Postgraduate Certificate in Marine Salvage Operations (Spain)

Marine Salvage Equipment and Techniques

Airbag Lift – Concept: inflatable devices used to raise sunken structures. Related terms: hydraulic lift, buoyancy bags. Explanation: air is pumped into high-strength rubber bags placed under a wreck; the bag expands, providing upward force. Example: lifting a small fishing vessel from a harbor floor. Application: rapid recovery of lightweight craft where crane access is limited. Challenges: maintaining bag integrity under uneven loads and avoiding over-inflation that could damage the hull.

Anchor Handling Tug – Concept: vessel equipped for towing and anchor operations. Related terms: tugboat, anchor winch. Explanation: combines powerful winches with reinforced deck fittings to deploy heavy anchors and tow disabled ships. Example: positioning a salvage tug to secure a drifting oil tanker. Application: stabilising a wreck before diving operations. Challenges: coordinating with shore-based command and handling variable sea states.

Ballast Control System – Concept: system managing water ballast to adjust vessel trim. Related terms: trim tanks, stability. Explanation: pumps and valves regulate water intake and discharge, allowing precise control of a salvage vessel's draft. Example: lowering a ship's bow to expose a submerged hull breach. Application: optimizing deck height for crane deployment. Challenges: preventing imbalance that could lead to capsizing during heavy lifts.

Barge Crane – Concept: floating crane mounted on a barge platform. Related terms: gantry crane, lift capacity. Explanation: a fixed or telescopic boom provides high-capacity lifts over water, often exceeding 500 t. Example: removing a broken superstructure from a capsized ferry. Application: heavy-equipment removal where shore cranes cannot reach. Challenges: ensuring barge stability under dynamic loads and wind.

Barometric Pressure Gauge – Concept: device measuring ambient pressure. Related terms: depth gauge, dive computer. Explanation: indicates water depth by converting pressure readings; essential for divers planning safe ascent rates. Example: monitoring pressure during a 30 m hull inspection. Application: preventing decompression sickness. Challenges: calibration drift in saltwater and temperature variations.

Beaching Gear – Concept: equipment used to intentionally run a vessel ashore for salvage. Related terms: grounding procedure, beach ramps. Explanation: includes reinforced hull plates, winches, and sandbags to control the beaching angle. Example: beaching a small tug to prevent sinking in a storm. Application: facilitating repairs in shallow water. Challenges: environmental impact and potential hull damage.

Buoyancy Engine – Concept: system generating lift through controlled air release. Related terms: compressed air system, lift bags. Explanation: uses compressors to fill buoyancy bags attached to a wreck, providing incremental lift. Example: raising a sunken barge in a harbor. Application: modular lift operations where crane access is unavailable. Challenges: limited air supply and risk of bag rupture.

Cable Reel – Concept: device storing and dispensing steel or synthetic ropes. Related terms: winch, towing line. Explanation: motor-driven drums manage tension and length of towing cables. Example: deploying a 2 km tow line to a stranded cargo ship. Application: long-distance salvage towing. Challenges: cable fatigue and spooling under high tension.

Chain Locker – Concept: storage area for heavy steel chains used in anchoring or towing. Related terms: chain hoist, mooring. Explanation: reinforced compartments keep chains organized and protected from corrosion. Example: storing 500 mm anchor chain for a salvage tug. Application: rapid deployment of anchoring systems. Challenges: weight distribution and corrosion control.

Chafe Guard – Concept: protective sleeve preventing rope wear. Related terms: rope protector, abrasion. Explanation: typically made of hard rubber or metal, it slides over high-stress points on cables. Example: installing a chafe guard on a winch sheave. Application: extending rope life during prolonged salvage lifts. Challenges: fitting to varied rope diameters and ensuring smooth operation.

Clearance Survey – Concept: underwater inspection to assess obstacles. Related terms: sonar scan, site assessment. Explanation: divers or ROVs map the seabed and wreck to identify hazards before lifting. Example: surveying a collapsed hull before crane deployment. Application: planning safe lift paths. Challenges: limited visibility and complex debris fields.

Clump Weight – Concept: heavy ballast used to stabilize a vessel during salvage. Related terms: ballast weight, stability. Explanation: iron or concrete blocks are positioned to lower the centre of gravity. Example: adding clump weights to a salvage tug before heavy lifting. Application: improving roll resistance. Challenges: handling and positioning large masses safely.

Coiled Pipe – Concept: flexible tubing stored in a coil for fluid transfer. Related terms: hoses, suction line. Explanation: used to pump oil, water, or fuel from a damaged vessel. Example: deploying a 100 m coiled pipe to extract fuel from a sunken tanker. Application: environmental protection. Challenges: avoiding kinks and maintaining pressure.

Compressed Air Supply – Concept: source of high-pressure air for tools and lift bags. Related terms: air compressor, pneumatic system. Explanation: compressors generate air stored in cylinders for salvage equipment. Example: powering a series of lift bags on a submerged hull. Application: modular lifting operations. Challenges: ensuring air purity to prevent corrosion.

Controlled Flooding – Concept: intentional water intake to lower a vessel's draft. Related terms: ballasting, trim adjustment. Explanation: water is pumped into designated tanks to submerge the ship for docking or repair. Example: flooding a salvage tug to align with a low-lying dock. Application: facilitating cargo loading. Challenges: precise control to avoid over-flooding.

Crane Hook – Concept: device at the end of a crane's boom for attaching loads. Related terms: load block, safety latch. Explanation: rated for specific load capacities and equipped with safety mechanisms. Example: a 250 t hook used to lift a broken superstructure. Application: primary lifting point in salvage. Challenges: regular inspection for metal fatigue.

Crane Jib – Concept: extendable arm attached to the main crane boom. Related terms: boom extension, reach. Explanation: provides additional horizontal reach for lifting over obstacles. Example: a 15 m jib enabling a crane to lift a cargo container from a ship's side. Application: accessing hard-to-reach areas. Challenges: increased sway and load moment.

Deck Reinforcement – Concept: structural strengthening of a vessel's deck. Related terms: girder, load distribution. Explanation: additional steel plates or beams are installed to support heavy equipment. Example: reinforcing a salvage tug's deck before mounting a 500 t crane. Application: preventing deck deformation. Challenges: weight addition and balance.

Diving Bell – Concept: pressurised chamber used for underwater work. Related terms: habitat, saturation diving. Explanation: provides a dry environment at depth, allowing workers to exit the bell for limited periods. Example: using a bell to inspect a ship's forward bulkhead at 50 m. Application: extended underwater tasks. Challenges: maintaining pressure integrity and safe ascent.

Dynamic Positioning System – Concept: computer-controlled thrusters maintaining vessel position. Related terms: DP, station-keeping. Explanation: uses GPS, gyrocompasses, and thruster inputs to counteract wind and currents. Example: a DP-2 salvage vessel holding position over a wreck for ROV work. Application: precise maneuvering without anchors. Challenges: high fuel consumption and system redundancy.

Emergency Tow Line – Concept: standby rope for rapid towing. Related terms: quick-release, rescue. Explanation: pre-connected to the towing winch, ready for immediate deployment. Example: a 500 m high-strength line kept on deck for emergency response. Application: quick reaction to drifting vessels. Challenges: ensuring the line is free of damage and properly coiled.

Engine Room Dewatering – Concept: removal of water from a flooded engine compartment. Related terms: pumping system, bilge. Explanation: high-capacity pumps extract water to restore buoyancy and enable repairs. Example: dewatering a cargo ship's engine room after a hull breach. Application: stabilising the vessel for salvage. Challenges: dealing with contaminated water and limited access.

Environmental Impact Assessment – Concept: study evaluating potential ecological effects of salvage operations. Related terms: EIA, mitigation. Explanation: identifies risks to marine life, water quality, and habitats, proposing protective measures. Example: assessing oil spill risks before cutting a wreck. Application: complying with regulations and obtaining permits. Challenges: limited baseline data and time-sensitive operations.

Explosive Cutting – Concept: using controlled charges to sever metal structures. Related terms: linear shaped charge, demolition. Explanation: charges are placed on hull plates and detonated to create clean cuts. Example: cutting a compromised deck to remove a damaged section. Application: rapid access in confined spaces. Challenges: ensuring blast containment and preventing secondary damage.

Fall-away Winch – Concept: winch designed to release load under overload conditions. Related terms: over-load protection, safety. Explanation: a spring-loaded mechanism disengages the rope when tension exceeds a set limit. Example: a fall-away winch on a salvage crane preventing cable snap. Application: protecting equipment and personnel. Challenges: regular testing and proper setting.

Fast-Rescue Boat – Concept: small, high-speed craft for personnel recovery. Related terms: RHIB, rescue. Explanation: equipped with inflatable hull, powerful engine, and rescue equipment. Example: deploying a fast-rescue boat to retrieve divers from a sinking vessel. Application: emergency response. Challenges: sea-state limitations and limited cargo capacity.

Fire-Suppression System – Concept: onboard equipment to extinguish fires. Related terms: CO_2 system, safety. Explanation: includes extinguishers, hoses, and automatic detectors. Example: using CO_2 to suppress a fuel fire on a damaged tanker. Application: protecting salvage crews and equipment. Challenges: ensuring system readiness and proper training.

Fish Plate – Concept: steel plate welded to a hull to reinforce a damaged area. Related terms: patch plate, repair. Explanation: custom-fabricated to match hull curvature and welded in place. Example: installing a fish plate over a breached hull section. Application: temporary watertight repair. Challenges: achieving proper fit and weld quality underwater.

Floating Dry Dock – Concept: mobile structure used to raise vessels out of water. Related terms: submersible dock, shipyard. Explanation: ballasted down, the dock submerges, the vessel is floated in, then water is pumped out to lift the ship. Example: using a floating dry dock to service a salvaged cargo ship. Application: comprehensive repairs without shore facilities. Challenges: docking alignment and structural integrity under load.

Floating Pump – Concept: pump mounted on a barge for water removal. Related terms: dewatering, suction. Explanation: powered by diesel engines, capable of moving thousands of litres per minute. Example: a $2\,000\,m^3/h$ floating pump used to dewater a flooded ferry. Application: rapid flood control. Challenges: suction head limitations and debris blockage.

Foam Mattress – Concept: flexible foam placed under a hull to distribute load. Related terms: load spreader, cushioning. Explanation: reduces point pressure during lifts, protecting the hull. Example: positioning foam mattresses under a sunken yacht before crane lift. Application: preventing hull deformation. Challenges: ensuring adequate thickness and preventing slippage.

Fouling Removal Tool – Concept: equipment for cleaning marine growth from hulls. Related terms: scrubber, hull maintenance. Explanation: high-pressure water jets or mechanical brushes remove barnacles and algae. Example: cleaning a salvaged vessel before repainting. Application: reducing drag and improving stability. Challenges: access to confined areas and environmental discharge.

Framing Reinforcement – Concept: additional structural members added to a ship's frame. Related terms: scantling, strengthening. Explanation: steel angles or plates are bolted or welded to increase rigidity. Example: reinforcing the deck frame of a cargo ship before heavy lifting. Application: preventing structural failure. Challenges: added weight and interference with other equipment.

Fresnel Lens – Concept: optical device concentrating light for night operations. Related terms: searchlight, illumination. Explanation: a large, flat lens focuses a powerful lamp into a narrow beam. Example: using a Fresnel lens to illuminate a wreck at night. Application: improving visual assessment. Challenges: lens cleaning and power supply.

Fuel Transfer Pump – Concept: pump used to move fuel between tanks or vessels. Related terms: oil transfer, hazardous material. Explanation: sealed, corrosion-resistant units prevent leaks. Example: pumping fuel from a damaged tanker to a containment barge. Application: reducing fire risk. Challenges: handling volatile liquids and preventing spills.

Garbage Disposal System – Concept: equipment for managing waste generated during salvage. Related terms: waste management, environmental compliance. Explanation: includes compactors and storage tanks for debris and contaminated material. Example: storing broken hull sections for later disposal. Application: maintaining site cleanliness. Challenges: adhering to regulations and limited storage space.

General Arrangement Plan – Concept: schematic showing layout of equipment on a vessel. Related terms: GA drawing, layout. Explanation: details placement of cranes, winches, and safety zones. Example: reviewing the GA plan before a salvage operation to locate emergency exits. Application: ensuring efficient workflow. Challenges: updating plans for ad-hoc modifications.

Gimbal Stabiliser – Concept: device that keeps equipment level on a moving vessel. Related terms: gyro-stabiliser, leveling. Explanation: uses motor-driven pivots to counteract roll and pitch. Example: mounting a sonar array on a gimbal to maintain accurate readings. Application: improving data quality. Challenges: power consumption and maintenance of moving parts.

Gravitational Lift – Concept: using weight and buoyancy to raise a submerged object. Related terms: counter-weight, physics. Explanation: combines heavy ballast with lift bags to achieve net upward force. Example: employing a 10 t counter-weight and lift bags to raise a small barge. Application: low-technology salvage where cranes are unavailable. Challenges: precise calculation of forces and safety margins.

Ground Penetrating Radar (GPR) – Concept: non-destructive tool for detecting buried objects. Related terms: sub-surface imaging, detection. Explanation: emits radio waves that reflect off different materials, creating a profile of the seabed. Example: locating buried pipelines beneath a wreck. Application: planning excavation. Challenges: signal attenuation in salty water.

Guided Tow Cable – Concept: cable equipped with sensors for monitoring tension and angle. Related terms: load monitoring, telemetry. Explanation: integrates strain gauges and GPS modules to provide real-time data. Example: using a guided tow cable to tow a disabled vessel while avoiding excessive strain. Application: enhancing tow safety. Challenges: cable durability and data transmission reliability.

Harbor Pilot – Concept: specialist who navigates vessels in confined waters. Related terms: pilotage, navigation. Explanation: possesses local knowledge of tides, currents, and hazards. Example: a pilot guiding a salvage tug into a narrow port entrance. Application: ensuring safe vessel movement. Challenges: coordination with salvage crews and time-critical operations.

Heavy-Lift Vessel – Concept: ship designed to transport and lift extremely large loads. Related terms: semi-submersible, crane ship. Explanation: equipped with massive cranes or ballasting systems to submerge and lift. Example: a 10 000 t heavy-lift vessel used to recover a sunken oil platform module. Application: handling oversized wrecks. Challenges: limited availability and high operational costs.

Hydraulic Jack – Concept: device that converts hydraulic pressure into lifting force. Related terms: hydraulic press, lift. Explanation: cylinders extend under pressure, raising loads incrementally. Example: using hydraulic jacks to level a floating crane deck. Application: precise load positioning. Challenges: maintaining fluid cleanliness and avoiding leaks.

Hydraulic Winch – Concept: winch powered by hydraulic fluid. Related terms: hydraulic system, cable handling. Explanation: provides smooth, controllable tension for raising or lowering equipment. Example: a hydraulic winch operating a 200 t crane on a salvage vessel. Application: heavy-load management. Challenges: ensuring adequate hydraulic pressure and preventing overheating.

Impact Tether – Concept: strong line used to restrain a moving object. Related terms: mooring line, safety. Explanation: absorbs kinetic energy during sudden movements, preventing damage. Example: attaching an impact tether to a floating crane during storm conditions. Application: enhancing stability. Challenges: selecting appropriate strength and elasticity.

Inert Gas System – Concept: system supplying non-combustible gas to prevent fire. Related terms: nitrogen blanket, safety. Explanation: floods cargo holds with inert gas to displace oxygen. Example: using an inert gas system on a tanker to prevent explosion during salvage. Application: fire prevention. Challenges: maintaining gas concentration and monitoring.

Inspection Drone – Concept: unmanned aerial vehicle for visual assessment. Related terms: UAV, reconnaissance. Explanation: equipped with high-resolution cameras and thermal sensors. Example: flying a drone over a wreck to locate damaged sections. Application: rapid site overview. Challenges: limited flight time and weather dependence.

Jettison System – Concept: mechanism for discarding equipment or cargo quickly. Related terms: release valve, emergency. Explanation: uses explosive bolts or hydraulic releases to detach loads. Example: jettisoning a damaged cargo container to prevent sinking. Application: reducing risk in emergencies. Challenges: ensuring controlled release and avoiding collateral damage.

Kite-Sail Power Assist – Concept: using large kites to provide additional thrust. Related terms: wind assist, propulsion. Explanation: kites capture wind energy, reducing fuel consumption during towing. Example: fitting a salvage tug with a kite system for long-duration tow. Application: eco-friendly power augmentation. Challenges: kite handling in variable wind and regulatory acceptance.

Lift Bag – Concept: inflatable device providing buoyant lift. Related terms: airbag lift, buoyancy. Explanation: filled with compressed air, the bag creates upward force proportional to its volume. Example: using multiple lift bags to raise a sunken fishing boat. Application: modular lifting in shallow waters. Challenges: ensuring uniform inflation and preventing over-pressure.

Lift Crane – Concept: crane specifically designed for salvage lifting. Related terms: salvage crane, heavy lift. Explanation: features high load capacity, reinforced boom, and anti-sway systems. Example: a 500 t lift crane mounted on a salvage barge. Application: removing large sections of wreckage. Challenges: stability under dynamic sea conditions.

Lift Co-ordination Plan – Concept: detailed schedule and methodology for a lift operation. Related terms: lift plan, sequencing. Explanation: outlines equipment, load distribution, communication protocols, and safety measures. Example: a lift co-ordination plan for extracting a broken engine from a capsized vessel. Application: ensuring synchronized actions. Challenges: adapting to changing site conditions.

Lift Point – Concept: designated location on a wreck where lifting force is applied. Related terms: attachment point, rigging. Explanation: selected based on structural integrity and load path. Example: installing a lift point on the deck beam of a cargo ship. Application: safe load transfer. Challenges: assessing strength of aging structures.

Load Block – Concept: heavy steel block used as a temporary anchor for lifting. Related terms: deadweight, ballast. Explanation: placed on the seabed to provide a stable counter-weight. Example: using a 20 t load block to balance a crane during a lift. Application: stabilising lifts in deep water. Challenges: precise positioning and retrieval after operation.

Load Monitoring System – Concept: electronic system tracking tension and weight during lifts. Related terms: strain gauge, telemetry. Explanation: provides real-time data to operators, preventing overload. Example: a load monitoring system alerting when a crane approaches its limit. Application: enhancing safety. Challenges: sensor calibration and data latency.

Location Beacon – Concept: device emitting a signal to mark a wreck's position. Related terms: transponder, GPS. Explanation: transmits acoustic or radio signals for tracking. Example: attaching a beacon to a sunken hull for continuous monitoring. Application: facilitating re-location. Challenges: battery life and signal interference.

Marine Diesel Engine – Concept: internal-combustion engine used on salvage vessels. Related terms: propulsion, powerplant. Explanation: provides high torque for towing and maneuvering. Example: a 6 000 kW marine diesel engine on a salvage tug. Application: reliable propulsion. Challenges: fuel consumption and maintenance in harsh environments.

Marine Firefighting Foam – Concept: foam used to suppress oil and fuel fires. Related terms: AFFF, fire suppression. Explanation: creates a blanket that isolates fuel from oxygen. Example: deploying foam on a leaking tanker during salvage. Application: rapid fire control. Challenges: foam runoff and environmental impact.

Marine Salvage Manual – Concept: reference guide covering standards and procedures. Related terms: guidelines, best practices. Explanation: includes chapters on equipment, safety, and case studies. Example: consulting the manual before initiating a complex lift. Application: ensuring compliance and knowledge sharing. Challenges: keeping content up-to-date with evolving technology.

Marine Surveyor – Concept: professional who assesses vessel condition. Related terms: inspection, certification. Explanation: evaluates structural integrity, cargo status, and environmental compliance. Example: a surveyor inspecting a damaged bulk carrier before salvage. Application: providing expert advice. Challenges: limited access and time pressures.

Material Handling Crane – Concept: crane used for moving non-structural items. Related terms: forklift, hoist. Explanation: equipped with spreader bars and hooks for cargo. Example: using a material handling crane to offload containers from a wreck. Application: clearing debris. Challenges: load stability and deck space.

Mechanical Winch – Concept: winch driven by electric or diesel motor. Related terms: cable reel, hoist. Explanation: provides controlled tension for towing or lifting. Example: a mechanical winch pulling a disabled vessel into a safe anchorage. Application: versatile load handling. Challenges: wear on gears and cable fatigue.

Metal Cutting Torch – Concept: torch using oxy-acetylene or plasma to cut metal. Related terms: cutting torch, welding. Explanation: produces high-temperature flame to slice through steel. Example: cutting a hull plate to remove a damaged section. Application: rapid structural modification. Challenges: fire risk and need for skilled operators.

Mine Clearance Diver – Concept: diver trained to locate and neutralise underwater mines. Related terms: UXO, EOD. Explanation: uses sonar, ROVs, and manual tools to disarm explosives. Example: a mine clearance diver working on a warship wreck. Application: ensuring safe salvage zones. Challenges: high risk and limited operational depth.

Multipurpose ROV – Concept: remotely operated vehicle equipped for various tasks. Related terms: underwater drone, inspection. Explanation: features manipulators, cameras, and sonar for inspection, cutting, and sampling. Example: deploying a multipurpose ROV to attach lift bags to a wreck. Application: extending human capability underwater. Challenges: tether management and limited battery life.

Navigation Buoy – Concept: floating marker indicating safe passage or hazards. Related terms: buoyage, marker. Explanation: equipped with lights and radio beacons for night visibility. Example: placing navigation buoys around a salvage site to guide vessels. Application: traffic control. Challenges: buoy drift and maintenance.

Oil Skimmer – Concept: device for recovering oil from water surfaces. Related terms: spill response, containment. Explanation: uses sorbent belts or vacuum systems to collect oil. Example: an oil skimmer deployed after a tanker breach. Application: environmental protection. Challenges: efficiency in rough seas and oil-water separation.

On-Board Hospital – Concept: medical facility aboard a salvage vessel. Related terms: medbay, first aid. Explanation: equipped with treatment beds, medication, and emergency equipment. Example: treating a diver with decompression sickness on a salvage tug. Application: immediate medical response. Challenges: limited space and need for trained personnel.

Operational Safety Plan – Concept: document outlining safety measures for a salvage mission. Related terms: risk assessment, SOP. Explanation: includes hazard identification, emergency procedures, and PPE requirements. Example: an operational safety plan for a night-time lift. Application: reducing accidents. Challenges: keeping the plan current with dynamic conditions.

Over-Board Pump – Concept: pump that discharges fluid directly overboard. Related terms: discharge pump, waste management. Explanation: used for non-hazardous water removal. Example: pumping seawater from a flooded hold onto the ocean surface. Application: clearing spaces quickly. Challenges: ensuring compliance with discharge regulations.

Paraview System – Concept: visualisation tool for 3-D modelling of wreck sites. Related terms: CAD, simulation. Explanation: integrates sonar data to create immersive models. Example: using Paraview to plan lift points on a complex wreck. Application: improving decision-making. Challenges: data processing time and software expertise.

Partial Load Lift – Concept: lifting a structure in stages rather than as a whole. Related terms: staged lift, modular. Explanation: reduces stress on equipment and the wreck. Example: lifting a ship's bow first, then the remaining hull. Application: handling fragile or oversized objects. Challenges: coordination and ensuring structural stability between stages.

Passenger Rescue Boat – Concept: small craft designed to evacuate passengers from distressed vessels. Related terms: lifeboat, evacuation. Explanation: features high capacity and easy boarding. Example: deploying a passenger rescue boat to evacuate crew from a capsized ferry. Application: mass rescue. Challenges: rapid deployment and sea-state limitations.

Petroleum Recovery Skimmer – Concept: specialised skimmer for heavy oil recovery. Related terms: oil spill response, recovery. Explanation: uses rotating drums to collect viscous oil. Example: recovering crude oil from a leaking offshore platform. Application: minimizing environmental impact. Challenges: handling emulsified oil and equipment fouling.

Petroliferous Cargo Containment – Concept: systems for safely storing petroleum cargo during salvage. Related terms: cargo tanks, containment. Explanation: includes double-hull barriers and venting. Example: sealing cargo tanks on a damaged tanker before towing. Application: preventing leaks. Challenges: maintaining integrity under impact.

Photogrammetry Survey – Concept: technique using photographs to create 3-D models. Related terms: image-based modelling, mapping. Explanation: overlapping images are processed to generate accurate surface geometry. Example: photogrammetry of a wreck's deck to assess damage. Application: detailed documentation. Challenges: lighting conditions and water clarity.

Pipe Laying Crane – Concept: crane equipped to handle large diameter pipelines. Related terms: pipe handling, offshore. Explanation: features specialized spreader bars and tensioners. Example: using a pipe laying crane to install a relief line on a damaged vessel. Application: structural reinforcement. Challenges: pipe alignment and weight distribution.

Platform Supply Vessel – Concept: ship that transports goods and equipment to offshore platforms. Related terms: PSV, logistics. Explanation: carries fuel, water, and salvage gear. Example: a PSV delivering pumps and containers to a salvage site. Application: logistical support. Challenges: coordination with offshore conditions and limited deck space.

Plasma Cutter – Concept: tool using ionised gas to cut metal. Related terms: thermal cutting, precision. Explanation: produces a focused arc that melts and blows away metal. Example: plasma cutting a damaged hull plate for removal. Application: fast, precise cuts. Challenges: power requirements and safety shielding.

Plumb Line Survey – Concept: measurement of depth using a weighted line. Related terms: depth sounding, bathymetry. Explanation: a line with a weight is lowered, and length is measured to determine seafloor depth. Example: a plumb line survey to verify seabed conditions before anchoring. Application: simple depth assessment. Challenges: line drift and limited accuracy.

Portable Decompression Chamber – Concept: mobile unit for treating divers with decompression sickness. Related terms: hyperbaric chamber, medical. Explanation: provides pressurised environment to accelerate inert gas elimination. Example: using a portable chamber on a salvage vessel after a deep dive. Application: immediate treatment. Challenges: transport logistics and maintenance.

Power Trawl – Concept: towing device that drags equipment through water for debris removal. Related terms: drag net, salvage. Explanation: powered by winches to pull collection nets. Example: a power trawl used to gather scattered cargo from a wreck site. Application: clearing debris. Challenges: entanglement and equipment wear.

Pressure Relief Valve – Concept: valve that automatically releases excess pressure. Related terms: PRV, safety. Explanation: prevents system over-pressurisation by venting fluid. Example: a pressure relief valve on a hydraulic lift system. Application: protecting equipment integrity. Challenges: proper sizing and regular testing.

Propeller Guard – Concept: protective structure around a propeller. Related terms: propeller shroud, safety. Explanation: prevents entanglement with debris or divers. Example: fitting a propeller guard on a salvage tug operating near wreckage. Application: reducing damage risk. Challenges: maintaining propulsion efficiency.

Pump-Jack – Concept: mechanical device using reciprocating motion to lift fluids. Related terms: reciprocating pump, oil extraction. Explanation: commonly used in offshore platforms to raise oil. Example: employing a pump-jack to transfer oil from a damaged tanker's cargo tanks. Application: controlled fluid movement. Challenges: mechanical wear and alignment.

Radiation Detector – Concept: instrument for measuring ionising radiation. Related terms: Geiger counter, safety. Explanation: detects gamma, beta, or alpha radiation levels. Example: scanning a wreck for radioactive cargo. Application: hazard identification. Challenges: shielding and calibration.

Recovery Barge – Concept: flat-bottomed vessel used to retrieve objects from the seabed. Related terms: salvage barge, lift. Explanation: equipped with cranes, winches, and storage holds. Example: a recovery barge lifting a sunken container. Application: bulk retrieval. Challenges: stability and deck load limits.

Recovery Rope – Concept: strong line used to pull objects to the surface. Related terms: towing line, lift. Explanation: often made of high-modulus synthetic fibers for lightweight strength. Example: a 100 mm recovery rope attached to a submerged vehicle. Application: lifting large objects. Challenges: abrasion

resistance and UV degradation.

Refloat Pump – Concept: high-capacity pump used to dewater and increase buoyancy. Related terms: dewatering pump, salvage. Explanation: removes water from flooded compartments to restore lift. Example: a refloat pump removing 5 000 m^3 of water from a capsized vessel. Application: preparing a ship for tow. Challenges: suction head and debris blockage.

Regasification Unit – Concept: equipment that converts liquefied gas back to gas form. Related terms: LNG, processing. Explanation: uses heat exchangers to vaporise LNG for safe handling. Example: regasifying LNG from a damaged carrier before transfer. Application: reducing hazardous liquid cargo. Challenges: thermal efficiency and safety.

Remote-Operated Camera – Concept: underwater camera controlled from the surface. Related terms: ROV camera, inspection. Explanation: provides live video feed for assessment. Example: a remote-operated camera inspecting a hull breach. Application: visual guidance for divers. Challenges: low light and murky water.

Rescue Diver – Concept: diver specialized in emergency response. Related terms: SAR diver, rescue. Explanation: trained in swift water rescue, first aid, and equipment deployment. Example: a rescue diver extracting a trapped crew member from a sinking vessel. Application: life-saving operations. Challenges: rapid deployment and limited dive time.

Riser Pipe – Concept: vertical pipe used to transport fluids between sea surface and seabed. Related terms: flowline, offshore. Explanation: can be used to pump water or oil during salvage. Example: a riser pipe delivering fresh water to a submerged platform. Application: fluid transfer. Challenges: pressure management and corrosion.

Roll-On/Roll-Off (RoRo) Vessel – Concept: ship designed for wheeled cargo loading via ramps. Related terms: car carrier, transport. Explanation: facilitates rapid loading and unloading of vehicles. Example: using a RoRo vessel to transport salvaged cars from a wreck. Application: efficient cargo movement. Challenges: compatibility with damaged cargo.

Rope Tensioner – Concept: device that maintains constant tension on a rope. Related terms: winch, load control. Explanation: uses springs or hydraulic cylinders to adjust tension automatically. Example: a rope tensioner on a towing winch preventing slack. Application: smooth towing operations. Challenges: calibration and wear.

Rotary Salvage Cutter – Concept: rotating blade system for cutting large structural elements. Related terms: rotary saw, demolition. Explanation: powered by hydraulics or electricity, capable of cutting through thick steel. Example: a rotary salvage cutter used to sever a ship’s foremast. Application: rapid dismantling. Challenges: power supply and blade wear.

Rudder Damage Assessment – Concept: evaluation of damage to a vessel’s steering mechanism. Related terms: steering assessment, inspection. Explanation