course of the day. Check that ladders are stored by hanging them up or placing them in a designated rack where they will not be damaged by other rig activities. Damaged ladders must be removed from service and replaced.

Feet & Levelers

Check the area of the ladder where it sets down on the supporting surface. Check the feet for any missing or bent traction devices. Check that rivets are tight and the connection does not move at the attachment point unless it is designed to do so.

Examine factory attachments to be sure they are in place and functioning properly. Bent or “sprung” ladders should be taken out of service.

Visible Rating

Ladders must be marked with ladder size, type, maximum length, number of sections (if appropriate), highest standing level, total length of sections (if applicable), model number, manufacturer’s name, manufacturer’s location, and date of manufacture. Usage guidelines and other warning statements must also be placed on the ladders in specific locations depending on ladder type. Ladders appropriate for electrical work should be available and clearly identified. Check that ladders are available which are appropriate for the rig workers at that site.

Fixed Platforms

Do this inspection to ensure that platforms around the rig are of the proper size and configuration required to provide safe working surfaces for employees. For more information see: 29CFR1910.23.

Location/Use

List each fixed platform for easy identification along with the original designed purpose of the platform.

Support Structure

Check that frame work is straight and spaced to provide adequate support for grating or decking. Check that knee braces or angle braces are straight, undamaged, and do not have any cuts or welds that would weaken the original design. Check that there are not any additional equipment or tools hanging from the support structure beyond what it was designed to hold.

Hinges & Attachments

Check for weld cracks or deformities that could fail when the platform is in use. Ensure that properly sized pins and keepers are installed and secure.

On fold-down platforms, check for pinch points and heavy lifting exposure when rigging up or down.

Working Surface

Check that the working surface of the platform is even and free from dents or level changes that would create trip hazards. Check that the surface is not worn to the point that it fails to provide reasonable slip protection for normal work activities. Make sure the walking or working area is not cluttered with tools or equipment.

Guard Rails

Check that rails have a solid top rail, mid rail, and 4" kick plate on the bottom to prevent tools from being knocked off the platform.

Removable rails that have the potential to be snagged and pulled out of their sockets when lifting loads should be drilled and safety bolted into the pin pockets.

Module 8 Quiz

- 1. When inspecting ladders, ensure anchor points are attached using any one of the following methods, except ____.**
 - a. roped
 - b. welded
 - c. bolted
 - d. welded or bolted

- 2. When inspecting the rungs on fixed ladders, check that the rungs of the ladder meet each of the following requirements, except ____.**
 - a. rungs are straight
 - b. rungs are evenly spaced
 - c. rungs are hemp slings
 - d. rungs are painted

- 3. When inspecting portable ladders make sure bent or “sprung” ladders are ____.**
 - a. repaired
 - b. tagged with hazard warning
 - c. taken out of service
 - d. converted to a fixed ladder

- 4. When inspecting fixed platforms on a rig, check for all the following, except ____.**
 - a. framework provides adequate support for grating or decking
 - b. platform is painted appropriately as authorized by OSHA
 - c. knees or angle braces are undamaged
 - d. tools or equipment are not hanging from support structure

- 5. When inspecting fold-down platforms on a rig, be sure to check for _____ when rigging up or down.**
- a. a platform surface is painted
 - b. loose materials
 - c. safety approval prior to folding
 - d. pinch points and heavy lifting exposure

Module 9: Hoses, Pins and Keepers

Hose and Fittings

The purpose of this inspection is to ensure that hoses used around the rig are in good working order and used properly.

Hose

List each hose with a description of location and purpose so that another worker could locate it. Inspect based on the instructions below and note on the form.

Service Rating

Each hose must be clearly marked with its pressure rating and service limitations. Some hoses may not be rated for high temperature or corrosive materials.

Any hoses that are being used for purposes other than what they were designed for should be addressed.

Hose Body

Inspect the entire length of the hose all around.

-)] The hose should not be crushed or kinked or otherwise deformed.
-)] Check for swelling of the hose body that would indicate that the hose had been over heated or over pressured.
-)] Small cracks on the outside layer are common; however, cracks that expose multiple layers may need to be addressed and should be noted on the inspection.
-)] Look for signs of stretching or pulling of the hose. This may cause undue stress on the fittings.
-)] Check for damage that may have been caused by the hose being snagged along its length.

End Fittings

Carefully inspect each end of the hose to verify the integrity of the connection.

-)] The fitting should be seated all the way down into the hose and show no signs of movement.
-)] Fitting clamps and bands should be tight and located in the proper position on the fitting.
-)] The end fittings themselves should not be damaged and any locking mechanisms should be fully functional.
-)] Hose fittings and connections should be tight and not leaking.
-)] Fittings must be rated for the same service as the hose and be installed correctly.

Hose Runs

-)] Check the run of the hose to ensure it is not rubbing or chaffing on sharp edges.
-)] Check the hose run to ensure it does not interfere with doors, walkways, or overhead clearance.
-)] Hoses should not be run in rig ditches and should be protected from chemicals or heat sources such as steam piping or welding.
-)] Hoses should never be stretched tight from fitting to fitting, the hose must be allowed to expand and contract during use without putting a pull load on the fitting.

Storage

When not in use, hoses should be coiled and stored properly to prevent damage to the body of the hose or to the end fittings.

-)] Large diameter hoses should be coiled flat without kinks; they should not be transported in a junk basket where heavy iron equipment may damage them.
-)] Smaller hoses can be coiled and hung for storage and transport.
-)] Make sure that all hoses have been properly drained or flushed prior to storage or transport.
-)] If hoses have been used for hydrocarbon or chemical service, they should be plugged to prevent spills or employee contact from residue left in the hose.

Third Party Equipment

Third party hose runs should be checked as well to make sure they don't interfere with rig operations or create unsafe conditions for the rig crew.

Safety Chain and Whip Check

Conduct this inspection to ensure that hoses used around the rig are properly snubbed to prevent injury should the fitting fail and the hose whip out of control.

Good practice recommends that hoses longer than 3 feet should have secondary restraint if they are:

-) high pressure, high volume hoses (for example: rotary hoses, vibrating hoses, cement hoses, circulating hoses)
-) compressed gas hoses (air hoses $\frac{3}{4}$ " and larger, nitrogen transfer / service hoses)
-) energized fluid lines (steam hoses, water blasting, test pump lines)

Hose

List each hose with a description of the location and purpose so that another worker could locate it. Inspect based on the instructions below and note on the form the: hose size and rating, clamp location, attachment point, and condition of whip checks.

Safety Chains and Cables (Hobbles)

Ensure that the chain clamp is installed at the proper location on the hose. Most vibrating/ rotary hoses have the clamp area marked 2 to 3 feet in from the coupling. The small eye on the coupling is for fit up of the connection only and is not a lifting eye and should not be used for secondary restraint. Safety chains should be attached securely to a dedicated pad eye or structural member that can withstand the impact of a sudden failure. Clamps used overhead should be placed where they do not interfere with running lines or tugger hoist lines. Restraints should never be placed around the coupling.

Whip Checks

Whip checks are light weight cable devices used for smaller hoses in various applications. Air powered tools that use large volume air hoses should always be equipped with whip checks at each connection. The whip check should be installed before each connection is made and the

cable should be installed to minimize the amount of slack in the cable. Whip check cables should not be used to hang hoses nor should they be used for any other purpose than intended. Whip checks should not be used for high pressure, high volume applications where safety chains or cables should be used. Whip checks can be used for moderate pressure <200 psi in smaller diameter <3-inch hose. Whip checks should be inspected for corrosion or damage.

Pins and Keepers

Be sure to conduct this inspection to make sure that pins and keepers are installed correctly for efficient and safe operation. For more information see: factory specifications from manufacturer.

Location/Type/Number

Note the locations and type of pins and keepers on the rig. Write the quantity inspected for many in one location.

Pin Diameter

Check that the point taper on the pin is completely through the assembly with the outside diameter of the pin in contact with the internal diameter of the connection.

Pin Length

Check that pins are not so long that they can be bent or otherwise damaged making them difficult or impossible to remove.

Pin Condition

Check that the pin head has a stop collar or stop pin to prevent the pin from being driven too far into the connection.

Make sure that the head of the pin is not mushroomed to the point that fragments could be broken off as the pin is being driven. Also inspect the pointed end of the pin for damage caused by excessive hammering.

If the pin must be hammered to the point where mushrooming occurs, the connection is misaligned.

Pin Installation

Check that pins are not in an area where they can be impacted by equipment or pipe which may shear the safety keeper and drive the pin out of the connection. For example, pins in the

mast across from the racking board may be struck by a lost stand of pipe and driven out of their connection.

In these situations, the pin should be installed so that any impact will drive the pin into the connection rather than out. In addition, the pin should not present a snag hazard for hanging or hoist lines on the rig.

There are generally two types of safety keepers used on assembly pins:

) safety pin

) safety bolt

They should be inspected for proper fit and condition.

Keepers should not have other items attached to them, and should not present a snag hazard.

Safety Pins

Confirm that the pins are inspected for damage and in good shape prior to installation. If the keeper is in good shape when installed, any damage noted during the inspection would indicate some type of problem or interference. Check that the keeper is not hard against the shoulder of the pin pocket, but is loose and free to move without binding.

Safety Bolts

Check that the safety bolts are sized to fit the pin safety hole closely, without binding, and without the need for numerous washers.

The bolts should be long enough to get the entire nut onto the bolt with at least 2 threads showing through the nut.

Check that the safety bolt is not installed without nuts, particularly in overhead applications.

Module 9 Quiz

- 1. When inspecting hoses and fittings on the rig, each hose must be clearly marked with _____.**
 - a. its pressure rating and service limitations
 - b. its designed use
 - c. the length of the hose
 - d. tags and emergency information

- 2. When inspecting hoses and fittings on the rig, be sure to check for all the following defects, except _____.**
 - a. swelling of the hose body
 - b. small cracks on the outside layer
 - c. signs of stretching
 - d. synthetic hose flexibility

- 3. When inspecting hoses runs on the rig, be sure to check that hoses are _____ when not in use.**
 - a. stretched tight
 - b. laid out in the rig yard
 - c. properly coiled
 - d. placed in basked with other equipment

- 4. When inspecting hoses runs on the rig, make sure that all hoses have been _____ prior to storage or transport.**
 - a. properly straightened
 - b. properly drained or flushed
 - c. pressurized
 - d. washed

- 5. When inspecting safety bolts in overhead applications, check that the safety bolt is not installed without _____.**
- a. pins
 - b. tags
 - c. nuts
 - d. keepers

Module 10: Chemical Hazards

Safety Data Sheets (SDS)

It's important to conduct this inspection to make sure that all classified chemicals are properly documented and labeled. More information on this topic can be obtained at 29 CFR 1910.1200.

Chemical Storage Locations

List each area where chemicals are stored and make sure the locations are properly and clearly labeled.

Inventory Current

Check that the inventory list matches the chemicals present. Efforts should be made to limit chemicals on the rig to those needed for day-to-day operations.

Document Dating

Printed copies of SDS should be clearly dated to determine if the information provided is current. Chemicals that are new to the system should be reviewed with all crews at weekly safety meetings. A brief run through of the data sheet, discussion of chemical use and storage, and proper PPE requirements for handling and mixing should be provided. Mud chemical companies can be of great assistance in providing updated training as they must provide SDS information for all the chemicals they send out to the rig.

Note: The NIOSH HazCom Writer at <http://www.cdc.gov/niosh/mining/works/coversheet1822.html> is a free software program from NIOSH designed to help companies write their OSHA and MSHA required HazCom plans and list all hazardous chemicals at a company's site.

Right to Know Information

It is required that information regarding employees "Right to Know" about chemicals in the workplace be posted on the rig in the change house or the doghouse. Different states may have different requirements regarding the proper postings, so review laws closely if the rig has moved across state lines.

Emergency Numbers

Numbers of chemical response information services should be posted along with other emergency numbers. When calling these information services, you should have all the

information provided on the original packaging so the service can find and communicate the necessary information to emergency response personnel.

Requests

SDS should be attached to all new chemicals shipped to the rig. Always request current SDS information when ordering or reordering chemicals. Chemical suppliers have an obligation to provide current information with any chemicals they offer for sale or transport. Revisit SDS requests every week until the proper documentation has been provided. Prior to new mud companies coming on the rig, they should provide complete SDS information for all chemicals they intend to use on your rig.

Chemical Storage

To ensure that chemicals are stored properly and do not present a hazard to employees or the environment. For more information see: 29CFR1910.1200.

Chemical Storage Locations

List each area where chemicals are stored. Examine the chemicals and storage area for each issue below. Take the time to examine other areas of the rig for chemicals not in their proper location.

Stored as Instructed

Every effort should be made to store chemicals on the rig as instructed by the manufacturer. Consideration for wet and dry locations, direct sun light, hot or cold locations, among other things, may be noted in the SDS or on the packaging. Whenever possible store chemicals in their original containers.

Compatibility

Make sure that chemicals are not incompatible with other chemicals they are stored near. For instance, Caustic Soda should never be stored around acids or chemicals with a low PH. It should never be stored where it can be damaged by water. Pressurized containers should not be stored where they are subjected to heat that can cause them to over pressure. Special precautions should be taken with propane bottles and other compressed flammable gases to ensure they do not leak or relieve pressure in enclosed areas.

Signs and Postings

Ensure that storage areas are properly posted as to their contents and any warnings that may be necessary.

Department of Transportation (DOT) markings may be required on buildings housing chemicals during rig moves or building transport. Cabinets and storage bins used for chemical storage must be labeled. Outside storage areas containing hazardous chemicals must have signs and be clearly defined.

Containers and Marking

The law requires that chemicals, regardless of the container they are stored in, must be clearly marked as to contents and health hazards. A system for marking and communicating chemical information should be part of the rig's safety program. Ensure that chemical storage on the rig complies with company rules.

Chemicals must never be stored or transported in water bottles, cups, or cans that have contained or could contain fluids for human consumption.

Spill Reporting and Clean Up

Chemical spills can be a serious environmental exposure. Local, State, and Federal laws may apply to spills of highly hazardous chemicals. Ensure that any release of hazardous chemicals is reported to your supervisor. Always follow clean up and disposal instructions included in the appropriate SDS.

Compressed Gas

The purpose of this inspection is to ensure that gas cylinders are stored properly and do not present a hazard to employees. For more information see: 29CFR1910.101 – 104, DHHS (NIOSH) Publication Number 2004-101, and local emergency response agencies.

Storage Locations

List each area where compressed gas cylinders (bottles) are stored. Enclosed areas used for the storage of compressed gas cylinders should be ventilated to prevent an accumulation of gas. Gas cylinders should be stored upright and immobilized by chains or other means to prevent them from being knocked over. All stored compressed gas cylinders, including empty cylinders, must have the valves closed and the caps installed. Compressed gas cylinders should not be exposed to heat.

In use Cylinders

Dedicated racks should be available to hold nitrogen bottles that are used for backup on accumulator systems. Portable compressed gas cylinder racks for welding and cutting should be in good repair and the cylinders should have protection around the valves should the rack tip over. When moving gas cylinders from one place to another, the gauges should be removed and the caps installed to protect the valve.

Compatibility

Compressed gas cylinders containing different types of gases should be marked and stored separately so that they can be easily identified to avoid confusion. Stored oxygen and acetylene cylinders should have a fire-resistant partition between them; if this is not possible, they should be stored 20 feet apart.

Signs and Postings

Storage racks and areas should be clearly marked with the required placards and type of gas stored in each area with appropriate warning signs.

Cylinder Inspection

Compressed gas cylinders should be clean and undamaged and the valve system functioning properly. The bottom of the cylinder should be protected from the ground and they should be inspected for corrosion, pitting, cuts, gouges, digs, bulges, neck defects and general distortion. The cylinders must be clearly marked as to contents and expiration date, and the inspection date should be current. Compressed gas cylinders that have reached their expiration date should be removed and returned to a distributor for reconditioning or disposal.

Right-To-Know Information

Community Right-To-Know laws may apply to buildings and storage sheds that would need to be marked for the purpose of emergency response. Information regarding local requirements can be found by contacting the local fire department or emergency response agency.

Module 10 Quiz

- 1. When inspecting for chemical hazards on the rig site, ensure all new chemicals shipped to the rig include ____.**
 - a. safety data sheets (SDS)
 - b. manufacturer phone numbers
 - c. ingredient information
 - d. "best used by" dates

- 2. When inspecting for chemical hazards on the rig site, ensure chemicals are never stored or transported in containers that could contain ____.**
 - a. biological matter
 - b. pressurized gasses
 - c. liquids other than water
 - d. fluids for human consumption

- 3. When inspecting, check to make sure all stored compressed gas cylinders, including empty cylinders, comply with all the following, except ____.**
 - a. valves are closed
 - b. caps are installed
 - c. hoses are attached
 - d. no exposure to heat

- 4. Compressed gas cylinders containing different type gases should be marked and stored ____ so that they can be easily identified to avoid confusion.**
 - a. together
 - b. separately
 - c. in groups
 - d. off-site

- 5. Compressed gas cylinders should be protected from the ground and inspected for each of the following, except_____.**
- a. corrosion
 - b. pitting, gouges, and digs
 - c. inflation
 - d. bulges

Module 11: Other Areas

Falling Objects

It's important to do this inspection to ensure that overhead equipment is properly secured to prevent injuries from falling objects.

For more Information: IADC Health, Safety, and Environmental Reference Guide.

Rig Location

List each area of the rig below and check: lights, welds and attachments, safety cables, secured tools, cable or line rubbing, and sheaves. Inspect based on the instructions below and note on the form.

Mast or Derrick

-) All lights should be securely mounted and a safety cable attached.
-) Counter weight sheaves and hoist line sheaves should be mounted to a dedicated cross member with a 4-part shackle (bolt, nut with keeper pin).
-) Chains, wire rope, and soft line used during rig moves should be removed from the derrick to prevent it from becoming fouled in the traveling equipment. Stabbing boards and other work platforms should be securely attached and have a safety cable for both the track and the fold down platform.
-) Wooden bumper blocks under the crown should be wrapped in expanded metal to prevent broken pieces from falling to the rig floor.
-) Inspect the horizontal girts for tools or materials that may have been left behind following repairs.

Racking Board

-) Inspect the racking board for any broken welds or cracks.
-) The board should be straight and show no signs of contact with traveling equipment.
-) The board and fingers should have safety chains installed to prevent them from falling if they are broken off.
-) Check the board area for loose tools, water bottles, or shackles.
-) Inspect the board and fingers for damage from tugger lines where they may be sawing into the iron causing damage.
-) Make sure lights, winches, and cameras are properly mounted and equipped with safety cables.

Traveling Equipment

Traveling equipment includes an arrangement of pulleys, or sheaves, through which drilling cable is reeved, which moves up or down in the derrick or mast.

-) The block hanging attachment should not have an unsecured shackle or sling riding along with the block.
-) Check the areas around the top drive and swivel for tools and loose items.
-) Top drive drilling units should be checked for safety wires on the bolts and safety cables on moving parts.
-) Inspect die holders to ensure broken dies will not fall to the rig floor.
-) Look for areas on the traveling assembly where tugger lines may be rubbing and causing damage.
-) Check hinges and pins on access platforms and guard openings.
-) Hoses and service loop connections should be secured and safety cables installed.

Substructure

The substructure is the foundation on which the derrick or mast and usually the drawworks sit. The substructure also contains space for well control equipment.

-) Look for loose tools on platforms or on beams above the cellar area.
-) Check lights for proper mounting and safety cables.
-) Suspended platforms should have a locking device to prevent the loss of scaffold boards, platform pieces, or hand rails.
-) Check all fixed shackles and sheaves same as the mast.

Derrick or Drill Floor

The derrick or drill floor is the work area in which the workers conducts operations. This usually includes adding or removing drillpipe to or from the drillstring.

-) Areas around the drill floor should be checked for equipment or tools that could be knocked over the side to work areas below.
-) Removable handrails that may be snagged when lifting with the hoist should be safety pinned.
-) Equipment and tools stored on or hanging from hand rails should be secured to prevent dropped objects.
-) Storage areas that are above walking and working surfaces should be properly guarded to prevent items from falling or being knocked off the edge.

Housekeeping

Conduct this inspection to ensure that areas around the rig are kept clear to provide safe access for employees and that hazardous conditions are addressed.

Location

Note the name of each area of the rig and inspect for the following issues.

Walking & Working Surfaces

-) Inspect areas for oil, grease, mud, and standing water.
-) Check that tools and equipment are not left lying in areas where employees are walking.
-) Make sure that any mats or absorbent materials used on floors and walkways are clean and lying flat so they do not create a trip hazard.

Stairs & Ladders

Check that they are clear of ropes, hoses, chains and electrical cords. Check hand rails and ladder rungs for grease or mud.

Eating Areas

-) Check that eating areas are kept clean and food requiring refrigeration is not left out.
-) Items left in coolers or refrigerators should be dated and outdated items should be removed and disposed of at least twice a week.
-) No food or beverages are to be consumed in areas where chemicals or other contaminants are present.

Portable Water

-) Make sure that drinkable water sources are clearly marked and were replenished during the current shift.
-) Disposable cups should be provided and the use of a common cup is prohibited.
-) Check that individual bottled water is marked by the user after it is opened and partial bottles are disposed of at the end of each shift.

-)] Water not safe for drinking must be clearly marked.

Toilet Facilities

-)] Check that toilet facilities are kept clean and are well ventilated.
-)] Check that vents are screened off to prevent insects and animals from gaining access.
-)] Food and drinking water are not to be stored in or around toilet facilities.
-)] Check that an area for cleaning hands is available and working.

Common Areas

-)] Check that change rooms are clean and well ventilated.
-)] Wet or damp clothing must be allowed to dry before use.
-)] Check that the area is free of trip hazards.
-)] Where employees must change foot wear, a bench or seating area should be provided.

Waste Disposal

-)] Look for waste containers around the rig, and check that they are secure from insects/animals and are emptied daily.
-)] When handling chemical wastes such as sacks or cans, the same PPE used for mixing should be used for waste disposal.
-)] Check that disposal areas or containers are equipped to prevent trash from blowing around or being scattered by animals.
-)] If applicable, ensure that waste streams are properly segregated.

Oil Leaks & Overflows

-)] Check areas where oil leaks, or where drips occur, for proper absorbent material.
-)] Also check installed catch basins.
-)] Absorbents should be changed on a regular basis to prevent fire and contamination issues.

-) Oily waste should be managed properly to ensure other waste streams are not contaminated if they are to be handled off location.

Tubular Storage

Do this inspection to ensure that drill string components are stored properly.

Location on Rig

List the areas of the rig where drill string components are stored. Inspect components based on the instructions below and note on the form.

Racks

-) Racks should be level and have a solid footing.
-) The welds on the racks should be inspected for cracks and breaks.
-) Where racks are hooked together end-to-end, they should be pinned, or overlapped, to prevent pipe from falling through the connection.
-) If racks need to be blocked, they should have support in enough places to prevent bowing or sagging of the structure when the rack is fully loaded.
-) Make sure that blocking is not crushed or broken and supports both sides of the rack.
-) Ensure that stop pins are in place, straight, and standing upright.
-) Racks that are integral to pipe baskets should have the bridging components properly attached and locked into place.

Stops and Chocks

A system should be in place for blocking and/or wedging the pipe to prevent it from rolling.

-) The bottom layer of pipe should be held in position with pins in the pipe rack.
-) Successive layers should each have blocking on both ends to prevent movement.
-) The chocks can be made of steel, plastic, or wood.
-) Whatever the material, the chocks should be nailed or otherwise secured to prevent the pipe from rolling.

Stripping

Stripping or strapping refers to the material used to separate the successive layers of pipe as they are stacked on the rack.

Stripping may be sections of old drilling line or 2x4's or 2x6's and should be a consistent thickness. Whatever is used, it must be sized for the pipe that is being stacked and provide support for the layers above.

-) Do not use stripping to bridge gaps between the pipe and the racks.
-) Lower layers of pipe should be tight with no gaps before the next layer is installed.
-) The upper layers should not extend beyond the lower layers; the stripping should never be loaded without support from below.
-) Stripping should be laid with sufficient overlap to prevent pipe from falling down between sections.

Thread Protectors

-) Pipe stored on racks should have thread protectors installed at all times.
-) The end connections should not be pushed with a forklift or other equipment without thread protectors installed.

Heavy Pipe

Special care must be taken when stacking heavy tubular goods. The preferred method is to only stack drill collars on the first layer.

If drill collars must be moved over drill pipe, the stripping must be strong enough to handle the load – three or more rows of stripping may be necessary.

Down Hole Tools

Special tools may require different handling. All of these tools along with the handling subs should be inspected.

Load Path Welds

This inspection will visually ensure that load path welds are not damaged.

Develop a systematic plan with the crew to conduct a focused visual inspection of the load path. Additional light and tools for scraping and brushing the welds should be available.

The inspection plan should address access to the area, necessary fall protection, and in some cases energy isolation and lockouts. Rig operations may need to be stopped or modified to ensure the safety of the inspector.

Rig Component

For each major rig component of the load path, note any: weld damage, bent structures, corrosion, cuts or holes, modifications, fluid build-up, and freeze damage. Specific instructions for each component are below.

Substructure

Starting on the bottom, look over the horizontal base beams of the structure.

-) Look for any broken or cracked welds.
-) Check for damage that occurred during rig moves, such as bent or torn iron.
-) Look for areas of corrosion or rusting where fluid or debris have accumulated.
-) Move up through the diagonal bracing looking for cracks or breaks in the main support structure.
-) Keep an eye out for torch cut holes or modifications that may jeopardize the integrity of the structure and note them on the form.

In self-elevating structures, look carefully around sheaves and raising lines for damage.

Look for areas where beams have been “boxed in” or have plates welded on them where fluids can become trapped causing corrosion and or freeze damage.

Areas around rotary beams, drawworks support beams, and the dead line anchor should be cleaned and inspected.

Mast Shoes and A-Legs

Clean and inspect the starting leg and A-leg pin assemblies both above and below the rig floor.

-) Look for torn welds around guide plates caused by misalignment during rig up/down.

-) Closely inspect areas that may accumulate debris and liquids.
-) Look for areas where rust build-up between plates is pushing them apart.
-) Look for “bulging” of enclosed beams that would indicate freeze damage.

Mast Structure

Clean and inspect each weld area systematically as you move up through the mast.

-) Look at each weld, top and bottom, for any deformities in the structural components where they may have been impacted.
-) If reinforcing plates or angles have been stitch welded to the main structure, look for build-up of rust and corrosion that may be forcing the surfaces apart.
-) Check welds on attachment and hangers that may be installed for hoist sheaves.
-) Structural members that support top drive rails or similar equipment should be checked for damage resulting from vibration or misalignment.

Raising Line Sheaves

-) Look for bending or cracks in the sheave bearing shaft where it is attached to the main structure of the mast.

Crown Base

-) Inspect pad eyes and other attachments to the bottom of the crown block.
-) Bumper block retainers can be damaged from incidental contact and could present a dropped object hazard.
-) Check for deformation in crown base beams and water table connection plates on top of the mast or derrick legs.

Module 11 Quiz

- 1. To prevent falling objects from suspended platforms, make sure they have a _____ to prevent the loss of scaffold boards, platform pieces, or hand rails.**
 - a. locking device
 - b. expanded metal wrapping
 - c. wooden bumper block
 - d. secure stabbing board

- 2. When inspecting for housekeeping hazards, make sure that any mats or absorbent materials used on floors and walkways are clean and lying flat so they _____.**
 - a. create a biological hazard
 - b. do not contaminate oil samples
 - c. assure an ergonomically correct surface
 - d. do not create a trip hazard

- 3. While inspecting for hazards with tubular storage, check welds on the racks for _____.**
 - a. sharp edges
 - b. residual heat
 - c. cracks and breaks
 - d. warping

- 4. When inspecting the storage of pipes, make sure end connections are not being pushed with a forklift or other equipment _____.**
 - a. off designated paths
 - b. without thread protectors installed
 - c. without prior approval
 - d. without proper suspension

- 5. When inspecting the rig's mast structure, you should complete all the following actions, except _____.**
- a. checking for deformities in structural components
 - b. inspecting each weld top to bottom
 - c. including photos of all welds for recordkeeping
 - d. cleaning and inspecting each weld area

Endnotes

1. Dept. of Labor, Occupational Safety and Health Administration (2014). Oil and Gas Well Drilling and Servicing eTool. Retrieved from:
<https://www.osha.gov/SLTC/oilgaswelldrilling/otherresources.html>
2. American Petroleum Institute (2014). Guidance Document for the Development of a Safety and Environmental Management System for Onshore Oil and Natural Gas Production Operations and Associated Activities. Retrieved from: [http](http://www.apis.com)
3. Bureau of Land Management (2014). Public Lands: Interior. Retrieved from:
www.blm.gov/pgdata/etc/medialib/blm/mt/blm_programs/energy/oil_and_gas/policy/cfr3160.Par.28656.File.dat/cfr3160.pdf