LIFTING OPERATION MANAGEMENT SYSTEM

OPAL

الجمعية العمانية للخدمات النفطية
Oman Society for Petroleum Services

شركة تنمية نفط عمان
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Ministry Endorsement

Ministry of Oil and Gas	
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This document was prepared and agreed upon by the working committee represented with Subject Matter Experts from Operators under the steer from Oman Society of petroleum Services (OPAL).

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Operators CEO Commitment

By endorsing this Oil and Gas Lifting Operations Management System (OPAL-STD-HSE-07), each Operator will reasonably endeavor to comply with the standards set forth herein.

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2. GLOSSARY OF TERMS

Term	Definition
Lifting Operation Management system	A process in which management provides accurate and current information to the stakeholders about the efficiency and effectiveness of its policies and operations, and the status of its compliance with the statutory obligations, in terms of this standard a systematic review in order to gather evidence of compliance
Centre of gravity	Point at which the total mass of a body may be regarded as being concentrated, or about which the parts of the body exactly balance each other.
Equipment Certificate of test and or examination	A Test Certificate is issued by the third-party certification lifting engineer on completion of a satisfactory survey. A new Test Certificate is mandatory if the equipment is subject to repair or modification. Where a Test certificate states that it is also a report of thorough inspection/examination it must contain all the information as required by LOLER 98, Schedule 1.
Equipment Certificate of Conformity	Either a document issued by an authorized party or the manufacturer to confirm that the product has been designed, manufactured, inspected and tested in accordance with the criteria set out within the relevant specifications and/or standards for each product issues a document.
Colour code	A method of marking equipment (normally with paint or plastic cable ties) to give a visual indication of its certification/inspection status. This 'coded' colour is changed every six months.
Competent person	An individual, who, by way of education, training, experience and defined assessment, is knowledgeable of applicable standards, can identify workplace hazards relating to the specific operation, is designated by the employer, and has authority to take appropriate actions.
Factor of Safety	The ratio of the load that would cause failure of an item of lifting equipment to the load that is imposed upon it in service i.e. SWL (This is to allow for detrimental criteria such as wear and tear, dynamic loadings etc.).
Free Fall	A boom or hook-block descending under its own weight, or that of the load.
Lifting	Lifting is an operation concerned with the moving, lifting or lowering of a load
Lifting equipment (LOLER)	Lifting equipment is any work equipment for lifting and lowering loads, and includes any accessories used in doing so (such as attachments to support, fix or anchor the equipment).
Lifting equipment inspector	A person from an ISO/IEC 17020 type 'A' approved company who has the appropriate practical and theoretical knowledge and experience of the lifting accessories and equipment to be thoroughly inspected against the applicable lifting equipment standards in relation to the safety and continued use of the lifting accessories and equipment.
Load	An item being lifted or lowered which could include material, people, or combination of these.
Mobile Lifting Equipment	Lifting equipment that can be transported from one installation to another (e.g. mobile cranes, forklift trucks etc.). This equipment is likely to be owned and used by the Contractor.
Mode Factor	A factor, which considers, the geometry of the sling assembly, the number of parts and other constants as specified in the appropriate British Standard.

Overload Testing	Operation of the lifting equipment with a load exceeding the rated load but without operating the full range of motions of the equipment in order to determine whether the equipment is stable, structurally sound and fit for the use for which it was designed.
Overload Testing (Dynamic)	Operation of the lifting equipment with a load that exceeds the rated load applied in order to determine whether the equipment is stable, structurally sound and fit for the use for which it was designed.
Pre-use Inspection	A visual check and, if necessary, a function check of the Lifting Equipment by a competent person before each use. In determining the suitability and scope of the inspection, reference should be made to information such as manufacturer's instructions and relevant industry standards.
Rated Capacity Limiter	A device that automatically cuts, with a specified tolerance, motions that could increase risks, if the rated capacity is exceeded.
Rated Capacity Indicator	A device that automatically provides, with a specified tolerance, warning for the load is approaching rated capacity and another warning when capacity is exceeded.
Rigging Store or Rigging Loft	A cargo container, or similar, modified specifically to suit the storage of lifting equipment.
Risk	Combination of the probability of occurrence of harm and the severity of that harm
Safe Working Load (SWL)	Maximum safe force that a piece of lifting equipment, lifting device or accessory can exert to lift, suspend, or lower, a given mass without fear of breaking. Usually marked on the equipment by the manufacturer or as determined by a competent person. e.g. the SWL can be lower than, but can never exceed, the WLL. Normally SWL = WLL unless the Lifting Equipment has been de-rated.
Safe	Freedom from unacceptable risk
Shall	Indicates a requirement.
Should	Indicates a recommendation
Slewing	An angular movement of a crane boom or crane jib in a horizontal plane.
SME	Lifting Operation Subject Matter Expert
Structural Integrity	The reliability of the load bearing structure.
Operating Company	Oil and Gas Major companies
Test Certificate of Proof Load	A Test Certificate of Proof Load is the certificate of a proof load test, which would normally be carried out at the completion of manufacture and be supplied with the equipment. A new Test Certificate of proof load will require to be issued if the equipment is subject to repair or modification of any load bearing structure, or if the independent lifting engineer deems it is necessary to ensure continuing integrity.

Thorough Inspection or Examination	A visual inspection by a lifting equipment inspector carried out carefully and critically and supplemented by other means, such as measurement and where necessary non-destructive testing, in order to arrive at a reliable conclusion as to the condition and safety of the equipment. If necessary, for the inspection, part of the equipment shall be dismantled.
Working Load Limit (WLL)	It is the maximum working load designed by the manufacturer. This load represents a force that is much less, than that required making, the lifting equipment fail or yield, also known as the Minimum Breaking Load (MBL).

3. ABBREVIATIONS

BP:	BP Exploration (Epsilon) Ltd Oman
IEC:	International Electrotechnical Commission
ISO:	International Organization for Standardisation
LEEA:	Lifting Equipment Engineers Association
LOLER:	Lifting Operations Lifting Equipment Regulations
NOS:	National Occupational Standard
OEM:	Original Equipment Manufacturer
OPAL:	Oman Society for Petroleum Services
OXY:	Occidental of Oman Int
PDO:	Petroleum Developments Oman
PTW:	Permit to Work
QHSE:	Quality Health Security Environment
SIMOPS:	Simultaneous Operations
SME:	Subject Matter Expert
SPMT:	Self Propelled Modular Transporter
SWL:	Safe Working Load
WLL:	Working Load Limit

4. PURPOSE

The OPAL lifting operation Management system was developed with the help of the concerned industry, represented by SME's and all stages of the development processes were in cooperation with OPAL.

The purpose of this standard is to define the minimum requirements for a robust lifting management system to be adhered and implemented by any party involved with the management or execution of lifting operations in the Omani Oil & Gas industry.

Additionally, the standards define the minimum sub-systems that are to be considered acceptable for the effective management of lifting operations and lifting equipment.

5. SCOPE

This Lifting Operation Management System shall apply to all work activities involving lifting equipment.

6. APPLICABILITY

This Lifting Operation Management System applicable to the Oman Oil & Gas industry for lifting operations and lifting equipment with the primary purpose to move loads.

In the event of a conflict between this standard and applicable legal and or regulatory requirement, the applicable legal and regulatory requirements are to be followed.

The following items are specifically excluded from the applicability of this Lifting Operation Management System:

- Marine towing operations
- Mooring lines of floating units such as barges, boats, ships, and dedicated associated items used on mooring devices or buoys
- Guy and stay wires and other items subject to static loading conditions only
- Personnel lifts, elevators or drilling articulated elevated platforms
- Personnel or goods elevators 'for moving personnel between floors of a building as an alternative to stairs'
- Normal freight transportation 'transportation by truck or goods vehicles.
- Air transportation 'transportation of goods and personnel by aircraft or helicopter.
- Manual handling operations 'movement of loads by people
- Safety harness, fall arrestors, escape and rescue from height devices
- Rope access techniques 'gaining access or working from suspended ropes.

This Lifting Operation Management System prohibits a person from riding or travelling on the load, lifting hook, sling, platform, or another lifting medium.

Where mobile lifting equipment is used for lifting, but lifting is not the primary equipment purpose such as excavators or JCB backhoe, they can only be used with a risk assessment approved by the Operating company Lifting Operation SME.

7. ROLES AND RESPONSIBILITIES

7.1 Operating companies:

Promoting the implementation of the standard in their industry.

7.2 Contracting Company:

Verifying lifting operations are being effectively managed according to this standard, any deviation from this standard subjected to the Lifting SME from the respective Operator approval.

7.3 The Oman Society for Petroleum Services (OPAL):

Managing communication between the different stakeholders as well as facilitating revisions, amendments and improvement of the standard.

8. COMPLIANCE REQUIREMENTS

8.1 Competency of lifting personal

The minimum requirement competency of all lifting related roles shall be according to the Lifting Operations National Occupational Standards (NOS).

This includes the following;

- Appropriate training
- Experience level
- Skill level
- Knowledge
- Assessment criteria and methodology
- Task performance
- Working environment
- Role and responsibilities

All lifting operators should be holding a valid OPAL lifting operator competency card.

NOTE: Additional guidance on role designations can be found in Annex 1

8.2 Risk Assessment

Contracting companies must ensure that there is a system in place a safe system of work that effectively manages risk concerning hazard identification, risk assessment, and risk control that applies a cyclic learning system of risk management shall be incorporated, to include:

- Lift planning
- Site survey
- Risk assessment
- Prepare
- Authorise
- Execute
- Monitor
- Complete
- Learn and record

NOTE: A list of prompts to aide in risk assessments can be found in Annex 2

8.3 Categorisation of lifting operations

Contracting companies must ensure that there is a system in place to ensure lifting operations are effectively categorised shall be incorporated, to include:

- Categorising operations specific to the lifting environment
- Categorisation reflecting the complexity of the operation
- Defining lifting operations as either repetitive tasks or non-repetitive tasks
- Segregation of non-repetitive tasks into a hierarchal level, based on risk, equipment, environment, or complexity, for example, some Operators may use definitions such as:
    - Simple, Complicated, Complex/critical
    - Simple, Complicated, Engineered
    - Category 1, Category 2, Category 3
    - Routine, Non-Routine simple and Non-routine Complex

NOTE: Considerations for categorising lifts can be found in Annex 3

8.4 Lift planning

Contracting companies must ensure that there is a system in place to document effective lift planning shall be incorporated, to include:

- Documented lift plans for all lifting operations
- Matrix or process to confirm that lift plans are being developed and approved by a Competent Person
- Lift Plans being written in a language which is understood by the workgroup or where necessary, in dual languages

- Defining safe operating limits
- Working in line with OEM instructions
- Using appropriate contingency factors
- An effective measure to ensure the stability of loads, equipment and plant is applied
- Access and egress routes for mobile lifting appliances and transportation equipment
- Exclusion zone[s]

NOTE: List of points to consider to lift plan inclusion can be found in Annex 4

8.5 Communications

Contracting companies must ensure that there is a system in place to ensure the effectiveness of communications shall be incorporated, to include:

- Methods of communications being agreed and established before lifting
- Suitable measures for non-repetitive tasks being implemented [for example blind lifts]
- A clear line of communication between the lift team and facility management
- A communication plan for unexpected events shall be agreed [for example a general alarm sounding during a lift or an incident within the lift area]
- Consider any language barriers and mitigations when establishing communications

8.6 Quality of lifting equipment

Contracting companies must ensure that there is a system in place to ensure the quality & suitability of lifting equipment shall be incorporated, to include:

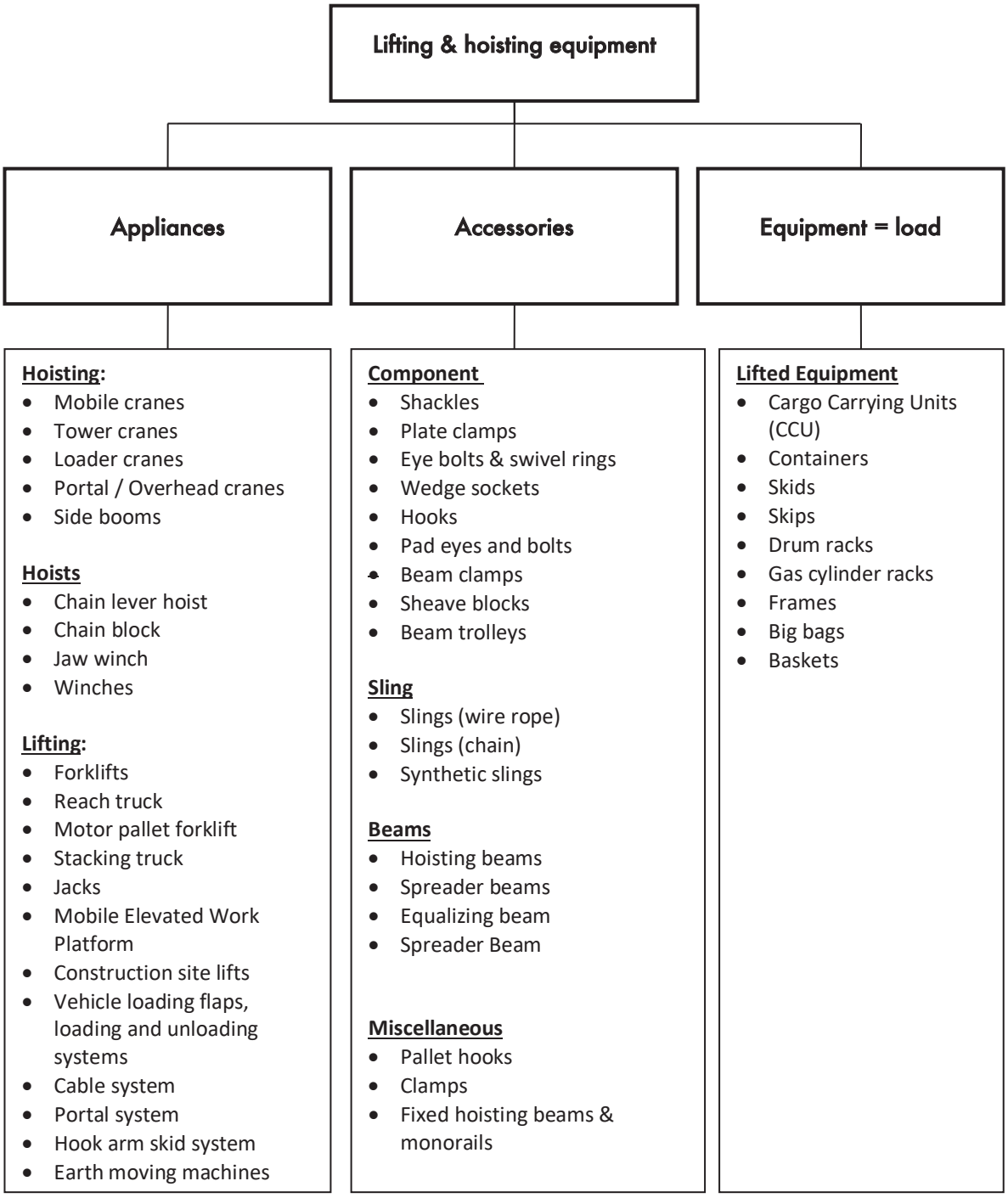
- Selection of vendors and suppliers
- Specification of equipment
- Procurement process
- Quality control & assurance processes

8.7 Selection of lifting equipment

Contracting companies must ensure that there is a system in place to ensure the selection of lifting equipment shall be incorporated, to include

- Safety factors
- Angles of use
- Applied loadings or tensions
- Capacity
- Connection points
- Fitness for task condition
- Competency of personnel
- Environment
- Stability
- Frequency
- Duration of operation

8.8 Lifting Equipment Classification



8.9 Marking of lifting equipment

Contracting companies must ensure that there is a system in place for the effective marking and identification of lifting equipment. OPAL recognised industry colour code scheme with associated guidance (Annex 5). Effective marking and identification of lifting equipment control system shall include and not limited to incorporate the following:

- Identification number of equipment
- Capacity, safe working load and/or working load limit of equipment
- Application of colour-coding to indicate the examination status of equipment
- Traceability of equipment to its certification [implementation of a colour-coding system]
- Date of next inspection

8.10 Control of lifting equipment

Contracting companies must ensure that there is a system in place to control the safe condition of portable lifting equipment shall be incorporated, to include:

- A dedicated storage area or facility of the suitable size for housing equipment [for example a rigging loft or store room]
- Facilities, tools or equipment necessary for maintaining lifting equipment [for example a bench, hand tools, consumable spares]
- Issue/return facility to clearly define the status of equipment [for example a register or T-card system]
- Facility to securely quarantine defective or unfit equipment
- Register of personnel that are competent to withdraw/receive lifting equipment

8.11 Stability

8.11.1 Stability of lifting equipment

Contracting companies must ensure that there is a system in place that effectively manages stability of lifting equipment shall be incorporated, to include:

- Applied bearing pressures
- Stability components or systems [for example crane outriggers, lorry loader stabilisers or SPMT's]
- Monitoring systems [for example crane outrigger position sensors, crane level indicators or SPMT levelling systems

8.11.2 Stability of ground

Contracting companies must ensure that there is a system in place that ensures ground stability and the site shall be incorporated, to include:

- Access roads shall be strong enough to withstand axle loads of mobile lifting equipment.
- Ground condition is suitable to support the crane under fully loaded conditions.

- There are no dangers to or from underground services
- Additional control measures when working near to exposed edges, for example, Geotechnical surveys and soil reports

8.12 The structural integrity of lifting equipment & load

Contracting companies must ensure that there is a system in place that ensures the structural integrity of the load and all lifting equipment shall be incorporated, to include:

- Pre-use checks of lifting equipment that includes lifting appliances and lifting accessories
- Pre-use checks of load for potential dropped items, verify structural integrity, and pad eyes (trunnion) design
- Periodic testing, inspection, and certification of all lifting equipment and load by an independent third-party lifting inspection body
- Thorough examination or test & thorough test by a competent person being carried out to lifting equipment that has undergone major repairs or changes to the load-carrying components
- Risk assessments being carried out before any test/inspection
- The asset holder/custodian retaining and holding copies of any required documents i.e. previous inspection certificates, manuals and maintenance records including an arrangement of test loads, etc.
- Thorough examinations and testing of equipment at defined periods as follows:
    - Lifting Appliances being thoroughly examined at intervals of no more than 12 months
    - Lifting Accessories being thoroughly examined at intervals of no more than 6 months
    - Any Lifting Equipment used for lifting personnel being thoroughly examined at intervals of no more than 6 months
- Written scheme of examination where equipment is not used and examined at regular intervals
- Suitable Factors of Safety
- Load path suitability to sustain the load
- Hold points as the load is applied
- A thorough examination, MPI/NDT inspection, load testing, and further thorough examination of structural lifting equipment components i.e.: Runway Beams, Pad eyes, and Pulling Posts, etc.

NOTE: Additional guidance for thorough examinations can be in Annex 6.

8.13 Accreditation for inspection bodies

All third-party lifting inspection bodies shall comply with the following requirements:

- Hold valid certification to ISO/IEC 17020 type ‘A’ inspection body
- Have sufficient lifting equipment inspectors holding relevant individual LEEA competencies or equivalent

- Where LEEA accreditation or equivalent is not available, the relevant Operator Lifting SME is to review and approve the inspector.

8.14 Safe operating limits

Contracting companies must ensure that there is a system in place that ensures equipment and operations are only carried out within defined operating limits shall be implemented, to include:

- Maximum wind speeds
- Equipment safe operating limits
- Visibility
- Day/night time operations

8.15 The potential loss of power

Contracting companies must ensure that there is a system in place that effectively manages potential loss of power or automation shall be incorporated, to include:

- Mechanical protection systems [for example gauges and indicators]
- Automated lifting control systems [for example rated capacity indicators and overload protection systems]
- Operator error [for example fail-safe systems or devices]

8.16 Potential load obstruction

Contracting companies must ensure that there is a system in place that ensures the load is not obstructed before lifting, throughout the load path or after disconnection shall be incorporated, to include:

- Lift route checkpoints
- Confirmation of clear lifting route

8.17 Potential Loss of Primary Containment

Contracting companies must ensure that there is a system in place that effectively manages potential loss of primary containment shall be incorporated, to include:

- Pre-lift depressurisation
- Minimise the time & height the load is near to or above process safety equipment

8.18 Potential damage

Contracting companies must ensure that there is a system in place that effectively manages potential impact to load, transport, or facilities by utilisation of guides, bumpers, or similar protection measures shall be incorporated.

8.19 Effects of wind

Contracting companies must ensure that there is a system in place that effectively manages wind effective on suspended loads and lifting equipment, to include:

- OEM maximum allowable operating wind speed shall never be exceeded
- The PIC shall define the safe operating limits based on the site, equipment, load and weather conditions
- The PIC shall document the location & method of measuring wind speed that is accurate and appropriate for the lifting operation
- The PIC shall define Factors of Safety for loads with a large sail area

NOTE: The wind speed will likely be higher above the point at which it is measured, and allowances should be made to reflect that.

8.20 Uncertified suspension or anchoring points

Contracting companies must ensure that there is a system in place to ensure the effective management of lifting operations that include the use of scaffolding, uncertified suspension points or anchoring points shall be incorporated, to include:

- The higher level of risk assessment than developed for normal/routine operations
- Defining a Competent Authority for approval purposes
- If required, a method to permit repeated use under controlled conditions is developed
- Engineered scaffold designs for higher risk operations [for example dynamic lifts, cross-hauling, increased load weight, business-critical operation, areas of vibration]
- Engineering support, input or assessment when uncertified structural steel members are considered for use during lifting operations

8.21 Lifting of personnel

Using lifting appliances that have not been specifically designed for lifting people, such as mobile cranes, shall only occur in exceptional circumstances, followed by e.g. for rescue purposes or if there is no other alternative to access.

Contracting companies must ensure that there is a system in place to ensure the effective management of lifting personnel shall be incorporated, to include:

- Completing a higher level of risk assessment than developed for normal/routine operations
- Operations to be approved in the highest level of lift categorization [for example Complex, Engineered or Category 3 as noted in Annex 3]
- Specific emergency response/rescue plan to be developed
- A specific exclusion zone around the worksite to being implemented
- Lifting equipment that is certified and suitably marked to lift personnel
- Suitable safety factors and margins of safety above required lifting equipment capacities
- Before commencing with the lifting of personnel, a detailed trial lift using all equipment and control measures shall be conducted and approved/accepted as safe to proceed

NOTE: Considerations for a lifting of personnel can be found in Annex 7

8.22 Lifting over or near to live plant

A Contracting companies must ensure that there is a system in place to ensure the effective management of lifting over or near to live plant shall be incorporated, to include:

- A higher level of risk assessment than developed for normal/routine operations
- Specific emergency response plan to be developed
- Specific exclusion zone around the lifting equipment and/or worksite to be implemented
- Defining factors of safety and/or redundancy [for example 100% redundancy]
- Consideration to be made for lifting equipment potential collapse radius

8.23 Hands-safe lifting

Contracting companies must ensure that there is a system in place to ensure the loads are moved in a hands-safe method shall be incorporated, to include:

- When loads can be touched
- When loads cannot be touched
- Hands-safe requirements being defined on the lift plan
- Application and assessment of tools that reduce or remove the need for touching loads [for example push/pull poles, tag lines, boat hooks]
- Safety when using tag lines

8.24 Line of fire

Contracting companies must ensure that there is a system in place to ensure personnel is not trapped between objects or come into the 'line of fire' shall be incorporated, to include:

- Escape routes
- Barriers around the work site
- Defining 'no go' zones and or safe routes around the work site
- Ensuring loads are never suspended or moved over personnel

8.25 Temporary supporting of loads

Contracting companies must ensure that there is a system in place to ensure loads cannot move unnecessarily, are not left unsecured, suspended or rested against a moveable object shall be incorporated, to include:

- Temporary support plan
- Minimising time loads are supported or secured
- Defining factors of safety and/or redundancy for example 100% redundancy
- Defining the attachment points
- Defining the support equipment being used
- Risk control measures for example exclusion zones, notifications

8.26 Movement & security of cargo during lifting operation

Contracting companies must ensure that there is a system in place to ensure the safe movement & security of cargo during transportation shall be incorporated, to include:

- Managing cargo based on its type or contents designation for example dangerous goods
- Security of cargo [for example positioning of loads, method of securing, safety factors, load weights]
- Potential for movement/dropping of loads for example modular trailer operations
- Verification checks before loading/unloading
- Method of slinging & lifting loads
- Methods & types of cargo carrying units for example cargo carrying units, portable offshore units, pallets, baskets

8.27 Evacuation and emergency response

Contracting companies must ensure that there is a system in place that effectively manages evacuation and emergency response shall be incorporated, to include:

- Efficient evacuation of personnel
- Emergency response planning
- Limiting exposure to essential personnel only
- Access & egress routes

8.28 Documentation

Contracting companies must ensure that there is system in place to effectively manage documentation shall be incorporated, to include:

- Copy of this OPAL lifting standard being available
- Copy or access to applicable Operator lifting procedure, when working directly for an approved OPAL Operator for example PDO, OXY, Oman Oil or BP
- Relevant and up to date equipment registers
- Equipment Certificates of Conformities
- Certificates/Reports of thorough test and or examination
- Operating manuals and manufacturer instructions
- Equipment capacity charts or manuals
- Competency records and training matrix of all rigging and lifting personnel of personnel
- Register of lift plans

8.29 Learn and improve

Contracting companies must ensure that there is a system in place to learn and to improve shall be incorporated, to include:

- After completing the lifting and hoisting operation, everyone involved in the operation should have the opportunity to discuss and make improvements to the lift plan.

- Any learning points noted on the lift plan should be reviewed by the Person in Charge and, where appropriate, action taken
- The Person in Charge should ensure that the significant learning's and improvements identified from the lifting and hoisting operations are recorded and communicated to all relevant parties

8.30 Compliance Verification

Contracting companies must ensure that there a system of a self-assessment to verify lifting operations are being effectively managed according to this lifting standard.

NOTE: Self-Assessment checklist can be found in Annex 8.

9. ANNEX 1 - ROLE DESIGNATIONS

Where roles or job titles differ between companies, the competent person has the accountability to ensure responsibilities are defined and aligned to the OPAL NOS and or similar job title as recommended in the following table:

Generic Job Title	POTENTIAL Aligned Job Title		
Lifting Technical Authority	Lifting SME	Lifting Authority	Lifting Engineer
Lifting Specialist	Lifting Superintendent	LOLER Focal Point	
Site Lifting Competent Person	Deck Foreman	Deck Pusher	Lifting Competent Person
Lifting Supervisor	Crane supervisor	Site supervisor	Person in Charge
Banksman	Signaller	Roustabout/Roughneck	Person in Charge
Slinger Load Handler	Slinger	Roustabout/Roughneck	Rigger
Powered Lift Appliance Operator	Equipment operator	Appliance operator	Crane operator
Rigger	Lifting Competent Person	Roustabout/Roughneck	
Rigging Loft Controller	Lifting Competent Person	Storeman	Rigger

10. ANNEX 2 - RISK ASSESSMENT PROMPTS

Element	Potential Hazard
People	Personnel under a suspended load Incorrect training and low competence Personnel fitness Insufficient number of personnel Unsafe positioning Non-compliance with the Lift Plan, Control of Work and company practices Reduced concentration levels
Organisation	Low competence in planning and performing the lift Lack of organisational capability to manage the lift Inadequate interfaces and co-ordination Insufficient lift management Incorrect instructions
Control	Insufficient supervision Lack of clarity as to who is in charge Ineffective communication: visual, verbal, radio back-up systems The risk of not having a common language Incorrect approval, endorsement, and authorisation Ineffective/incorrect or break down in communications Tag Line (incorrect use)
Planning	Insufficient planning, hazard identification, and risk assessment Incorrect data used for plans Confused instructions, wrong revision of plan or incomplete plan Non-returnable lifts
Load	Unexpected load movement at the initial lift Unexpectedly heavier or lighter

	Instability Lifting point failure Structural integrity failure Excessive load movement during travel and landing Sharp edges Dropped/deflected objects The motion caused by wind due to the sail area Means of attaching/detaching rigging Nature of load (Hazardous/dangerous substances/personnel)
Equipment	Insufficient maintenance Incorrect installation/connection Overload and failure Impacting with other equipment Uncertified equipment Inadequate or inoperative safety devices Overturning Proximity Hazards Clashes (with other equipment or structures)
Energy Source	Motion Chemical Radiation Electrical Gravity Heat/Cold Biological Pressure
Changes in Load	Unexpected increase or reduction in the load (e.g. flooding, mud suction, load transfer, splash zone) Dynamic loading Snagging/impingement Changes to the centre of gravity/centre of buoyancy Cargo shift in a container/liquid movement/free surface of a liquid Inertia effects in long loads
Working Environment	Poor visibility Plan susceptible to the environment (high wind speed, high sea state, vessel movement, currents, tides, extreme heat or cold) Site conditions Adjacent structures Overhead cables Ground collapse Underground services Equipment stability Live plant/process safety Proximity Hazards, public roads, walkways. Blind Lifts Weather windows, such as wave height and vessel motion Time restrictions, tide Deterioration in the condition of Lifting Accessories Working at height Congested area/confined space

11. ANNEX 3 - CATEGORISATION OF LIFTING

Example comparison matrix for categorisation of lifting operations:

DEFINITION	RISK LEVEL	EXAMPLE CATEGORISATION 1	EXAMPLE CATEGORISATION 2	EXAMPLE CATEGORISATION 3
Repetitive	Low	Routine	Routine	Category 1
Non-repetitive	Low	Simple	Simple	Category 1
	Medium	Complicated	Critical	Category 2
	High	Complex/Critical	Engineered	Category 3

Example considerations for risk-based categorisation of lifting operations:

- Use of crane or lifting equipment that needs to be built on-site
- Type of lifting equipment [for example a mobile or crawler crane, lorry loader, helicopter, jacks]
- Utilisation of lifting equipment
- Use of uncertified equipment
- Lifting of personnel
- Operations that need technical input, specific engineering design or input from an engineer that is not part of the lifting team
- Proximity hazards [for example roads, bridges, overhead power lines, flare towers, masts]
- Proximity to live plat
- Multiple lifting appliances
- Configuration and methods of using lifting equipment [for example cross-hauling, sling angles, tensions, rigging configuration, cranes that require additional counterweights or boom attachments]
- Cost and/or replacement value of the load
- Consequence of failure
- The complexity of load or operation [for example demolition, construction, dangerous goods, rotating loads]
- Lifting environment [for example blind lift, confined area, nearby trench or excavations]
- Centre of gravity position of the load [for example high CoG, moveable CoG, off-centre CoG]
- Ground or deck bearing capacity
- Use of temporary equipment
- Use of portable lifting equipment with attachments [for example forklift trucks with load lifting attachment]
- Weather conditions
- SIMOPS
- Dynamic loadings [for example when load weights can increase through unwanted movement]
- Load position [for example load at height, load below ground, load on water]
- Drop cone effect [for example where a load can fall or be forced away from the vertical position]

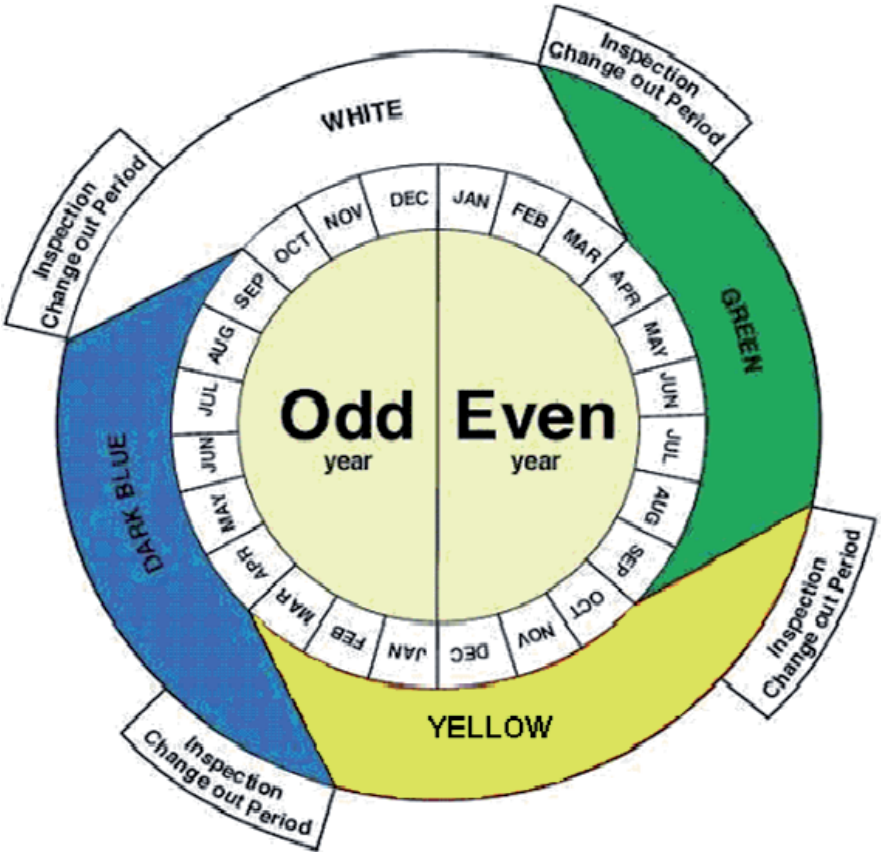
12. ANNEX 4 - LIFT PLANNING

Lift Plans are to include the following items upon lifting operation complexity as:

- Lift Plan title
- The location where the task will be performed
- Lift Plan number, date and revision number
- Description of the Lifting Operation
- Method of Hands-Free Lifting to be used (e.g. Tag Line, push-pull poles)
- Method of communication
- Lift categorisation
- Signatures and names of persons providing approval, authorisation, and endorsement
- Load details including descriptions, dimensions, and weight
- If the Centre of Gravity of the load is central or offset
- Details of the Lifting Appliance(s) to be used and its safe operating limits
- Configuration of equipment [how it will be connected or used]
- SWL at the radius used
- Total load to be lifted and the percentage of equipment utilisation
- Potential destabilisation factors, such as ground or deck strength
- The pressure imposed by the equipment or load
- Load spreading required
- Applied ground or deck bearing pressure afterload spreading
- The capacity of the ground or deck at the task location
- Number of personnel required for the task and their roles
- Table of Lifting Accessories used, including:
    - description of accessory
    - quantity required
    - SWL/WLL
    - weight of each item
    - total weight
- The interface between rigging and load (connection points)
- Method statement
- Sketches and drawings and or photographs:
    - plan view
    - side elevation
- Rigging arrangement (lifting accessories)
- Equipment rigging calculations
- Critical dimensions, angles, and clearances
- References to associated documentation (for example, engineering drawings or calculations, risk assessment, contingency plan, rescue plan, Permit to Work (PTW)).
- Post lift lessons learned
- Destabilisation factors such as excavations or underground services could affect the stability of the equipment
- Lift Plans shall not make use of:
    - process pipework as a suspension point to bear any load
    - flat or belt webbing sling for dynamic lifts
    - choking of the slings
    - flat-braided slings.
- Utilisation capacity of the crane
- Task risk assessment/job hazard analysis

13. ANNEX 5 - MARKING OF LIFTING EQUIPMENT

- The colour code scheme applies to lifting accessories; however, some Operator's may apply colour-coding to all lifting equipment [accessories and appliances] It indicates to the user that a thorough examination has been carried out and current certification is valid
- Upon satisfactory results of the thorough examination, the Colour Code shall be marked on every piece of lifting accessories
- A new colour shall be introduced every six months. The two months' overlap is to ensure lifting accessories are always available for use. There are four colours in the sequence, and the cycle is repeated every 2 years
- If the colour is out of date, equipment shall not be used. It shall be returned to the rigging store and quarantined. Such equipment shall not be re-issued or used until after a satisfactory thorough examination by a lifting equipment Inspector. Some Operators may apply red colour code to quarantined equipment; this is to easily identify equipment that is fixed or placed into a quarantine area
- The validity of lifting accessories inspection is 6 months or end date of the colour code whichever comes first
- All main work sites are to have a visible means of confirming the colour code, normally this is by placing an identity board[s] with the current colour codes being displayed at prominent position [or positions] at the site
- Webbing slings are not to be colour-coded with enamel or spray paint directly, self-coloured tags or plastic cable ties are to be used



14. ANNEX 6 STRUCTURAL INTEGRITY REQUIREMENTS

A “thorough examination” is a visual inspection carried out by a competent person. The competent person should also decide if any tests are to be carried out, enabling them to verify any findings.

Lifting equipment may also be examined under a Written Scheme of Examination:

- A written scheme of examination may be drawn up by the user or owner provided they have the necessary competence
- The scheme should specify the intervals at which the lifting equipment should be thoroughly examined
- Any examination scheme for lifting equipment should consider the lifting equipment’s condition, the environment in which it is used, the number of operations and the nature of load the equipment will be subject to
- If a written scheme of examination is to be used, it is essential that the user or owner produce the examination scheme if requested

15. ANNEX 7 - CONSIDERATIONS FOR A LIFTING OF PERSONNEL

When confirming the need to lift personnel, you are to consider:

- There is no other safe alternative to lifting personnel?
- Have the reasons for personnel lifting and job objectives been adequately explained?
- Has the risk assessment and the specific plan/procedure for personnel lifting been reviewed?
- Are the current environmental conditions suitable for performing the activities?
- Have all involved personnel attended a Toolbox Talk?
- Has a competent person created/reviewed the rescue plan and examined the associated equipment?
- Is the relevant Permit to Work in place?
- Have all control measures been implemented?
- Have all other planned activities that may interfere with personnel lifting been stopped?
- Have 'DO NOT USE' warning signs been placed on any other machinery which may interfere with/compromise the safety of the operation (machinery isolated if possible)?
- If 'over the side' working is possible, has a standby boat been notified?
- Have the radios been checked and tested, using a dedicated channel?
- Is the rider wearing a helmet chinstrap?
- Is the crane marked 'Suitable for Personnel Lifting' and is the crane certification in date?
- Is the crane operator aware that they are not to leave the crane while the person is being lifted?
- Are the loose items tied off to the harness/rider securely?
- Are the landing areas clear of obstructions and marked?
- Is the carrier marked with SWL/number of people 'Suitable for Personnel Lifting'?
- Is the carrier floor non-slip?
- Has the carrier been designed, fabricated and tested under the relevant standard
- When transfers over water, is the carrier fitted with floatation?

When using a crane to lift personnel, you are to consider:

- Has it been established that no other viable option of carrying out the work is available?
- Are all the necessary certificates for the crane, crane wire ropes, slings, and another associated equipment current?
- Has the crane and associated equipment been thoroughly inspected by a competent person?
- Is the crane in good condition, regularly inspected, maintained, and are records kept substantiating this?
- Are all the safety features and systems working properly (e.g. rated capacity indicators, over hoist limiters)?
- In the event of a complete power failure, does the crane maintain the load in a safe condition (e.g. do the brakes fail to the applied position?)
- Are the brakes applied progressively (e.g. to avoid shock or snatch loading)?
- In the event of a complete power failure, can the load be lowered manually to a position where the person can be recovered safely or is self-rescue equipment available?
- In the event of a primary brake or transmission system failure, is the load be prevented from free-falling (e.g. is there a secondary braking system or does the transmission system have hydraulic retardation to prevent this?)
- Is the crane fitted with an emergency stop, which is located for immediate operation by the crane operator (except North American Regions)?
- Is the crane designed so that inadvertent free fall is prevented when the drive train is in motion or the hook is loaded?
- Is the crane certified for personnel lifting and marked as 'Suitable for Personnel Lifting'?

When using a winch to lift personnel, you are to consider:

- Have the reasons for personnel lifting and job objectives been adequately explained?
- Have the risk assessment and the specific plan/procedure for man-riding been reviewed?
- Are the current environmental conditions suitable for performing man-riding activities?
- Have all involved personnel attended a Toolbox Talk?
- Has a competent person created/reviewed the rescue plan and examined the associated equipment?
- Is the relevant Permit to Work in place?
- Have all control measures been implemented?
- Have all other planned activities that may interfere with man-riding been stopped?
- Have 'DO NOT USE' warning signs been placed on any other machinery which may interfere with/compromise the safety of the operation (machinery isolated if possible)?
- If 'over the side' working is possible, has a standby boat been notified?
- Have the hand signals for RAISE, STOP, and LOWER been agreed by all involved?
- Has the winch operator agreed on the principle of 'NO SIGNAL = NO MOVEMENT'?
- If using radios, have the RAISE, STOP, and LOWER commands been agreed with by all involved?
- Have the radios been checked and tested, using a dedicated channel?
- Are the harness, karabiner/shackle, and winch rope certification in date, clean and all in good condition?
- Has the harness been adjusted properly, and is the rider wearing a helmet chinstrap?
- Is the winch line connected directly to the harness (i.e. no swivels or hooks)?
- Is the winch marked 'MAN-RIDING WINCH' and is the winch certification in date?
- Is the winch wire in good condition, and spooled correctly (min 5 turns on the drum)?
- Where possible, have obstructions to vertical travel been removed or tied back?
- Are the manual/automatic brakes operating correctly?
- Is the control lever marked, and does it return to neutral on release?
- Has the emergency stop facility been tested?
- Has the load limiter been tested?
- If a fall arrestor (inertia reel) is to be used, has it been tested before use, and does it have a separate means of connection to the harness (note: safety hooks are not permitted)?
- Is the winch operator aware that they are not to leave the winch while the person is man-riding?
- Are the hand tools of sufficient size for easy handling?
- Are the hand tools tied off to the harness/rider securely?
- Have the rider's pockets been emptied of loose articles (especially money and other small metal objects)?

16. ANNEX 8 SELF-ASSESSMENT CHECKLIST

COMPANY NAME:		**DATE OF REPORT:**	
COMPANY ADDRESS:		**COMPANY LIFTING PROCEDURE TITLE:**	
		LIFTING PROCEDURE NUMBER:	
		REVISION NUMBER:	
		ISSUE DATE:	
NAME OF CONTACT PERSON:		**NAME OF REPORTING PERSON:**	
CONTACT PHONE NUMBER:		**JOB TITLE OF REPORTING PERSON**	

Ref,	OPAL System Heading	OPAL System Requirement	Company lifting conformance level				Company lifting procedure reference
			Full	Practical	None	N/A	
-	Applicability	Applicable to the Oman Oil & Gas industry for lifting operations and lifting equipment with the primary purpose to move loads: • Legal and regulatory requirements are to be followed • Specific exclusions from the applicability of the standard • Prohibiting personnel from riding or travelling on the load or any lifting medium • Prohibiting equipment which is not the equipment primary purpose unless with a risk assessment approved by the relevant Competent Person					
1	Roles and responsibilities	Roles & responsibilities shall be to the NOS for lifting operations. Alternatively, a Lifting SME from the respective Oil& Gas Operator may approve other role designations where it can be demonstrated they align to the NOS. All lifting operations shall be planned, executed, verified and adequately supervised by Competent People.					
2	Competency of personnel	Competency shall be according to the NOS for lifting operations as a minimum requirement: Alternatively, a Lifting SME from the respective Operator has the authority to approve other competency systems, where it can be demonstrated the system meets or exceeds the NOS with regards to: • Appropriate training • Experience • Skill • Knowledge • Assessment • Task performance • Working environment • Role • Accountability					

3	Risk assessment	A safe system of work that effectively manages risk with respect to hazard identification, risk assessment and risk control that applies a cyclic learning system of risk management shall be incorporated, to include: • Lift planning • Site survey • Risk assessment • Prepare • Authorise • Execute • Monitor • Complete • Learn and record					
4	Categorisation of lifting operations	A system to ensure lifting operations are effectively categorised shall be incorporated, to include: • Categorising operations specific to the lifting environment • Categorisation reflecting the complexity of the operation • Defining lifting operations as either repetitive tasks or non-repetitive tasks • Segregation of non-repetitive tasks into a hierarchal level, based on risk, equipment, environment or complexity					
5	Lift planning	A system to document effective lift planning shall be incorporated, to include: • Documented lift plans for all lifting operations • Matrix/process to confirm lift plans are developed & approved by a Competent Person • Lift Plans being written in a language understood by workgroup, potentially in dual languages • Defining safe operating limits • Working in line with OEM instructions • Using appropriate contingency factors • Effective measure to ensure the stability of loads, equipment and plant is applied • Access and egress routes for mobile lifting appliances and transportation equipment • Exclusion zone[s]					
6	Communications	A system to ensure the effectiveness of communications shall be incorporated, to include: • Methods of communications being agreed and established prior to lifting • Suitable measures for non-repetitive tasks being implemented • Clear line of communication between the lift team and facility management • Communication plan for unexpected events shall be agreed • Consider any language barriers and mitigations when establishing communications					
7	Quality of lifting equipment	A system to ensure the quality & suitability of lifting equipment shall be incorporated, to include: • Selection of vendors and suppliers • Specification of equipment • Procurement process					

		• Quality control & assurance processes					
8	Selection of lifting equipment	A system to ensure the selection of lifting equipment shall be incorporated, to include • Safety factors • Angles of use • Applied loadings or tensions • Capacity • Connection points • Fitness for task condition • Competency of personnel • Environment • Stability • Frequency • Duration of operation					
9	Marking of lifting equipment	A system to ensure the effective marking and identification of lifting equipment shall be incorporated, to include: • Identification number of equipment • Capacity, safe working load and/or working load limit of equipment • Application of colour coding to indicate the examination status of equipment • Traceability of equipment to its certification • Date of next inspection					
10	Control of lifting equipment	A system to control the safe condition of portable lifting equipment shall be incorporated, to include: • A dedicated storage area or facility of suitable size for housing equipment • Facilities, tools or equipment necessary for maintaining lifting equipment • Issue/return facility to clearly define the status of equipment • Facility to securely quarantine defective or unfit equipment • Register of personnel that are competent to withdraw/receive lifting equipment					
11.1	Stability of lifting equipment	A system that effectively manages stability of lifting equipment and controls ground or deck strength shall be incorporated, to include: • Ground conditions • Applied bearing pressures • Stability components or systems • Monitoring systems					
11.2	Stability of ground	A system that ensures ground stability and the site shall be incorporated, to include: • Access roads shall be strong enough to withstand axle loads of mobile lifting equipment • Ground condition is suitable to support the crane under fully loaded conditions • There are no dangers to or from underground services • Additional control measures when working near to exposed edges					

12	Structural integrity of lifting equipment & load	A system that ensures structural integrity of the load and all lifting equipment shall be incorporated, to include:
		• Pre-use checks of lifting equipment that includes lifting appliances and lifting accessories
		• Pre-use checks of load for potential dropped items, verify structural integrity, and pad eyes (trunnion) design
		• Periodic testing, inspection and certification of all lifting equipment and load by an independent third-party lifting inspection body
		• Thorough examination or test & thorough test by a competent person being carried out to lifting equipment that has undergone major repairs or changes to the load carrying components
		• Risk assessments being carried out prior to any test/inspection
		• The asset holder/custodian retaining and holding copies of any required documents
		• Thorough examinations and testing of equipment at defined periods:
		  ○ Lifting Appliances at intervals of no more than 12 months
		  ○ Lifting Accessories at intervals of no more than 6 months
		  ○ Any Lifting Equipment for lifting personnel at intervals of no more than 6 months
		• Written scheme of examination where equipment is not used at regular intervals
		• Suitable Factors of Safety
		• Load path suitability to sustain the load
		• Hold points as the load is applied
		• MPI/NDT inspection, load testing and further examination of structural components					

13	Accreditation for inspection bodies	All third-party lifting inspection bodies shall comply with the following requirements: • Hold valid certification to ISO/IEC 17020 type 'A' inspection body • Have sufficient lifting equipment inspectors holding relevant individual LEEA competencies or equivalent • Where LEEA accreditation or equivalent is not available, the relevant Operator Lifting SME is to review and approve the inspector					
14	Safe operating limits	A system that ensures equipment and operations are only carried out within defined operating limits shall be implemented, to include: • Maximum wind speeds • Equipment safe operating limits • Visibility • Day/night time operations					
15	Potential loss of power	A system that effectively manages potential loss of power or automation shall be incorporated, to include: • Mechanical protection systems • Automated lifting control systems • Operator error					

16	Potential load obstruction	A system that ensures the load is not obstructed prior to lifting, throughout the load path or after disconnection shall be incorporated, to include: • Lift route check points • Confirmation of clear lifting route					
17	Potential Loss of Primary Containment	A system that effectively manages potential loss of primary containment shall be incorporated, to include: • Pre-lift depressurisation • Minimise the time & height the load is near to or above process safety equipment					
18	Potential damage	A system that effectively manages potential impact to load, transport or facilities by utilisation of guides, bumpers or similar protection measures shall be incorporated					
19	Effects of wind	A system that ensures ground stability and the site shall be incorporated, to include: • OEM maximum allowable operating wind speed shall never be exceeded • PIC shall define the safe operating limits based on the site, equipment, load and weather conditions • PIC shall document the location & method of measuring wind speed that is accurate and appropriate for the lifting operation • PIC shall define Factors of Safety for loads with a large sail area • The wind speed will likely be higher above the point at which it is measured, and allowances should be made to reflect that					
20	Uncertified suspension or anchoring points	A system to ensure the effective management of lifting operations that include the use of scaffolding, uncertified suspension points or anchoring points shall be incorporated, to include: • Higher level of risk assessment than developed for normal/routine operations • Defining a Competent Authority for approval purposes • If required, a method to permit repeated use under controlled conditions is developed • Engineered scaffold designs for higher risk operations • Engineering support when uncertified structural steel members are being considered					
21	Lifting of personnel	Using lifting appliances which have not been specifically designed for lifting people, such as mobile cranes, shall only occur in exceptional circumstances A system to ensure the effective management of lifting personnel shall be incorporated, to include: • Completing a higher level of risk assessment than developed for normal/routine operations • Operations to be approved in the highest level of lift categorisation • Specific emergency response/rescue plan to be developed • Specific exclusion zone around the worksite to be implemented • Lifting equipment that is certified and suitably marked to lift personnel • Suitable safety factors and margins of safety above required lifting equipment capacities • Prior to commencing with lifting of personnel, a detailed trial lift using all equipment and control measures shall be conducted and approved/accepted as safe to proceed					

22	Lifting over or near to live plant	A system to ensure the effective management of lifting over or near to live plant shall be incorporated, to include: • Higher level of risk assessment than developed for normal/routine operations • Specific emergency response plan to be developed • Specific exclusion zone around the lifting equipment and/or worksite to be implemented • Defining factors of safety and/or redundancy • Consideration to be made for lifting equipment potential collapse radius					
23	Hands-safe lifting	A system to ensure the loads are moved in a hands-safe method shall be incorporated, to include: • When loads can be touched • When loads cannot be touched • Hands-safe requirements being defined on the lift plan • Application and assessment of tools that reduce or remove the need for touching loads • Safety when using tag lines					
24	Line of fire	A system to ensure personnel are not trapped between objects or come into the 'line of fire' shall be incorporated, to include: • Escape routes • Barriers around the work site • Defining 'no go' zones and or safe routes around the work site • Ensuring loads are never suspended or moved over personnel					
25	Temporary supporting of loads	A system to ensure loads cannot move unnecessarily, are not left unsecured, suspended or rested against a moveable object shall be incorporated, to include: • Temporary support plan • Minimising time loads are supported or secured • Defining factors of safety and/or redundancy • Defining the attachment points • Defining the support equipment being used • Risk control measures					
26	Movement & security of cargo during lifting operation	A system to ensure the safe movement & security of cargo during transportation shall be incorporated, to include: • Managing cargo based on its type or contents designation • Security of cargo • Potential for movement/dropping of loads • Verification checks prior to loading/unloading • Method of slinging & lifting loads • Methods & types of cargo carrying units					
27	Evacuation and emergency response	A system that effectively manages evacuation and emergency response shall be incorporated, to include: • Efficient evacuation of personnel					

		• Emergency response planning • Limiting exposure to essential personnel only • Access & egress routes						
28	Documentation	A system to effectively manage documentation shall be incorporated, to include: • Copy of this OPAL lifting standard being available • Copy or access to any applicable OPAL recognised Operator lifting procedure • Relevant and up to date equipment registers • Equipment Certificates of Conformities • Certificates/Reports of thorough test and or examination • Operating manuals and manufacturer instructions • Equipment capacity charts or manuals • Competency records and training matrix of all rigging and lifting personnel of personnel • Register of lift plans						
29	Learn and improve	A system to learn and to improve shall be incorporated, to include: • After completing the lifting and hoisting operation, everyone involved in the operation should have the opportunity to discuss and make improvements to the lift plan. • Any learning points noted on the lift plan should be reviewed by the Person in Charge and, where appropriate, action taken • The Person in Charge should ensure that the significant learning's and improvements identified from the lifting and hoisting operations are recorded and communicated to all relevant parties						
30	Verification	A system to verify lifting operations are being effectively managed according to this lifting standard shall be incorporated i.e. self-audit checklist						

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