**Safe Work Requirement**

LIFTING PROCEDURE

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| IntroductionBackground ECDC and sub-contractors carry out a large number of lifting operations to support activities in wells operation and rig move, camp and rig site construction. Lifting equipment used includes mobile cranes, forklifts, self-loader cranes and lifting gear. Purpose The document provides direction and guidance for all personnel involved in lifting operation to plan and execute safe and effective lifting operations. This document defines procedures for lifting operations and criteria for selecting and using lifting equipment and lifting appliances. ECDC highlights the process control of lifting operation and avoid DROPS incident happen. Drops refer to **ECDC Dropped Object Prevention Guidelines and ECDC Drops Standard.** Application This procedure is applicable to all personnel involved in lifting operations at any of ECDC facilities. It applies to all lifting equipment including new, existing, second-hand and leased equipment. Terms Explaination of Lifting Operation  1. **Banksman**(rigger)   A Banksman is the designated person who coordinates each lifting procedure and maintains radio and/or visual communication with the Crane Operator and load handler.   1. **Blind lifts**   A lifting operation whereby the lifting operator does not have a direct view of the load or landing area during lifting operations.   1. **Colour code**   A method of marking equipment, normally with paint or coloured tag, to give a visual indication of its certification status.   1. **Competent person**   A person who has such practical, theoretical knowledge and experience of the lifting equipment to be able to thoroughly examine and to detect defects or weaknesses in, and to assess the importance in relation to the safety and continued use of, lifting equipment.   1. **Factor of safety**   The ratio between minimum breaking load and the Safe Working Load or Working Load Limit, sometimes referred to as the working coefficient or coefficient of utilisation.   1. **Fixed lifting equipment**   Fixed lifting equipment is equipment which has been installed and is fixed into position.   1. **Inspection**   A process of recorded routine inspections of work equipment.   1. **Installed**   Refers only to lifting equipment which is assembled at a particular location, for example, a runway beam, and not to portable lifting equipment which is positioned at a particular location.   1. **Lifting accessories**   Equipment that links lifting equipment with the load, for example, masters links, spreader beams, slings, shackles, and eyebolts.   1. **Lift category**   A categorization of lifting operations reflecting the risk and the level of control required.   1. **Lifting equipment**   Work equipment for lifting or lowering loads, including attachments used for anchoring, fixing or supporting, for example, cranes, winches, chain hoists, lever hoists, fork lift trucks, lorry loaders and lorry cranes.   1. **Lifting equipment register**   The lifting equipment register is a system of recording the examination and inspection history of lifting equipment in use at ECDC worksite.   1. **Lift plan**   A document which gives step by step details of the ‘lift’. The document also identifies all the lifting equipment and lifting accessories to be used and details of responsible persons. The lift plan should also have attached, or provide, details of the sites safety measures, relevant drawings, illustrations and data.   1. **Method statement**   The method statement is required as a part of the lift plan for all lifts. The method statement provides a complete plan of the operation including equipment and accessories, mobilisation, setting-up, erection procedures, lifting and placing loads, dismantling and clearing up.   1. **Routine lifts**   Routine lifts are lifts that are carried out on a regular basis, that require no detailed engineering planning and have been previously subjected to a Hazard Identification and Task Risk Assessment (HITRA) and lift plan as appropriate   1. **Safe Working Load or Working Load Limit**   The maximum load the lifting equipment is certified to withstand under normal use. The Safe Working Load (SWL) or Work Load Limit (WLL) must NEVER be purposely exceeded. The designated Lifting Operations competent person must establish the safe loading limit of all components used in any lift and must NOT exceed the SWL or WLL.   1. **thorough examination**   A thorough examination is an examination by a competent person in such depth and detail as they consider necessary to enable them to determine whether the equipment being examined is fit for purpose and is safe to continue in use.   1. **written scheme of examination**   A written scheme of examination is a document describing the process of thorough examination based on risk assessment. The intervals between examination and the extent of thorough examination are determined by assessment of the relevant risks involved.   1. **Portable lifting equipment**   Portable lifting equipment is defined as any equipment whose principal purpose is to lift or lower loads, including attachments used for anchoring, fixing or supporting it.  The following equipment and operations are defined as portable lifting operations equipment:-   1.  Chain blocks 2.  Pull lifts 3.  Powered hoists 4.  Manual hoists 5.  Rope hoists 6. **Portable lifting accessories**   A lifting accessory is anything designed to connect a load to a lifting appliance and does not form a part of the actual load.  Examples of lifting accessories that may be used include:-   1.  Wire rope slings 2.  Chain slings 3.  Man-made fibre slings 4.  Hooks and fittings 5.  Swivels 6.  Shackles 7.  Eyebolts 8.  Rigging screws 9.  Plate clamps   This equipment will be stored and issued from a designated storage area such as a cargo container modified for the purpose of storing lifting equipment, generally referred to as a “rigging loft”.   1. **Fixed lifting equipment**   Fixed lifting equipment are those items of lifting equipment permanently installed at the site such as:   1.  Overhead cranes 2.  Hoists trolley beams 3.  Pad eyes 4.  Davits 5.  Swing jibs 6.  Man-riding winches   Maintenance schedules, records of inspection and testing shall be maintained through the lifting equipment records.   1. **Mobile equipment**   Mobile equipment is equipment that is on wheels or tracks and is self-propelled or specifically designed to be attached to or pulled by a vehicle. This category of lifting equipment includes but is not limited to:-   1.  Mobile cranes 2.  Mobile fork lifts 3.  Mobile working platforms 4. **Lifting equipment records**   The record of every examination and test of lifting appliances shall be made on the lifting inspection form. Each record shall be signed by the Authorized Competent Person who carried out the examination and/or test. An examination record:-   1. Shall be kept at the site where it will be filed in a safe place until any revision or new record related to the lifting appliances has been received 2. That shows that any lifting appliances cannot be safely used until repaired or exchanged, notice of such condition shall be given to the Site Controller by the Inspection Engineer： the lifting appliances will be taken out of service immediately   Every lifting appliance shall be plainly marked with its unique identification number and SWL or WLL as shown on the latest record of examination.   1. **Types of certificates**   For lifting equipment, two types of certificates/reports are used:-  **Certificate of test and examination**  A certificate of test and examination covers both the proof load test and the initial thorough examination of an item of equipment.  It is issued for new equipment or following substantial alteration or repair. This certificate must be dated before the item goes into service.    **Report of thorough examination**  A report of thorough examination is used for reporting the 6 monthly examination and any other in-service examinations as required.   1. **Colour coding**   Lifting appliances shall have a current valid Inspection / Test certificates, third party inspection must be conducted as following:   1. Crane and forklift, 12months 2. LLE (shackles, slings, winches, etc.), 6months. 3. Others, as per Contract’s requirement or manufacturer recommendation   All lifting appliance and lifting gear should be checked before any lifting operation, and weekly check should be conduct as per checklist by a responsible person.  The lifting appliance shall be positioned above the centre of gravity of the load. It must, in particular, be of sufficient Safe Working Load (SWL) and be able to move the load in a controlled manner to allow positioning.  If a lifting point is to be used to be suitable it must also have sufficient Safe Working Load (SWL). Lifting gear must have sufficient SWL to execute the lift. Lifting gear shall have been inspected and marked with the current colour code in accordance with **Colour Coding System for Loose Lifting Equipment**  All lifting gear shall be identified visually by the Colour Code system.  The Colour Code shall be painted on every piece of lifting gear. The colour shall indicate to the user that an examination has been performed within the prescribed period. All lifting equipment, gear and lifted equipment shall have SWL stenciled on them to ensure the limit is not exceeded.  Any lifting gear that does not have a visible colour band or where the colour is out of date shall not be used. It shall be returned to the rigging store. Such equipment shall not be re-issued or used until after satisfactory thorough examination a lifting equipment Inspector.  All main work sites shall have a lifting gear Colour Code Identity Board with the current colour codes displayed. Responsibilities    Rig Manager The Rig Manager is responsible for ensuring the Crane Operator and Banksman（Rigger）are trained and competent to perform their duties as defined in this procedure.  The Rig Manager has overall responsibility for ensuring that all lifting operation activities are correctly administered.  The Rig Manager is also responsible for ensuring that:-   1. This procedure is strictly adhered to for all occasions when it is identified that lifting operations are to take place 2. A competent person is available to inspect and certify lifting equipment as safe to use 3. No lifting equipment is allowed or used on site unless it is accompanied by all relevant certification and in date test certificates 4. Adequate records are maintained for all lifting equipment, including certification, examination and test reports 5. Competent persons are appointed to compile lifting plans and to perform lifts 6. Competent persons are appointed to control the issue and inspection of lifting equipment  Task Leader The Task Leader is responsible for the workshop or location where the lifting operations are to take place. The Task Leader will ensure that all hazards have been identified and will make recommendations for the implementation of various measures to reduce the risks to as low as reasonably practicable.  The Task Leader must personally inspect the job site along with the Crane Operator. He will authorize the lifting operations to commence and maintain an overview of all permitted work carried out in his area. He shall:-   1. Ensure that an appropriately detailed hazard identification and task risk assessment has been carried out for the task 2. Carry out a detailed safety briefing with the competent Crane Operator during the work planning stage to ensure that all hazards have been identified 3. Ensure that the Crane Operator has a detailed understanding of the task, the work location and the equipment to be worked on 4. Ensure that the Crane Operator is aware of any expected actions/responsibilities to be adopted in the event of an emergency 5. Ensure the worksite is tidy, clean, and safe before permitting work to start and for visiting the worksite as required throughout the task ensuring a safe place of work is maintained 6. The task leader relies on the advice of the Safety engineer for critical lifts when ensuring the work site continues to be a safe place of work.  HSE Supervisor/HSE Engineer The HSE Supervisor/HSE Engineer is responsible for:-   1. Implementation of all statutory requirements concerning lifting equipment 2. Liaising with the certifying company during six monthly examinations and tests 3. Scheduling all inspections and testing 4. Carrying out a thorough examination of fixed lifting equipment 5. Ensuring colour-coding and certification of examined equipment 6. Ensuring that all lifting equipment on site has a certificate of test and examination 7. Ensuring that all lifting equipment on site and in use is within current test dates 8. Ensuring that all lifting equipment on site and in use is colour coded to indicate current usage dates 9. Ensuring that all lifting equipment on site and not in use is stored according to manufacturer’s instructions 10. Ensuring that all lifting equipment on site is inspected either prior to issue or on return from use 11. Updating lifting equipment register and master file 12. Specification of certification requirements of new purchased company lifting equipment (requisition) 13. Allocation of company unique identification numbers 14. Issuing inspection reports 15. Decision on the repair or replacement of any suspected item 16. Destruction of slings removed from service 17. Specifying the requirements for examination and test for company lifting equipment as and when required  Crane Supervisor The Crane Supervisor (Lift Supervisor) is part of the lift team and responsible for directing and supervising the lifting operation, ensuring that these are carried out in accordance with the method statement. The Crane Supervisor must be competent and suitably trained and should have sufficient authority to stop the lifting operation if the supervisor considers it dangerous to proceed. The Crane Supervisor will:-   1. Assess the lift area. If it is a “Danger Area” further engineering consideration must be given BEFORE moving the crane into the area 2. Categories the lift 3. Select personnel to carry out the lifting activity 4. Select the appropriate equipment 5. Be fully conversant with the work, the potential hazards and associated precautions 6. Ensure safe execution of assigned work 7. Ensure that the worksite is left in a safe and tidy condition at the suspension or completion of work activities  Crane Operator The Crane Operator is responsible for the safe working of the crane and he must be certified to drive the specific model of crane being used. The Crane Operator must ensure that all servicing routines have been carried out prior to crane operation to make sure that the crane can function correctly and is available to carry out the necessary lifting operations as required.  The Crane Operator is also responsible for the safe operation of the crane during lifting operations and for:-   1. Signing the toolbox talk form to acknowledge his understanding of any tool box meeting held 2. Ensuring he understands the effects of various weather conditions on the safety of the lift 3. Taking action to avoid dangerous situations, for example, “Danger Areas” 4. Controlling the lift and stopping the operation should he feel that it is unsafe 5. Aware that the crane should be used on level ground or else set level on outriggers before any load is applied 6. Fully conversant with the correct use of outriggers and where outriggers should be fitted, and aware of how to properly support the outrigger feet (this requires regular monitoring to ensure that no movement occurs throughout the operation) 7. Able to set and check the functioning of the rated capacity limiter and rated capacity indicator 8. Aware of the effects of wind and other climactic effects on the crane and load 9. Able to resist pressures from other persons to carry out unsafe operations 10. Able to take the action to avoid dangerous situations, including stopping operations 11. Able to operate fire suppressant equipment, if fitted Reporting all worksite problems immediately to the Task Leader such as:- 12.  Any mechanical defect 13.  Any structural defect 14.  Any accident or unusual occurrence  Banksman The Banksman is responsible for giving clear instructions during lifting operations; relaying the signal from the Slinger to the crane driver. The Banksman may also be responsible for directing movement of the crane and load instead of the Slinger, provided that only one person is responsible at any time.  During the lifting operation, hand signals and voice instructions to the crane driver should be given by only one person at a time. If, during the lifting operation, responsibility for directing the crane and load is transferred to another signaller, the first signaller should clearly indicate to the crane driver that this responsibility is transferred and to whom. The first Banksman should clearly indicate to the second Banksman that the transfer is taking place. The crane driver and the second Banksman should clearly indicate that they accept the transfer.  The Banksman will:-   1. Maintain communication with the Crane Operator through agreed hand signals and/or by radio 2. Maintain communication with the Slingers 3. Ensure that the lifting plan is adhered to and that all safety precautions are in place 4. Judge distances, heights and clearances 5. Direct the movement of the load so as to ensure safety of personnel and plant 6. Control all aspects of the lift and movement of equipment  Slinger The Slinger is the person responsible for attaching, detaching and securing loads to the lifting equipment. The Slinger’s responsibilities include:-   1. Estimating the load 2. Selecting suitable lifting equipment 3. Attaching, detaching and securing loads 4. Giving clear and precise signals 5. Assisting the movement of the load so as to ensure safety of personnel and plant   Note: The role of Banksman and Slinger can be fulfilled by one person. However, while the Banksman is in charge of the lift he will not perform any other duties. Lifting operations - classification    Routine lifting operations A routine lifting operation is defined as:-   1. Repetitive and frequent lifting using the same equipment 2. Carried out in suitable environmental conditions 3. Load has a known and evaluated weight, shape and centre of gravity 4. Utilizes cranes and lifting appliances with approved sling types 5. Familiar, competent Crane Operators  Simple lifting operations  1. A simple lifting operation is defined as:- 2. Infrequent, uncomplicated lifting operations 3. Carried out in good weather conditions 4. Known weight and centre of gravity 5. Using a single lifting appliance and single set of lifting accessories attached to a dedicated lifting point. For example, a sling, shackle or eyebolt   The typical activities for simple lifting operations are installation, removal of small items of rotating machinery and valves.   1. Explicit exclusions   A lift cannot be deemed to be simple if it involves:-   1. A confined restricted space 2. Awkward shaped fragile items 3. Cross hauling loads 4. Tandem lifts 5. Traversing over live operational plants 6. Extended duration (more than one shift) 7. Using soft eye flat webbing type slings 8. Personal lifts for access 9. They lack specific lifting attachments in non-certified steel structures  Critical Lifting The decision to designate a lift as a critical lift is a management decision. Guidelines provided here are intended to aid in making that decision. A lift should be designated as a critical lift if dropping, upset or collision could cause or result in any one of the following:   1. Damage that would result in serious economic consequences. 2. Damage that would result in unacceptable delay to schedule or other significant deleterious programmatic impact (such as loss of vital data) 3. Undetectable damage that would jeopardize future operations or safety of a facility. 4. Significant release of radioactive or other hazardous material to the environment or creation of an undesirable condition. 5. Personnel injury or significant adverse health impact, either onsite or offsite. 6. In addition, a lift that meets one of the following criteria shall be designated as a critical lift: 7. Any lift that requires the use of multiple cranes. 8. Any lift that exceeds 75% of the crane’s rated capacity within the lift configuration of the crane. 9. The item to be lifted requires exceptional care in handling because of size, weight, close-tolerance installation, high susceptibility to damage or other unusual factor. 10. The item, although non-critical, requires exceptional care in handling because it is being lifted above a critical item. 11. The lifting operation shall be planned and performed taking in account all the foreseeable risks. The lifting plan must be used for any critical lifting. The example of lifting plan is as attachments. 12. Lifting Plan template shall be approved /agreed by HSE and Ops department 13. The Lifting plan covering all aspects of the lift. 14. Certificates for cranes, lifting gear, crane operator. (Verified) 15. (See ECDC -HSE-L3-42-RIG\_XXX\_Lifting Plan template v1.0)  Lifting operations - safety    Lifting operations - safety rules Lifts utilizing cranes, hoists or other mechanical lifting devices will not commence unless:-   1. An assessment of the lift has been completed and the lift method and equipment has been determined by a competent person 2. Operators of powered lifting devices are trained and certified for that equipment 3. Rigging of the load is carried out by a competent person 4. Lifting devices and equipment has been certified for use within the last twelve months (at a minimum) 5. The load does not exceed dynamic and/or static capacities of the lifting equipment 6. Any safety devices installed on the lifting equipment are operational 7. All lifting devices and equipment have been visually examined before each lift by competent person.  Lifting operations - safety precautions The following safety precautions must be followed by all personnel who are involved in lifting and rigging operations: -   1. Cranes must be fitted with limit switches on the fast line, the main line, and the luff (in and out) 2. All lifting components must be operated within manufacturer specifications 3. The boom and basket load limit specified by the manufacturer must not be exceeded 4. Personnel must not be permitted to use or operate any lifting equipment unless they are instructed, trained, and assessed by a competent person in the use and operation of such equipment. Documentation of operator competence must be provided 5. Lifting equipment and work areas must be kept free of oil, grease, and trash 6. Equipment must not be moved when the boom is elevated in a working position 7. All personnel must wear the required Personal Protective Equipment 8. Personnel involved in the operation must watch the load being lifted until it is set in place and disconnected from the lifting device 9. Personnel must not walk under a suspended load 10. Personnel must stand clear of any rope, line, or cable that is under strain 11. Personnel must not get any part of their bodies between unsecured objects (pinch points) 12. Two tag lines must be used on all lifts to guide heavy suspended loads   Note: Weather conditions may cause suspended loads to swing or become disconnected. Lifting operations - equipment and material handling    Lifting equipment - general If no SWL or WLL, identification number or correct color code is adequately marked, then do not use the lifting equipment.  Every lifting appliance or piece of lifting gear must be clearly marked with the SWL or WLL and must be used within these parameters.  Lifting appliances and associated lifting gear must be examined and where necessary tested by an approved inspector as follows: -   1. Before it is used initially 2. Whenever the equipment has been substantially modified or repaired and before it is used again 3. At intervals and times according to CLIENT Inspection procedures and/or in accordance with the relevant legislation   All examinations and tests must be recorded in a lifting equipment register. A current copy of the register must be available on the site. All lifting gear is to have an identification number clearly marked on it.  Any appliance or piece of lifting gear that fails the examination or test must not be used until it is repaired and re-tested.  Any lifting gear that fails during an operation must not be moved until an investigation has been carried out. This does not apply in emergency situations. Inspection and testing All equipment used in lifting operations, whether fixed or portable, must be inspected and/or tested to confirm that it is fit for its intended use. A colour coding system is used to ensure that all equipment in use has been either inspected or tested. The colour code is changed every six months. No equipment other than those bearing the valid colour displayed is allowed to be used in lifting operations.  (see ECDC -HSE-L3-43-RIG\_XXX\_Lifting Gear Register v1.0) Third Party lifting equipment Third Party’s lifting equipment includes all items whether rented, or supplied free of charge, as part of the contractor tools of trade, including container sling assemblies.  Third Party’s lifting equipment may arrive on a site by a number of different routes. It is the site HSE supervisor’s responsibility to verify that the equipment satisfies the requirements of this procedure.  Third party equipment complete with valid color coded lifting gear (e.g. slings, shackles, etc.) &certificates. Wire ropes Wire ropes are used on cranes, hoists and hangers. The following precautions must be taken by the Banksman when handling or fitting wire ropes: -   1. Protective gloves must always be worn 2. Rings should not be worn 3. Twisting or kinking wire ropes should be avoided 4. Ropes in use must be lubricated periodically 5. Check that the rope is of the correct specification for the crane to which it is to be fitted 6. Ropes must be fitted to the relevant equipment in accordance with manufacturers’ instructions 7. Ensure all anchorages are secure and only the correct fittings are used 8. Rope guards must only be removed for maintenance, inspection or adjustment 9. All slings and strops are to be examined by the user before and after each use 10. Ropes must be discarded when the visible number of broken wires in any length is equal to ten times the rope diameter and/or exceeds 5% of the total number of wires in the rope 11. Ropes removed from equipment as unserviceable must be identified as such, brought to the attention of the site HSE supervisor and removed from the register 12. When a rope is replaced the test certificate of the new rope must be retained alongside the register of the lifting equipment 13. Replacement rope must be stored on pallets or drums in a place where deterioration from condensation is minimized  Chain hoists Chains are strictly not allowed and will not be used for lifting purposes. Slinging and lifting Tables of SWL or WLL are available for all lifting gear and kept with the lifting appliance registers. These must be consulted to ensure the correct size of lifting gear is selected.  When using multiple leg slings the SWL or WLL decreases as the angle between the legs increases. For three and four leg slings the SWL or WLL is determined by the largest angle between the legs. Special care must be exercised and a larger size sling used when: -   1. The exact load is in doubt 2. Shock loading is a possibility, for example, lifting from and to a vessel 3. There are exceptional hazards, or the possibilities of accidents are seen to exist, for example, lifting over "live" plant   Cables, slings and chains must always be padded when passing over sharp or machined edges of equipment. When using a two single-leg slings to lift pipes or equipment with no lifting eyes or holes, the slings must be double wrapped around the equipment with hook points always pointing outwards  The following list of prohibited actions is brought to the attention of all personnel using lifting gear: -   1. Never lift with the point of a hook 2. Never use nuts and bolts to join a broken chain 3. Never use a chain in which the links are locked, stretched or are without free movement 4. Never use corroded, worn or excessively pitted chains 5. Never hammer a chain to straighten a link or to force a link into position 6. Never drag a sling from under a load if it is not free 7. Never cross, twist, kink or knot any sling 8. Never drop any item of lifting gear from a height 9. Never join slings by threading the eyes 10. Never attempt to force a spread hook back into shape  Pre-slinging of pipework and containers Load sets must be properly assembled slung and have tag lines attached before they are hoisted or lowered.  Before heavy loads, such as long lengths of rolled sections or tubes are swung, the load must be given a trial lift to test the security of the slinging.  Strops and slings must be applied and pulled sufficiently tight to prevent the load, or any part of the load, from slipping and falling.  Lifting hooks must not be attached to the following: -   1. The bands, strops or other fastenings of packages of cargo, unless the fastenings have been provided for lifting purposes 2. The rims of drums for lifting purposes, unless the construction and condition of the drum is such as to permit lifting to be done safely with properly designed and constructed can hooks   Suitable precautions, such as the use of packing or chafing pieces, must be taken to prevent chains and wire and fibre ropes from being damaged by any sharp edges of loads.  The angle between the legs of slings should NOT exceed 90 and have an appropriately greater SWL or WLL rating.  Trays and pallets must be hoisted with crane pallet forks, or two legged slings in a basket hitch which must have safety nets to prevent any part of the load from falling.  When bundles of long metal goods such as tubes, pipes and casing are being hoisted, two slings, double wrapped and bulldogged, and where necessary, a spreader must be used. Suitable tag lines should also be attached.  Buckets, skips and similar appliances must be: -   1. Load in a way that there is no risk of the contents falling out. Retaining nets where necessary should be used 2. Securely attached to the hoist by a shackle to prevent tipping and displacement 3. Small drums, canisters, gas cylinders etc must be loaded or discharged in suitable containers or skips with sufficiently high sides, lifted by four-legged slings.  Slinging The procedure for slinging operations is as follows: -   1. The weight being lifted must be known 2. Check the SWL or WLL and color code of the sling 3. Select slings that are long enough to avoid a wide angle between the legs of a multi-leg sling 4. Ensure all legs of a multi-leg sling are evenly loaded 5. Never shorten chains or wire slings by tying knots or wrapping around the crane hook 6. Insert suitable packing to protect slings from any sharp corners, particularly when lifting steel sheets 7. Use end links, rings and shackles that are large enough to hang freely on the crane hook 8. To prevent swinging when the load is lifted, ensure that the hook is placed above the center of gravity of the load 9. When slinging casing, fit bulldog grips to hold the load in position when it is being lowered 10. With a multi-fall hook use a safety pennant on to which the load is hooked 11. If two slings are to be joined, shackles of compatible SWL or WLL must be used   **Web slings must be under lock & key unless used under a PTW.** Shackles The procedure for lifting shackles is as follows: -   1. Use the correct type of shackle for the job in hand 2. Check the SWL or WLL and color code of the shackle 3. Do not use any shackle that is not marked with the SWL or WLL 4. Do not use any shackle that shows damage or distortion 5. Always use the correct shackle pin 6. Make sure the pin is a good, secure fit in the shackle 7. Never side load a shackle, the hook should always be in the bow, above the pin 8. Do not use shackles that have been subjected to welding operations 9. Do not use shackles that have been heated to widen the jaws  Eye bolts The procedure for the use of eye bolts is as follows: -   1. Check the SWL or WLL and color code of the eye bolt 2. The SWL or WLL refers to vertical lifts and is reduced by an inclined lift 3. Check that the thread of the eye bolt is the same as the tapped hole and make sure the thread is a good fit 4. Ensure that the shoulder or collar is in contact with the load 5. Use a collar eye bolt for inclined loading. On an inclined lift the eye must always be in line with the sling 6. When using welded pad eyes on structures, ensure the weld has been load tested 7. When using a single eye bolt lift, prevent the load from rotating using a tag line 8. No single point lifts should be made over a floor area  Lifting of steel plates The safest way of lifting steel plates is by using the holes near the edge to attach the lifting slings via shackles.  For plates without holes, plate clamps must be used. These clamps, which depend on friction gripping, are not as positive as shackles. The greatest care must therefore be taken. When employing a single clamp it must be attached squarely to the plate. Packing must never be used between the clamp and the plate. A single clamp must not be used to lift more than one plate at a time.  Plate clamps should be color coded, be marked with a SWL or WLL and identification number.  Where a crane hook is attached directly to a clamp or shackle, over lowering of the crane hook is liable to detach the hook from the shackle and the plate can then fall over. This risk is greatly reduced by having a short wire sling between the clamp or shackle and the crane hook. When using two lifting clamps on a plate each clamp must be in line with the leg of the sling attached to it. Planning a lift    Safe system of work Throughout the planning and execution of any lifting activity, the site HSE supervisor shall ensure that the lifting is properly implemented.  A process safety control is established for each lifting operation and includes the following: -   1. Hazard identification and Risk assessment 2. Lift plan 3. Method statement for critical lifts 4. Selection of lifting equipment taking account of maintenance, inspection and certification 5. Preparation of the site 6. Appointment of the Lift Supervisor for critical lifting 7. Appointment of the lift team 8. Consideration of the consequences of failure of a lift   Upon completion of the lift ensure the worksite has been returned to a safe condition and sign-off the Permit. Define the lift If the lift has not been carried out before, the site HSE supervisor shall prepare a lift plan; this person may or may not be involved in executing the lift. Pre-lift Hazard Identification and Task Risk Assessment Prior to commencing a lift that has not been carried out before, or for which no lift plan or risk assessment exists, the task leader and site HSE supervisor shall associated hazards, their severity and likelihood of occurrence. The task leader shall submit the hazards identification and task risk assessment for rig manager approval.  The hazards identification and task risk assessment for lifting operations shall address the following issues: -   1. Cultural, communication and language difficulties 2. Weight, size, shape and center of gravity of the load 3. Availability of approved lifting points on load 4. Method of slinging/attaching/detaching the load 5. Risk of overturning/load integrity/need for tag lines 6. Suitability and condition of lifting equipment to be used 7. Initial and final load positions and how it will get there 8. Lifting over live equipment 9. Number and duration of lift(s) 10. Conflicting tasks in area 11. Environmental conditions such as weather and permissible limits 12. Lighting in the pick-up and lay-down areas 13. Proximity hazards, obstructions, path of load. For example, potentially live electrical, hydraulic or pneumatic lines, underground conduits, bridges and overhead structures 14. Working under suspended loads 15. Access and emergency escape routes for the lifting operator and load handlers such as Banksman and Riggers 16. Experience, training and competency of personnel 17. Number of personnel required for the task 18. Pre-use inspection of equipment by operator and Lift Supervisor   (See ECDC -HSE-L3-42-RIG\_XXX\_Lifting Plan template v1.0) Lift plan The lift plan clearly identifies the competent person planning the lift, the lifting operation it relates to, step-by-step instructions for carrying out the lift and the assigned role(s) to undertake each activity. For routine lifts, the lift plan may be ‘generic’ but will be reviewed prior to each lift. The rig manager approves every lift plan. The lift plan is reviewed and signed by those involved in the lift. The lift plan shall include consideration of the following: -   1. The load, its characteristics and proposed methods of lifting. This will include identification of the load’s center of gravity, balance and lifting points (it is not necessary to know the exact weight of the load for routine operations but an estimate must be made). For heavy, complex operations, the load weight must be known. This includes consideration of the SWL or WLL capability of the equipment and the light load consideration 2. The stability of the proposed operation 3. The position of the crane or lifting equipment and the load before, during and after the operation, making it clear that mats must ALWAYS be used. Even when mats have been correctly dimensioned, care must be exercised so that outriggers or tracks avoid dangerous positions 4. Proximity hazards, sensitive plant, space available and suitability of ground conditions 5. Loads are not being moved or suspended over personnel or accommodation 6. Environmental conditions 7. Appointment of a Lift Supervisor 8. During external lifting operations, the operation is planned in such a way that it is safely halted if weather conditions deteriorate to the point where it is not safe to continue 9. The lifting operation is organized so that lifting equipment cannot be operated until the person attaching/detaching the load has given their authorization to do so. |  |
| Description: C:\Users\USER\AppData\Roaming\Tencent\Users\1045450198\QQ\WinTemp\RichOle\C3(E(L@W(H{F`D697F[WS6E.pngStability guidelines for positioning within danger areas | |
| Note: If you are in a “Danger Area” do not lift without an engineering assessment being made by a competent engineer. Method statement A method statement is documented for critical lifts. The following items are considered in a method statement as a step by step description of the safe system of work: -   1. Site preparation and access requirements 2. Full details of cranes, if required, including type of hire 3. Details of lifting equipment and accessories 4. Engineering calculations where necessary 5. Uncertified steel beams being utilized as primary lifting points 6. Ground conditions, particularly excavations, could affect the positioning of mobile cranes 7. Existing documentation, for example, manufacturer/supplier information and/or drawings 8. Details of personnel to be used and co-ordination methods 9. Confirmation that landing areas have the required load bearing capabilities   A complete plan is required of the operation including; mobilization, setting-up, erection procedures, lifting and placing loads, dismantling and clearing major projects. Hoisting operationsHoisting operations - safety The hoist and its cable must be inspected at least daily when being used, and must be re-inspected for each lift when heavy loads are lifted.  Lifting equipment of any kind must be inspected and recertified by qualified personnel every twelve months.  Note: A record of inspection must be retained.   1. The equipment must not be used if it is working improperly 2. All wire rope and chains must be taken out of service when wear or corrosion exceeds that allowed by the manufacturer 3. All hooks on hoisting equipment should be visually inspected for cracks before the equipment is used   All operators of hoisting equipment must know the load capacities of the equipment and must not exceed those capacities. The maximum load specification for the hoist must be identified on the hoist. Capacity charts and signs must be posted so that the operator can see them clearly.  The hoist must not be overloaded by the following means: -   1. Trying to lift objects heavier than design limits 2. Extending the length of the mast   Boom angle indicators must: -   1. Be permanently attached to the boom 2. Be functional and showing the operating radius   Each person in the hoisting operation is responsible for working safely.  Hoist operators must: -   1. Be in the clear always so that they are not in a position to be caught or trapped by the load if it moves unexpectedly 2. Watch the block, sling, and the load 3. can move freely, if necessary  Hoisting operations - procedure When operating hoisting equipment, follow these guidelines: -   1. Do not leave a load hanging on the hoist any longer than necessary 2. Always rig the hoist down and secure it after the work is completed 3. The hoist operator must remain constantly alert and must take signals from one person only, except for the stop signal, which can be rendered by anyone 4. The qualified signal person must be the person giving the signals 5. The hoisting equipment must be securely anchored in place to prevent it from moving when under the load 6. Hoisting equipment must be anchored only to a fixed object after the operator knows the weight of the load and is sure the fixed object can support that load 7. Hoisting equipment must not be anchored to hydrocarbon bearing lines, valves, vessels, or to structures that are likely to move due to strain 8. When possible the hoist must be positioned to allow the operator to see the load 9. Every precaution must be taken to prevent persons walking under loads or near lines under strain 10. Loads must be taken with a steady pull, as opposed to a jerk. A jerk multiplies the stress on the rope to many times the lifted weight 11. The operator must take care to ensure that kinks do not form in the cable because they weaken the cable 12. Rigging equipment with obvious defects MUST be removed from service immediately and destroyed.  Crane operationsCrane operations - general The lifting operation shall be conducted in strict accordance with the approved lift plan. Any variation from the lift plan shall result in the job being stopped and reassessed to ensure continued safe operation.  Everyone involved in the lift has the responsibility to stop the lifting operation at any time if they believe the operation is unsafe.  Before any new Crane Operator is permitted to work on a site crane it must be verified that the Crane Operator has the following up-to-date documentation: -   1. Certificate of competency and authorization to operate cranes 2. Crane Operators log book 3. **before operations**   As a Crane Operator you must thoroughly examine the crane and all related safety devices to ensure that the equipment is in good working order. If any safety device is not operational you must report it immediately to the Safety Advisor.  You shall ensure a “no admittance zone” is clearly indicated by using sign boards or safety tape to prevent unauthorized access and keep people or vehicles at a safe distance away.   1. **During operations**   During crane operations the Crane Operator must check continually for unusual functions.  If conditions alter during crane operations, and if the Crane Operator believes it would be unsafe to continue, he must suspend operations immediately and advise the task leader.   1. **Wind speed restrictions**   Extreme caution must be taken during lifting when the wind speed reaches 20 miles. As a general guide, most cranes working on Main Boom operate at 9.8 m/s. For cranes working on Fly Jib and Luffing Jib, this figure is greatly reduced.  Items such as steel plates with a large surface area, which can be caught by the wind giving rise to hazardous working conditions, must not be lifted during windy conditions.  When the wind speed exceeds 25 miles, crane operations may only proceed with the permission of the rig manager or his delegated responsible person.   1. **Emergencies**   Crane activities must cease immediately if any site emergency is indicated by a site alarm or communicated by portable radio or word of mouth.  During any period of electrical storms in the area, all crane operations must cease immediately and the jib must be lowered. Crane operations - working near overhead power lines All overhead power lines and other electrical apparatus should be treated as live unless declared “dead” and “safe” by the line operator. If in doubt, seek advice from the operations manager.  If the crane contacts an overhead live electric line or cable, observe the following precautions: Safe Use of Cranes: -   1. Remain inside cab 2. Warn all other personnel to keep away from the crane and not to touch any part of the crane, rope or load 3. Try, unaided, and without anyone approaching the machine, to move the crane until it is clear of the power line or cable 4. If the machine cannot be moved away, remain inside the cab. If possible, get someone to inform the electricity supply authority at once. Take no action until it has been confirmed that the conditions are safe 5. If it is essential to leave the cab because of fire or some other reason, jump clear as far away from the crane as possible. Do not touch the crane and the ground at the same time 6. Inform the responsible engineer of the works or authority concerned of the situation immediately, and until assistance is received someone should remain near the crane to warn of the danger   Crane operations should NOT be carried out within 9 meters distance of overhead power lines, and 15 meters for those supported on metal towers. |  |
| Description: C:\Users\USER\AppData\Roaming\Tencent\Users\1045450198\QQ\WinTemp\RichOle\Q0@S1YW%)W${1988N~%7HTJ.png**Prohibited space around overhead power lines** | |
| To reduce the risk from such operations: -   1. Ensure loading and unloading areas are away from overhead lines, reducing likelihood of contact 2. Do not store long objects, for example, pipes near or under overhead power lines  Crane operations - lift supervisor/Safety supervisor The safety supervisor must: -   1. Ensure that both he and the Crane Operator are aware of all aspects of the lifting operation to be undertaken 2. Ensure that both he and the Crane Operator have agreed and are familiar with the method of communication to be used 3. Be aware of the wind speed and direction 4. Know the weight of the load 5. Be familiar with the capacities and parameters of the crane in use 6. Check that the lifting gear being used is in good condition, certified for use, correctly colour coded and of sufficient capacity to carry out the lift 7. Ensure that taglines are attached to all loads, for example, casing or drill pipe 8. Be aware of any obstructions within the crane’s radius and working area 9. Check that the area around the load to be lifted is clear and that the load is not attached to the adjacent equipment 10. Ensure that taglines in use are not secured or tied off to adjacent equipment or structures; there are no knots along the length of the tag line  Crane operations - communications protocol The method of communication used for a lifting operation is agreed and identified as part of the planning process. This shall be re-enforced during the pre-task toolbox talk and shall be incorporated in the method statement.  The primary method is hand signals and the secondary method is radio communications. When radio communications are used, only those personnel formally trained in the use of radio communications may operate radios.  When personnel are trained in the use of radio communications, this training must be recorded on training records. The task leader ensures such personnel are sufficiently familiar with the type of radio communication equipment to be used. Personnel involved in the use of radio communications shall continually assess background noise levels ensuring effective communications and clarity of transmitted information always.  All hand signals given to control crane operations, must comply with the standard code of hand signals.  They must be clear, distinct, and easily seen and identified by the Crane Operator. Where the Crane Operator has a restricted view of the load, one or more competent Banksman must relay the signals to the Crane Operator.  If two Banksman are necessary, the Crane Operator must know the changeover point and the area of responsibility for each Banksman. The Banksman must be positioned to have a good view of the whole operation always.  When hand signals are being used, lifting operations must cease if visual contact is lost. These operations can only recommence when a clear line of vision is re-established.  When radio communication signaling is being used, the Crane Operator is to reach a clear understanding with the Banksman before lifting operations begin. If there is any interruption to the communication the crane operator must stop the lifting operation immediately until communication with the Banksman is re-established.  Only the person in charge of the lift may give signals to the Crane Operator. | 减少此类风险的措施：   1. 确保装卸区域远离架空线，减少接触的可能性 2. 不要存放较长的物体，例如管道在附近或下方有管道电线的地方    1. **起重机操作 – 提升主管/安全主管** |
| `}VRD6KVQS~WP{{DJ%)%WW1 **Crane Hand Signals** | |
| Crane operations - check list Every six months the integrity of critical components of cranes must be inspected and verified to identify any potential issues affecting the safety of their operation. These components include:   1. Outriggers 2. Boom 3. Cathead 4. Main hoist hook block (sheaved) 5. Main hoist rope 6. Hoist machinery 7. Luffing hoist machinery 8. Slewing machinery 9. Slew bearing 10. Ballast weights 11. Power unit 12. Safe load indicator 13. Cabin and controls 14. Electrics 15. Overload protection   (see Appendix 6 - Mobile crane inspection check list)  On a daily basis, before the start of a shift, the Crane Operator should carry out basic crane checks: -   1. Walk-around checks, for example, checking for oil leaks 2. Engine checks, for example, radiator water level 3. After starting checks, for example, horn/reversing alarm   If ANY problems are found during the daily crane check, or during its operation, STOP and check with your supervisor immediately using the equipment.  (See ECDC -HSE-L3-57-RIG\_XXX\_Crane Weekly Check v1.0) Crane operations - lifting gear The following basic rules apply to all lifting gear used in crane operations: -   1. Latches or safety bolts on hooks must always be in use 2. All loads must be checked for correct slinging prior to lifting 3. All pipework should be pre-slung 4. Only certified lifting accessories must be used 5. Wire ropes, of suitable SWL or WLL rating, should be used in preference to chains whenever possible 6. Cranes must never be used to lower, raise or carry personnel 7. **Suspended loads**   Loads must never be left suspended for longer than it is necessary. When suspended, loads are unavoidable, the crane controls must never be left unattended by the Crane Operator.  A suspended load must not be slewed above personnel on the ground and an audible warning device must be located on the crane which will enable the Crane Operator to attract the attention of any personnel in the area.   1. **Crane and load movements**   The following rules apply to crane and load movements: -   1. Care must be taken to prevent a load or the crane boom from meeting any other objects 2. The crane’s audible alarm must be sounded prior to slewing 3. traversing a load across any live plant must be avoided if possible. Alternative methods of transfer must be considered. If there is no other alternative, then a full risk assessment must be carried out prior to the operation and the operation must be approved in writing by the Site Controller 4. Loads being traversed across roofs must have sufficient clearance. This is particularly important in “restricted” crane operating areas where impact from dropped objects is critical 5. traversing a heavy load across accommodation or occupied offices/workshops must be avoided whenever possible. If unavoidable, the buildings must be vacated 6. Loads must be lifted gently 7. Crane movements must be executed smoothly to avoid loads swinging 8. Steadying lines must be used on awkward or heavy loads and in high winds 9. If the lifting wire becomes slack on the drum, cross-coiled, or trapped, lifting operations must be suspended until the wire is paid out, examined for damage, and re-spooled correctly 10. The hoist motion of a crane must not be used for any purpose other than raising or lowering a load vertically 11. Over-hoist limit switches must never be used as a means of stopping crane movements 12. Safety devices must be checked daily before use to ensure operation 13. Safety devices must never be disconnected or tampered with  Crane operations shutdown On completion of crane operations, the crane, boom and hook must be properly secured before the Crane Operator leaves the crane. Post job debrief and learning points After completing the lifting operation, everyone involved in the lift has the opportunity to discuss and make improvements to the lift plan. Any lessons learned noted on the plan will be reviewed by site HSE supervisor and incorporated into future lifts. FORK LIFTSLift Preparations Because forklifts and working conditions vary, the operator must know the equipment and the manufacturer’s instruction on its operation and maintenance.  The operator must check the weight of the load and forklift adequate capacity to handle the load.  From the load dimensions the operator shall estimate the center of gravity. The fork dimensions shall be adjusted per the load dimensions and center of gravity.  The nature of the load shall be assessed i.e. fragile, chemicals and precautions taken including adequate support of the load. The load should be free to lift and not fastened down. The receiving area shall be checked and the best route to the area identified taking account of other ongoing work, ground conditions and other hazards.  Large loads where access and space is limited will require a banks man to guide the operator. Executing the Lift Once operations have begun the operator is in charge, if a fault or anything occurs which means the operation cannot precede safely the operator must make the forklift safe with the forks touching the ground.   1. Never allow personnel to ride on the truck or load. 2. Never leave a suspended load. 3. Never leave the forklift’s engine running unattended. 4. Ensure you warn others of your approach. 5. Never tie the load to the forks. 6. Never park or leave the forklift near emergency services or outlets. 7. Never use the forks for pushing they are only designed for lifting a load. 8. Avoid high loads if possible. If you cannot avoid them get some assistance. 9. Avoid uneven ground. If you have any doubts about anything ask someone.   The forklift hand signals show as following: |  |
| ]1S46`}A{D%A](234L~OM[D | |
| Procedure for removing loads from stack The following guidelines apply:   1. Approach the stock and stop. 2. Tilt mast until vertical. 3. Raise forks to desire height. 4. Ensure there is nothing behind the load that the forks can interfere with. 5. Drive forward slowly and gently. 6. Stop in neutral position and apply parking brake. 7. Take the load and tilt back. 8. Move back slowly clear of stack. 9. Lower the load before moving off. 10. Look behind you or use your mirror to check all is clear before reversing. 11. Remember the load must be on the forks squarely. 12. The load should be against the backrest of the mast and not carried on the tip of the forks.  Procedure for placing loads on a stack The following guidelines apply:   1. Approach the stack with caution. 2. Stop just in front of the stack. 3. Raise the load to desire height. 4. Drive forward slowly. 5. Apply parking brake and put the forklift into neutral. 6. The forks should not touch anything else. 7. Ensure there is nothing behind the load that may obstruct the forks. 8. Tilt mast until vertical and place load. 9. Reverse out slowly. 10. Lower forks and tilt mast back. 11. Back wheels should be straight when you lift or lower the load.  Handling Rolling Stock Rolling stock can be pipes and other accessories.  The following guidelines apply:   1. Drill pipes are usually stacked in racks. 2. Align the forklift squarely to the load making sure that it is positioned in the centre of the pipes. 3. Apply parking brake and put the forklift in neutral. 4. Ensuring that the rear wheels are straight. 5. In the case of the articulated forklift the machine should be in a straight line. 6. Gently ease the tip of forks under the pipes. 7. Gently tilt the forks back so that the pipes roll gently back to the backrest. 8. With the support of the rack lift the forks and ensure that the pipes are balanced. 9. If the pipes are not balanced lower the pipes back onto the rack and reposition the forklift. 10. Repeat the procedure. 11. If balanced reverse slowly away from the rack and lower to travelling mode.  OFF LOADING A TRUCK The following guidelines apply:   1. The trailer load shall be kept balanced as the load is removed. 2. Ensure that the trailer is prepared for unloading. 3. Ensure that the load is free to lift and is not tied down. 4. If the loads are on pallets make sure that the pallets are not going to break when being lifted. 5. The designated stacking area shall be clear and ready to receive the load. 6. Ensure the route of travel is clear from any obstacles. 7. Start unloading the trailer from one side. 8. The next load should be taken from the opposite side. 9. Repeat this procedure until the trailer is clear.  Training, competence and authorisation All personnel directly involved with lifting operations shall have received training in the practical application of this procedure.  The level of training and knowledge shall be proportionate with each individual’s participation and responsibilities within the lifting operations procedure.  Crane Operators must have a thorough understanding of all safety rules and regulations for the specific type of crane they will be operating. Additionally, they are responsible for the following: -   1. Understanding hand signals for crane operations 2. Understanding how to operate Safe Load Indicator systems 3. Understanding, reading, and interpreting load charts 4. Understanding basic engineering principles such as levers, gears, shafts, and chain drivers 5. Having a complete knowledge of basic machine operation, including lever and pedal functions 6. Understanding rigging techniques 7. Being able to estimate load sizes and weights 8. Understanding the proper methods of maintenance, care, and inspection of cables and lines 9. Understanding the vocabulary used in crane operation 10. Having a thorough knowledge of the machine's maintenance and lubrication requirements 11. Understanding methods of equipment reporting  Compliance and auditing Rigging equipment must be inspected before each use and as necessary during its use to ensure that it is safe.  All rigging equipment, including but not limited to slings (wire and fibre), chain-falls, spreaders, and lifting beams, must be inspected at least monthly, or as established through local regulation, by a qualified person.  Defective rigging equipment must be removed from service immediately and be repaired or destroyed.     Monitoring Records should be maintained using the crane and rigging equipment inspection report form or its local equivalent. The inspection must be performed by a qualified and trained person, and the rigging equipment must be colour-coded for validity. Inspections Annual inspections of crane and rigging equipment must be made by a competent person who is familiar with the machine. The original copy of the inspection report must be kept in the equipment history file, with a current copy maintained in the crane or piece of equipment. Auditing Audits should be conducted annually. Safety and production operations shall periodically audit the lifting operations procedure to assess how it has been used over a period (once a year) and to ensure it is being operated as intended. Record 12.1 BSA-ECDC-HS-CL-S005-01-Lifting plan form v1.0  12.2 BSA-ECDC-HS-CL-S005-02-Lifting Gear Register v1.0  12.3 BSA-ECDC-HS-CL-S005-03-Lifting Equipment Abandon Register v1.0  12.4 BSA-ECDC-HS-CL-S005-04-Lifting Equipment Weekly Check v1.0  12.5 BSA-ECDC-HS-CL-S005-05-Crane Weekly Check v1.0  12.6 BSA-ECDC-HS-CL-S005-06-Lifting Plan template v1.0 |  |