



SLICKLINE ASSISTANT

WORKBOOK

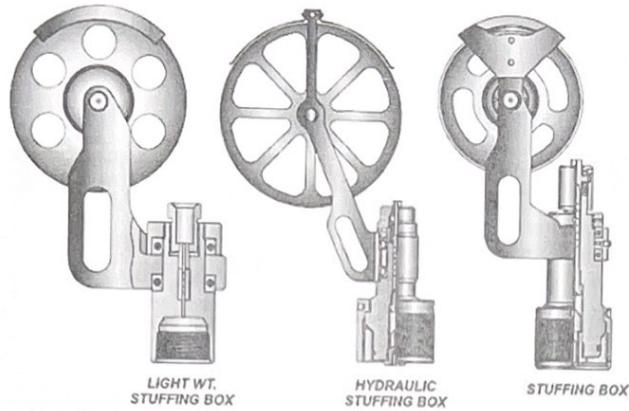
IMPORTANT NOTE:

1. Your point of reference to complete this workbook may be obtained from the following
 - Training Manual and any other training materials provided together with this workbook
 - Your Trainer, Assessor (Slickline Operator), Verifier (FSM) or senior colleagues
 - SOP / Quality Procedures & Processors
2. The completion of this Workbook is a joint effort and responsibility between you and your assessor therefore you have the obligation to request from your assessor to be assessed upon your completion of each topic
3. The completion of this Workbook is part of the MANDATORY requirements which you must fulfill to qualify for a promotion
4. Your training program is mostly self-driven, including this Workbook. It requires individual initiatives, dedication and commitment to complete the process.

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DATE COMPLETED	19/10/24

B. SURFACE EQUIPMENT

B.1. STUFFING BOX



What is Stuffing Box

A Stuffing Box is a key component in slickline/wireline operations that helps maintain a seal around the wireline as it enters the wellbore under pressure. It prevents well fluids or gases from escaping while allowing the wireline to move in and out of the well.

What is the purpose of stuffing Box

Allows the wireline to enter the well under pressure and provide a seal should be wireline break and be blow out of packing. Is a primary pressure barrier.

How to operate Stuffing Box

Positioned at the uppermost point of the PCE string



What is maintenance required for Stuffing Box

Components	Description
Packings	Not worn out. If the packing nut is near the lower end of its movement, there may not be sufficient movement remaining to increase the packing compression force to maintain a seal during wireline operations.
Sheave	The correct size for the line in use (16" for 0.125", or 20" for 0.140").
Upper and lower packing glands	Check for wear. If they are worn oversize they should be replaced, as worn glands allow the wire to cut the packings faster.
BOP Plunger	Check for wear and freedom of vertical movement.
Sheave Bearings	Check for free spinning and replace the bearings if necessary.
Sheave Staff	Check for freedom of swivel movement. It is essential that the sheave follow the wire direction during rig-up or the wire can jump out of the groove and become damaged.
Sheave Guard	Tight and adjusted close to the sheave to ensure it will trap the line in the event of a line break.

What is safety precaution required for Stuffing Box

- Check for Leaks: Regularly inspect the Stuffing Box for any signs of leaks or wear to ensure it's maintaining a proper seal.
- Use Proper PPE: Wear appropriate personal protective equipment (PPE) such as gloves, safety glasses, and protective clothing to safeguard against any potential exposure to well fluids.
- Depressurize Before Working: Ensure that the well is depressurized and that all pressure is safely released before working on or around the Stuffing Box.
- Follow Operating Procedures: Adhere to standard operating procedures and guidelines for installing, maintaining, and operating the Stuffing Box.
- Avoid Over-tightening: Be careful not to over-tighten the packing in the Stuffing Box, as this can damage the packing material and lead to leaks.
- Monitor Pressure Gauges: Keep an eye on pressure gauges to ensure that the pressure remains within safe operating limits.
- Ensure Proper Installation: Make sure the Stuffing Box is correctly installed and aligned to avoid any operational issues or equipment damage.



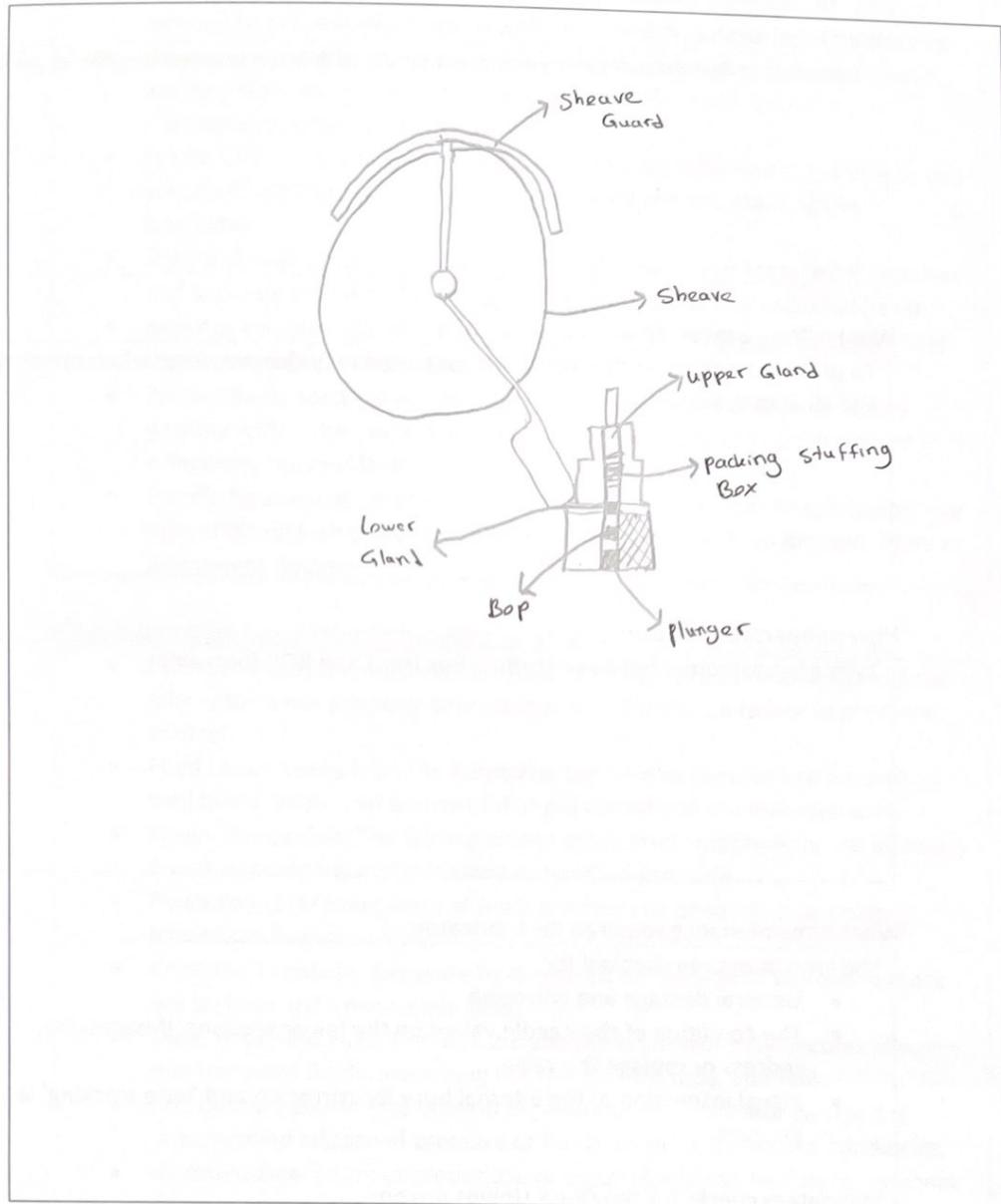
- **Inspect Packing Regularly:** Regularly inspect and replace the packing material as needed to maintain an effective seal and prevent leaks.
- **Clear Work Area:** Keep the work area around the Stuffing Box clear of any unnecessary personnel or obstacles to prevent accidents.

What is potential hazard during handling Stuffing Box

- **Pressure Exposure:** Accidental exposure to high-pressure well fluids or gases if the Stuffing Box is not properly sealed or if pressure is not safely released.
- **Leakage:** Leaks from a damaged or improperly maintained Stuffing Box can lead to exposure to hazardous well fluids or create a dangerous work environment.
- **Heavy Equipment:** The Stuffing Box and associated equipment can be heavy, posing risks of injury from lifting or moving it improperly.
- **Pinch Points:** The Stuffing Box assembly can have moving parts that may pinch or trap fingers or limbs.
- **Chemical Exposure:** Exposure to chemicals or fluids from the well if there are leaks or spills during handling.
- **Equipment Failure:** Malfunction or failure of the Stuffing Box can lead to uncontrolled release of pressure or fluids, creating a hazardous situation.
- **Slips, Trips, and Falls:** Working around the Stuffing Box may involve wet or slippery surfaces, increasing the risk of slips, trips, and falls.



Draw & name each part of stuffing box





B.2. LUBRICATOR

What is Lubricator

Lubricators (also known as risers) are a series of interconnected lengths of pipe.

What is the purpose of Lubricator

To provide a space for the tool to be contained in under pressure, when opening and closing the wellhead.

How to operate Lubricator

Typically positioned between stuffing box (top) and BOP (bottom).

What is maintenance required for Lubricator

The lubricators are checked for:

- General damage and corrosion
- The condition of the needle valves on the lower sections. If necessary, redress or replace the valve
- Visual inspection of the internal bore for corrosion and 'wire tracking' wear grooves

Mandatory checks for the Quick Unions are on:

- The condition of the O-ring groove
- The condition of the pin and box sealing surface
- The pin and box size

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What is safety precaution required for Lubricator

- Check for Leaks: Inspect the lubricator regularly for any signs of leaks or damage to prevent exposure to well fluids and ensure proper functioning.
- Depressurize Before Working: Ensure that the lubricator is depressurized, and any residual pressure is safely released before performing maintenance or adjustments.
- Follow Operating Procedures: Adhere to the manufacturer's guidelines and standard operating procedures for operating and maintaining the lubricator.
- Ensure Proper Installation: Confirm that the lubricator is correctly installed and securely connected to avoid operational issues and potential hazards.
- Monitor Pressure Gauges: Keep an eye on pressure gauges to ensure that the lubricator is operating within safe pressure limits.
- Inspect Seals and Packing: Regularly check and maintain the seals and packing within the lubricator to ensure they are in good condition and effectively prevent leaks.
- Handle Equipment Carefully: When moving or adjusting the lubricator, use proper lifting techniques and avoid abrupt movements to prevent injury or equipment damage.

What is potential hazard during handling Lubricator

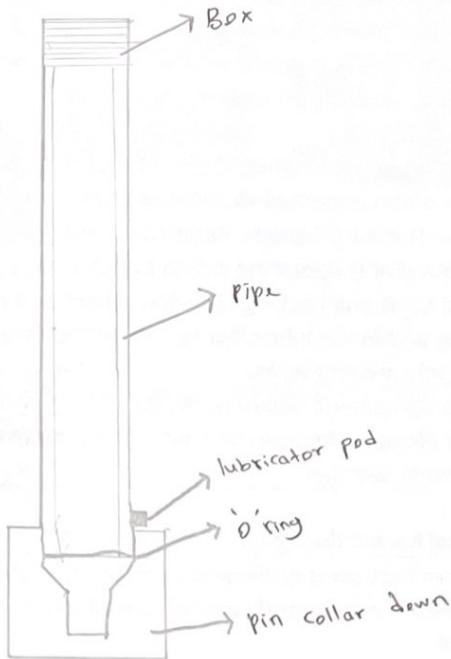
- Pressure Exposure: Accidental exposure to high-pressure well fluids if the lubricator is not properly depressurized or if there's a failure in pressure control.
- Fluid Leaks: Leaks from the lubricator can lead to exposure to hazardous well fluids, which can be harmful to personnel and the environment.
- Heavy Equipment: The lubricator and associated components can be heavy and may cause injury if not lifted or handled properly.
- Pinch Points: Moving parts of the lubricator can pose pinch or crush hazards to fingers or limbs.
- Chemical Exposure: Exposure to chemicals or fluids from the well if there are leaks or spills during handling.
- Slips, Trips, and Falls: The area around the lubricator may become slippery due to spilled fluids, increasing the risk of slips, trips, and falls.
- Equipment Failure: Malfunction or failure of the lubricator can lead to uncontrolled release of pressure or fluids, creating hazardous conditions.
- Incorrect Operation: Improper use or adjustments can lead to operational failures or accidents.

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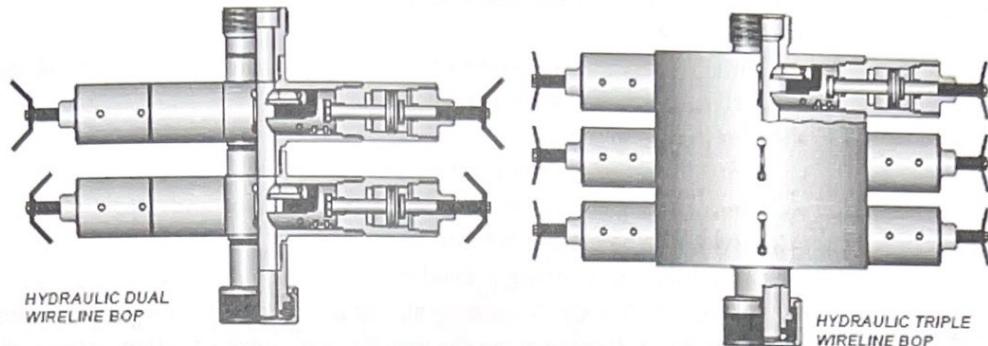


Draw & name each part of Lubricator



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B.3. BLOWOUT PREVENTER (BOP)



What is BOP

A BOP (also known as a wireline valve) is installed between the tree connection and lower lubricator section.

What is the purpose of BOP

Purposes:

- Enable the well pressure to be isolated without cutting the wire by closing the master valve
- Permit the assembly of the wireline cutter above the BOP rams and dropping it if the toolstring becomes stuck in the well
- Allow slickline work under the well pressure on surface equipment, while wire in the wellbore

How to operate BOP

- Check the Equipment: Inspect the BOP for any issues and ensure it's ready to use.
- Connect Hydraulic Lines: Make sure all hydraulic lines are properly connected.
- Monitor Pressure: Keep an eye on pressure gauges to ensure safe levels.
- Activate Controls: Use the control panel to engage the BOP's rams or blades as needed.
- Seal the Well: Close the rams to seal the well if needed.
- Handle Emergencies: Know how to use the shear rams to cut the pipe and seal the well in an emergency.
- Depressurize and Maintain: Release any pressure when done and inspect for damage.

done and inspect for
Chart 3/10/24

What is maintenance required for BOP

Level 1 Service - To be carried out after every job

- Wash down
- Initial inspection – remove rams and cylinders, inspect all seals and sealing surfaces, remove valves and inspect
- Grease up and rebuild
- Function and pressure test at working pressure
- Check lifting gear and record last certification type and date

Level 2 Service - To be carried out once a year

- Carry out Level 1 service procedure
- Replace all 'O' rings. Inspecting all components and sealing surfaces for corrosion or damage along the way Pay particular attention to the surfaces below the rams
- Rebuild Wireline Valve and pressure test to Test Pressure.
- Function test at Working Pressure

Level 3 Service - To be carried out every 5 years

- Carry out Levels 1 and 2 service procedure
- Strip Wireline Valve to component parts discarding all 'O' rings/back-up rings
- MPI (Magnetic Particle Inspection) of all parts.
- Rebuild using seal kit and any necessary new parts.
- Rebuild Wireline Valve and pressure test to Test Pressure
- Function test at Working Pressure
- Third party certificate of final test and inspection, certificate of conformity and lifting certification

What is safety precaution required for BOP

- Inspect all inner/outer ram seals, O-ring and seals. Replace when showing tear, cut,
- loss of bond between metal plates and rubber.
- Install thread protector before storing.
- Annually or after 10 jobs (whichever comes first), replace all seals in equalizing valve assembly.
- Annually or after 10 jobs (whichever comes first), inspect hydraulic cylinder assembly and replace all seals.

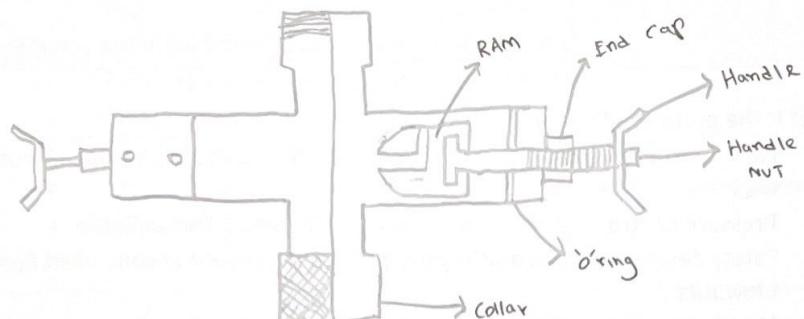
What is potential hazard during handling BOP

- Physical injury
- Falls
- Hydraulic fluid exposure
- Pressure-related accidents
- Noise exposure
- Toxic gas exposure

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Draw & name each part of BOP



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B.4. X-MAS TREE

What is x-mas tree

Equipment that provides flow control on a oil or gas well.

What is the purpose of x-mas tree

- Flow control: It regulates the rate at which oil and gas are produced from the well.
- Pressure control: It maintains a safe pressure within the wellbore.
- Safety device: It acts as a safety mechanism to prevent uncontrolled flow or blowouts.
- Monitoring: It provides data on well performance, such as flow rates and pressures.

How to operate x-mas tree

- Inspect: Check for any damage or issues.
- Open: Gradually open valves to allow flow.
- Monitor: Watch flow rate and pressure.
- Adjust: Use valves to control flow as needed.
- Close: Close valves to stop flow when finished.

What is maintenance required for x-mas tree

- Check it regularly: Look for any problems or damage.
- Clean and lubricate parts: This helps them work smoothly.
- Replace parts: If parts are worn or broken, replace them.
- Test it: Make sure it can handle the pressure it needs to.

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What is safety precaution required for x-mas tree

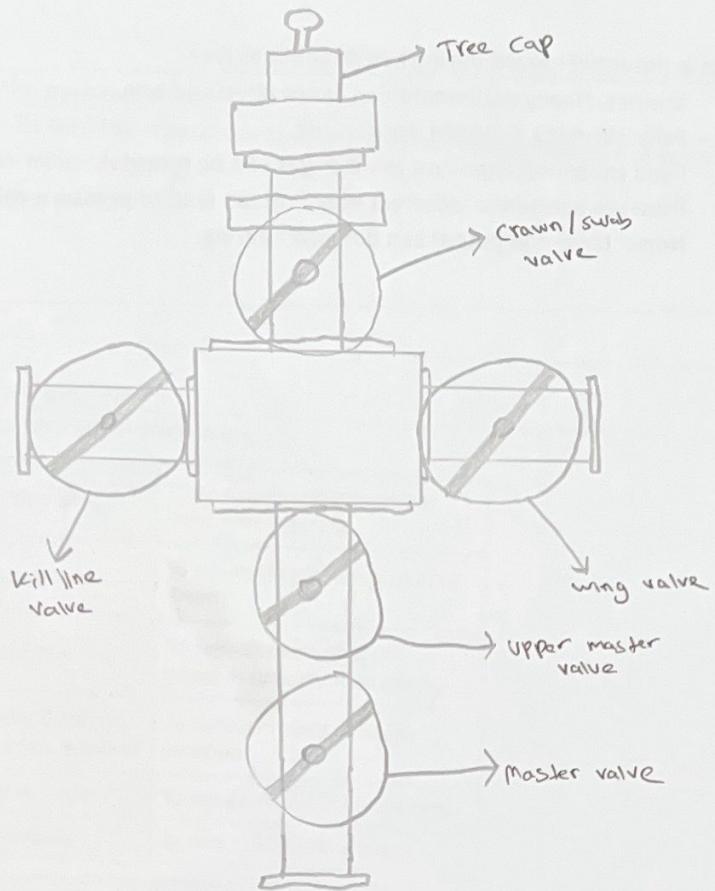
- Inspect regularly: Check for damage or leaks.
- Follow procedures: Adhere to operating and maintenance procedures.
- Wear protective gear: Use appropriate safety equipment.
- Emergency plan: Have a plan in case of problems.

What is potential hazard during handling x-mas tree

- Injuries: Heavy equipment can cause physical harm.
- Falls: Working at height poses a risk.
- Fluid exposure: Exposure to oil or gas can be harmful.
- Pressure accidents: Incorrect handling can lead to pressure-related incidents.
- Noise: Loud equipment can damage hearing.



Draw & name each part of x-mas tree



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B.5. WIRELINE REEL SKID UNIT (RSU) / WINCH – SINGLE DRUM AND DOUBLE DRUM

What is RSU

A reel skid unit is a specialized piece of equipment used to transport and deploy slickline.

What is the purpose of RSU

Function: To turn the wire drum to lower and rise tool strings in the wells that require wireline servicing.

How to operate RSU

Basic controls / instruments are:

Drum Brake	To keep drum stationary or used when jarring
Direction lever	To select rotation direction of drum
Gear Box	To select speed of drum rotation (usually four gears)
Hydraulic Control Valve (double A valve)	To control speed of drum rotation
Weight Indicator	To measure strain on wireline
Odometer	To indicate wireline depth

*This typical control panel can be found on SOP/TIS RSU/NOV Lightline.

What is maintenance required for RSU

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ITEM	DESCRIPTION	MONTHS/INTERVAL
1	Replace measuring & pressure wheel	500 hrs
2	Replace Hydraulic filter	500 hrs
3	Replace hydraulic oil	2000 hrs
4	Replace gear box oil	2000 hrs/yearly
5	Inspect First Aid Kit	Monthly
6	Inspect Fire Extinguisher	Monthly
7	Walk around to check leakage or damage	Monthly
8	Clean brake band & inspect brake performance	Monthly
9	Adjust & Lubricate drum drive chain	Monthly
10	Adjust and Lubricate drum drive chain idler	Monthly
11	Inspect measuring device rollers & replace if required	Monthly
12	Lubricate Drum bearings & Transmission bearings	Monthly
13	Lubricate and adjust brake linkage	Monthly
14	Inspect control panel and gauge	Monthly
15	Inspect certificates validity	Monthly
16	Inspect drum RPM & compare design data	Monthly

17	Inspect Accumulator	3 Monthly
18	Replace hydraulic pressure filter	3 Monthly
19	Calibrate line wise & over pull system	6 Monthly
20	Inspect hydraulic motor coupling	6 Monthly
21	Calibrate mechanical depth counter	6 Monthly
22	Calibrate mechanical weight indicator	6 Monthly
23	Complete performance test and fill form	6 Monthly
24	Replace angle drive	Yearly
25	Replace seals of quick coupling	3 Years
26	Replace seals gear box	3 Years
27	Replace seals of motor shaft	3 Years
28	Replace seals of relief valve & remote	5 Years
29	Rebuild hydraulic motor	5 Years
30	Replace drum bearings	5 Years
31	Replace seals of directional control valve	5 Years
32	Rebuild gear box	10 Years

What is safety precaution required for RSU

Before Starting :

- Check drum direction control valve is in Neutral or centre position
- Connect all hydraulic communication hoses
- Check system pressure panel mounted rotary is in fully open position
- Check wireline is properly connected with the measuring head assembly
- Check oil level in the lubricator tank
- Check weight indicator hose, bleed the air and fill with fluid
- Check 4-speed gearbox in neutral position
- Ensure that the drum hand brake is applied
- Check winch unit is properly locked with the deck

At the End of Operation:

- Keep wireline in parking position and lock with the drum
- Lock measuring head assembly in parking position
- Apply brake on the drum
- Fill-in diesel tank
- Clean the unit
- Store all your tools in proper location and in storage bins.

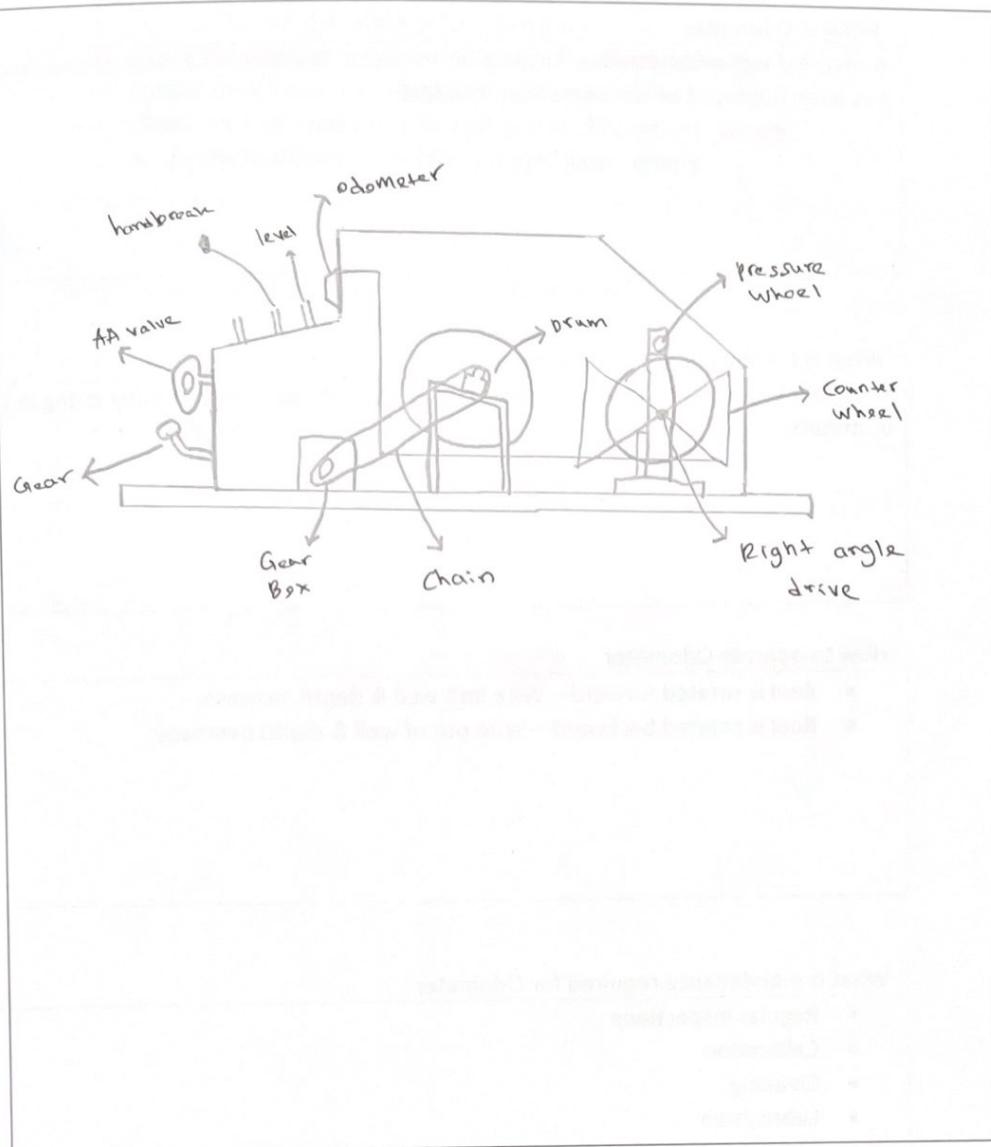
What is potential hazard during handling RSU

- Physical injuries
- Falls
- Hydraulic fluid exposure
- Electrical hazards
- Cable entanglement
- Pressure-related accidents

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Draw & name each part of RSU



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B.6. ODOMETER

What is Odometer

A reel skid unit odometer is a device that measures the length of cable or hose that has been deployed or retrieved from the reel.

What is the purpose of Odometer

Function: To indicate the depth of slickline toolstring hanging in a tubing string in feet or meters.

How to operate Odometer

- Reel is rotated forward – Wire into well & depth increase.
- Reel is rotated backward – Wire out of well & depth decrease.

What is maintenance required for Odometer

- Regular inspections
- Calibration
- Cleaning
- Lubrication
- Component replacement

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What is safety precaution required for Odometer

Before use, odometer should be checked as follows:

- a. Ensure the counter wheel is free to rotate.
- b. Check the rotation is being transmitted freely to odometer.
- c. Ensure the direction of rotation is correct.
- d. Check the cable has no kinks as it passes through the system.
1. e. Check the odometer is fully engaged after zeroing.

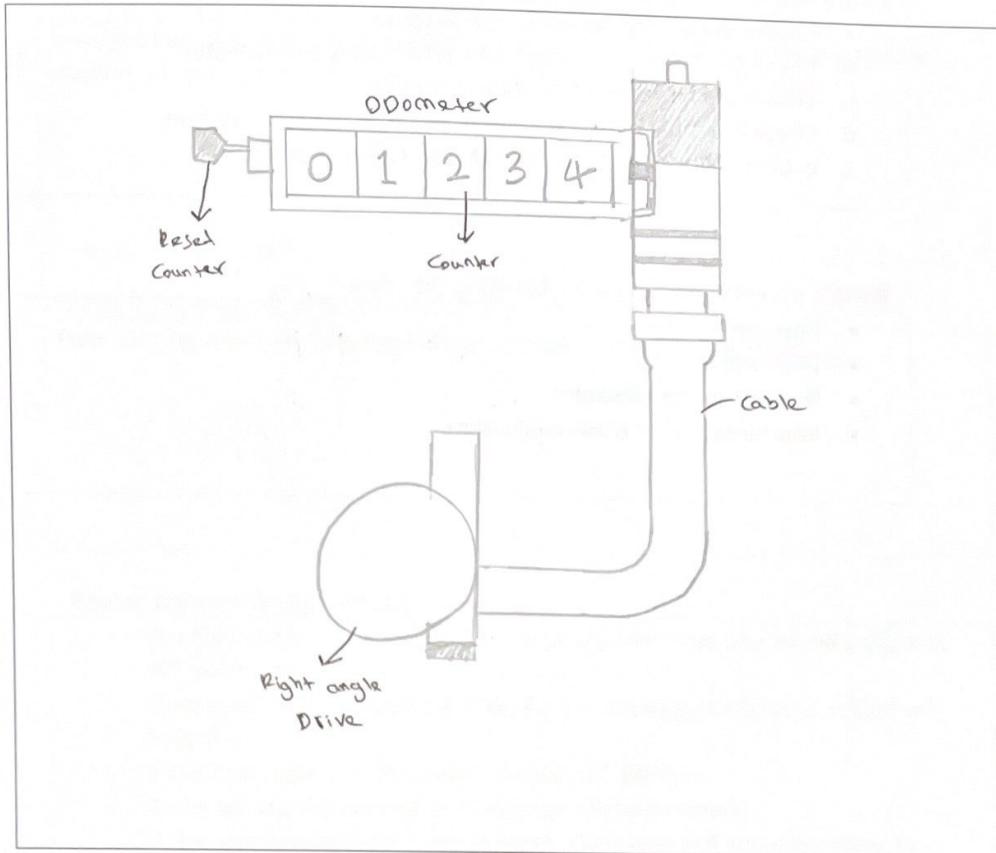
What is potential hazard during handling Odometer

- Physical injuries
- Electrical hazards
- Damage to the odometer
- Interference with other equipment

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Draw & name each part of Odometer



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B.7. WEIGHT INDICATOR (200 LBS AND 4000 LBS)

What is Weight Indicator

A weight indicator in a reel skid unit is an instrument used to measure the tension or load on the wireline or cable being spooled or unspooled from the reel.

What is the purpose of Weight Indicator

Function: To determine the total weight of tools hung in tubing string.

How to operate Weight Indicator

- The load cell is connected to the hay pulley and Xmas tree forming a pull at 90°, each side.
- Calibrated in lbs. Available in 2000 lbs (0 – 1000kg), 4000 lbs (0 – 2000 kg), 5000 lbs.
- If the fluid leaks out, the plated of load cell will close.
- If this occurs, the reading on the gauge will be incorrect.
- If the plates close sufficiently to touch, the gauge will no longer show the actual line tension.
- The gap should be approximately 7/16" or 11mm.
- Liquid filled gauge use W-8 fluid.

What is maintenance required for Weight Indicator

- To get the best possible results from weight indicator, it is necessary to completely flush and re-charge the unit at least once per month.
- Having recharged the unit, a specific gap should be set between load plate and load cell retaining ring.

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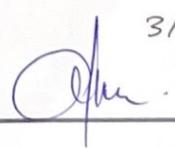
What is safety precaution required for Weight Indicator

- Check calibration before use for accurate readings.
- Inspect the equipment for any damage or wear.
- Mount securely to avoid movement or failure.
- Stand clear of heavy loads during operation.
- Never overload beyond the indicator's capacity.

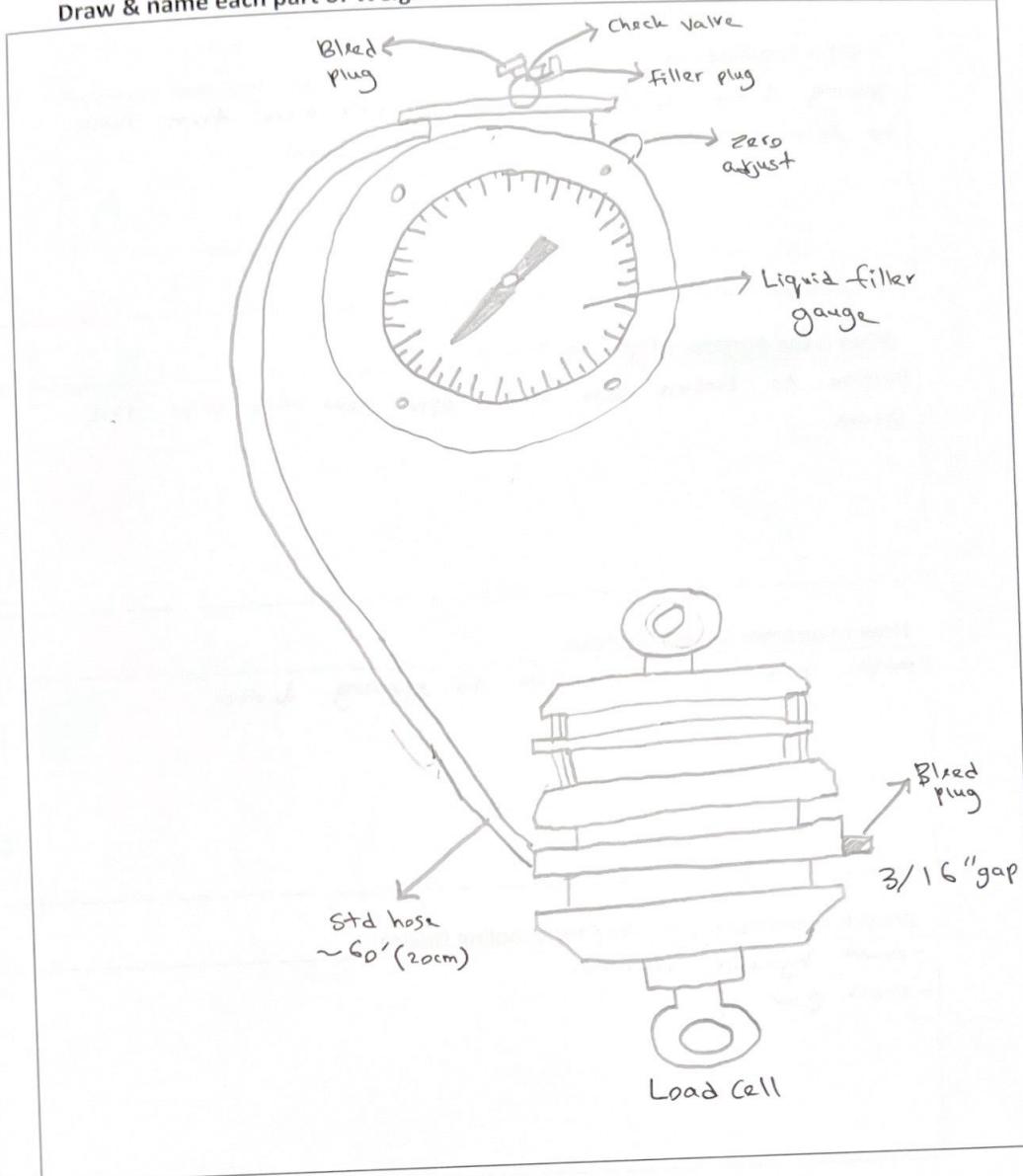
What is potential hazard during handling Weight Indicator

- Inaccurate readings can cause overloading and equipment failure.
- Electrical shock if wires or components are exposed.
- Crushing injuries from moving parts or falling loads.
- Equipment failure due to poor maintenance or damage.
- Slips and trips around cables or tools during setup.

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Draw & name each part of Weight Indicator



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B.8. SPOOLING DEVICE

What is Spooling Device

Spooling device is device to spool new wire from reel to drum or drum wire to another drum.

What is the purpose of Spooling Device

Purpose to tension wire while spool new wire into the drum.

How to operate Spooling Device

must connect powerpack hose to spooling device.

What is maintenance required for Spooling Device

- Check hydraulic regulator
- Check gear oil.

What is safety precaution required for Spooling Device

- Barricade work site area
- Full PPE

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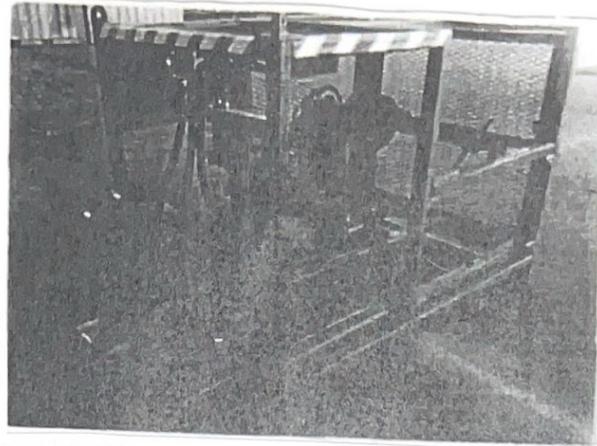


What is potential hazard during handling Spooling Device

- Hose burst
- High tension wire



Draw & name each part of Spooling Device



- Spooler drum
- Drive sprocket
- Pre-set spooling
- Double brake in parallel.

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B.9. CONTROL PANEL

What is Control Panel

In slickline operations, a control panel is used to monitor and control slickline equipment. It features displays for real-time data, buttons and switches for operating the equipment, and alarms for safety.

What is the purpose of Control Panel

- Control Panel (CP) – To operate BOP rams
- Single Well Control Panel (SWCP) – To operate Master Valve and SCSSV
- Well Control Panel (WCP) – An integrated CP that can operate BOP, Stuffing Box, MV & SCSSV

How to operate Control Panel

- Function tested SWCP
- Connected SWCP line to SSV/TR-SCSSV
- Pressure tested up to 500 psi above the pre-set operating pressure of the SSV
- If no leak, Set SSV to 2000 psi and TR-SCSSV to 3800 psi
- Switch station control to SWCP
- Depressurized station control SSV/TR-SCSSV
- Observed no communication between SWCP and station control
- Depressurized air supply to SWCP. Observed for 10 mins
- SSV/TR-SCSSV remained at 2000 psi/3800 psi respectively.
- Open back the air supply. Swab valve and SSV remained closed position

What is maintenance required for Control Panel

Maintenance

- Daily: Check hydraulic fluid level
- Monthly: Disassembly air, filter and clean thoroughly
- Yearly: Renew hydraulic tank and return filters, disassembly hydraulic pump, check for corrosion and wear

What is safety precaution required for Control Panel

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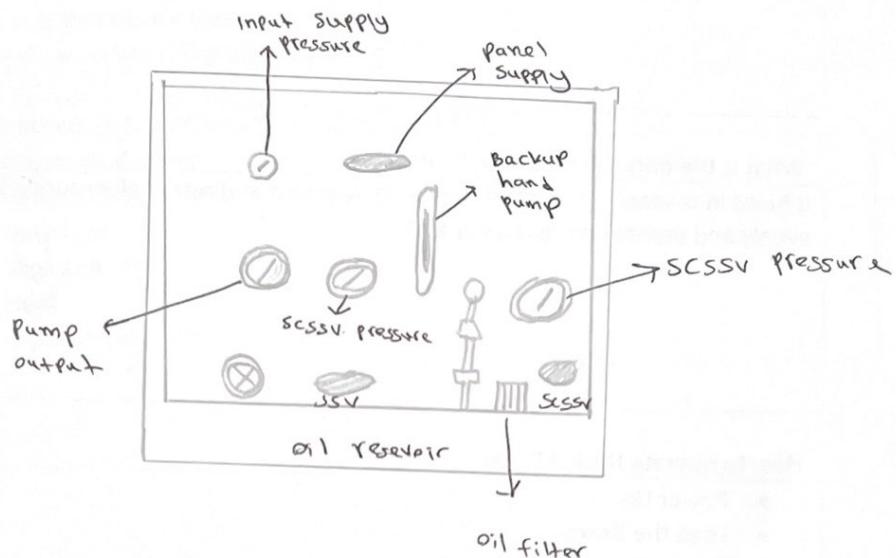
- Check hydraulic level through the level indicator
- The airline filter is drained
- Ensure that all air valves are OFF
- Ensure that all needle valves and air regulators are CLOSE
- Hand pump relief valves are CLOSED
- Check all tubing, fittings etc., for any signs of damage. Replace as necessary

What is potential hazard during handling Control Panel

- Electrical shock from exposed wiring or faulty components.
- Equipment malfunctions due to incorrect use or damage.
- Overloading circuits if not properly managed.
- Injury from moving parts or sudden equipment movements.

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Draw & name each part of Control Panel



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B.10. HUSKEL DRUM

What is Huskel Drum

A Huskel drum is a type of drum used in slickline operations, specifically for spooling and storing the slickline cable.

What is the purpose of Huskel Drum

It helps in managing the cable during deployment and retrieval, ensuring it is wound evenly and preventing tangles or kinks.

How to operate Huskel Drum

- Power Up
- Load the Drum
- Set Parameters
- Calibration
- Start Recording
- Monitor Operation
- Stop and Store Data
- Shutdown

What is maintenance required for Huskel Drum

- Inspection
- Cleaning
- Lubrication
- Calibration
- Functional Testing
- Component Replacement



What is safety precaution required for Huskel Drum

- Read the Manual
- Wear Protective Gear
- Check Connections
- Inspect Equipment
- Avoid Overloading
- Proper Training
- Emergency Stops
- Keep Workspace Clear
- Follow Lockout/Tagout Procedures

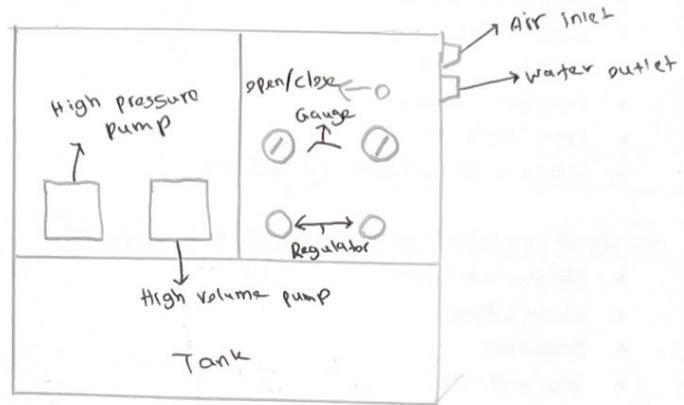
What is potential hazard during handling Huskel Drum

- Mechanical Injury
- Heavy Lifting
- Data Loss
- Slips and Falls
- Heat
- Exposure to Hazardous Materials

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Draw & name each part of Huskel Drum



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B.11. POWER PACK (ELECTRICAL & DIESEL)

What is Power Pack

Power Pack is a single piece configuration, skid mounted with integral crash frame, constructed in carbon steel with single point lifting.

What is the purpose of Power Pack

Function: To supply driving hydraulic power to equipment (Mast and RSU).

How to operate Power Pack

Starting procedure:

- Keep engine stop cable fully "IN" which is mounted on the control panel.
- Keep diesel cut off valve in start position.
- Keep winch unit drum directional control valve in neutral or center position.
- Start engine by pulling and holding inlet Overspeed shut down valve and depressing the foot/pedal starter switch.
- Keep and continue holding the inlet Overspeed shut down valve (approx. 10 sec.) until oil pressure is built.
- Release foot/pedal switch and the inlet Overspeed shut down valve.

Notes: See section 7 for POW-R-QUIK hydraulic starting system details.

What is maintenance required for Power Pack

Three Monthly	Check action of air inlet shut down valve. Check all pipe work for damage. Replace if necessary. Tighten all pipe.
Six Monthly	Check operation of various sensors.
Yearly	Carry out full calibration of all sensors upon every certification of equipment.

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What is safety precaution required for Power Pack

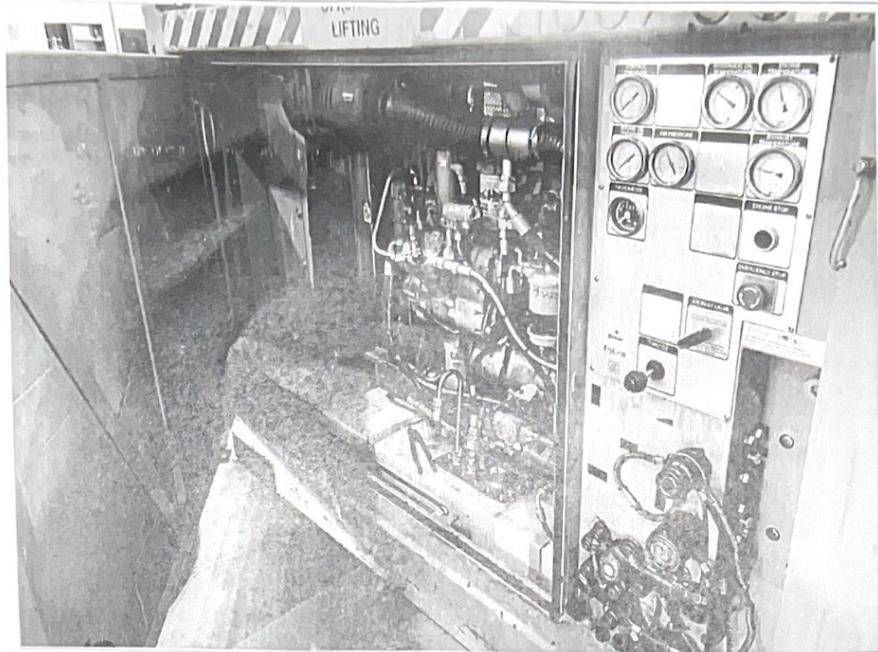
- Check hydraulic tank suction line ball valve is fully open.
- Check hydraulic oil level in hydraulic tank is up to min level if less top-up.
- Check diesel level in diesel tank if less top-up.
- Check engine oil level.
- Check Air inlet /outlet and exhaust are not blocked.
- Check engine fan belt and guards.
- Check exhaust Flametrap is fitted in exhaust heat exchanger after cleaning.
- Engine cranking is done with the help of hydraulic starter.
- Check accumulator pressure, should be greater than 2500 Psi.
- Check all hydraulic quick connectors for winch and BOP is connected properly.
- Check radiator coolant level.

What is potential hazard during handling Power Pack

- Electrical Shock
- Burns
- Heavy Lifting
- Hydraulic Leaks
- Mechanical Injury
- Pressure Hazards



Draw & name each part of Power Pack



- ① Exhaust silencer
- ② Pneumatic and hydraulic connection
- ③ Engine flame trap. Breather (zone 2 only)
- ④ Fuel tank.
- ⑤ Fuel Safety (sentinel) valve
- ⑥ Spring starter.
- ⑦ Fuel fine filter.
- ⑧ Electric Junction Box.
- ⑨ Engine air intake filter
- ⑩ Battery Isolation switch
- ⑪ Control panel.
- ⑫ Fuel pre filter and water separator.
- ⑬ Spring starter crank handle.
- ⑭ Engine oil sump pump .
- ⑮ Fuel purifier
- ⑯ Engine oil filter.
- ⑰ Engine Air intake Safety Valve.
- ⑱ Air Inlet valve control handle.

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B.12. AIR COMPRESSOR

What is Air Compressor

Air Compressor is an open loop hydraulic system unit.

What is the purpose of Air Compressor

Used to supply compressed air to Control Panels when there is no supply on site.

How to operate Air Compressor

- Keep diesel cut off valve in start position.
- Recoil spring starter by turning on clockwise direction until the indicator turns red.
- Start engine by pulling and holding inlet overspeed shut down valve and releasing the spring starter start lever.
- Keep and continue holding the inlet Overspeed shut down valve (approx. 10 sec.) until oil pressure is built.

What is maintenance required for Air Compressor

Component	Description	Maintenance Required
Exhaust Gas Cooler	Houses both the inlet manifold and the exhaust heat exchanger also accommodate exhaust spark arrestor.	Should be cleaned at an interval of 1200 hrs. Remove heat exchanger from engine. Tape over coolant connections. Soak gas side of heat exchanger in a suitable cleaning agent (overnight). Drain cleaning agent wash heat exchanger through with clean water, further soak and rinse. Ensure heat exchanger is completely drained and refit.
Exhaust Flamerap	This assembly is a heavy duty spaced plate construction in 100% stainless steel material.	Daily – remove flamerap element. Soak in cleaning agent for at least 2 hrs. Wash through with clean water. Inspect for cleanliness or damage. Three Monthly - Following to cleaning, carry out full inspection of element to ensure that it has sustained no visual damage or distortion and the joint surface are flat to within 0.075mm.
Component	Description	Maintenance Required
Spark Arrestor	This item is twin centrifugal type in 100% stainless steel. Tested and approved for hazardous area operation.	Daily – Visually examine outer case for damage Six Monthly – Remove spark arrestor, lightly tap with soft mallet to loosen deposits. Shake out loose particles.
Automatic Engine Shut Down Control System	Operated by engine lubricating oil pressure. On loss of oil pressure, due either to a sensor exceeding its set point, oil leakage or engine oil system failure, the air inlet shut down valve is closed to stop engine.	Three Monthly – Check action of air inlet shut down valve. Check all pipe work for damage. Replace if necessary. Tighten all pipe connections. Six Monthly – Check operation of various sensors. Yearly – Carry out full calibration of all sensors upon every certification of equipment.

3/10/24



What is safety precaution required for Air Compressor

- Check engine oil pressure is correct.
- Check radiator & coolant system for any leakage.
- Run the engine for 5-10 minutes, warm-up period, before putting air compressor on duty.
- Put air compressor on duty by pulling outwards the dump valve (Section 6, page 1).
- Check coolant and hydraulic oil temperature, must not exceed 90 °C when air compressor unit is under load.
- Check hydraulic oil pressure.
- For regular shutdown, dis-engage the compressor and allow 5 minutes running to cool the system before operating the panel mounting engine stop button.
- In case of emergency shutdown being required there are two options available.
 - 1).Push the over speed control lever away from you or
 - 2). Push the emergency stop control on the panel.

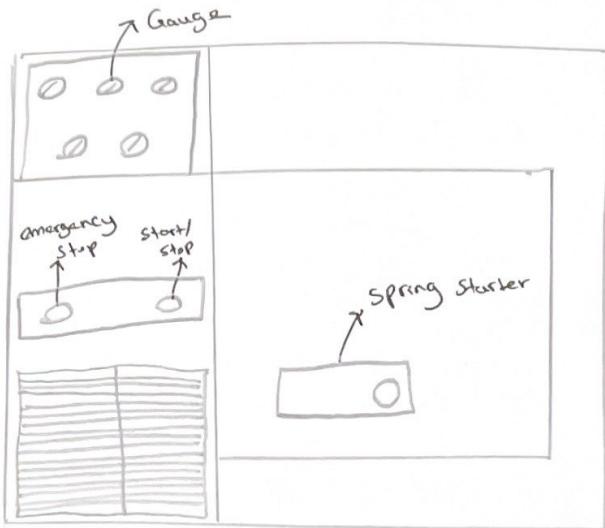
What is potential hazard during handling Air Compressor

- Air Pressure
- Electrical Shock
- Heavy Lifting
- Heat
- Noise
- Vibration
- Moving Parts
- Compressed Air

3/10/24



Draw & name each part of Air Compressor



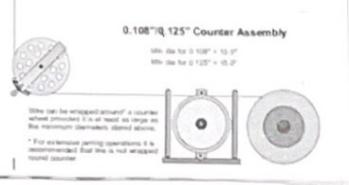


B.13. DRUM

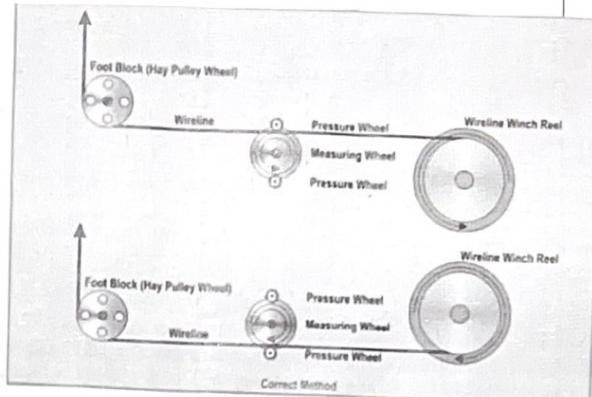
What is the purpose of Drum

- to inside the wire
- keep storage the wire

Draw the right and wrong wire arrangement from drum to hay pulley



Wrong Method



Right Method

What is maintenance required for Drum

- greasing bearing

What is safety precaution required for Drum

- make sure wire direction is correct way.

What is potential hazard during handling Drum

Chm 3/10/24



- pinch point
- sharp edge.

Please draw/sketch the toolstring configuration for:

- 1) Drift run/tubing clearance check
- 2) Sinker bar run
- 3) Set and retrieve plug
- 4) Set and retrieve insert valve

