International Association of Oil & Gas Producers

REPORT 376 | AUGUST 2022

Lifting and hoisting recommended practice

#Acknowledgements

This report was prepared by the Lifting and Hoisting Task Force, reporting to the IOGP Safety Committee.

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#About

This Report hopes to enable a significant reduction in lifting incidents among IOGP Member Companies and our contractors by highlighting the essential principles of safe lifting and encouraging their strict application to lifting and hoisting operations.

Secondly, this report aims to assist those responsible in planning, managing, and controlling lifting and hoisting operations by providing high level principles and operative questions to check safety and technical compliance at working sites.

!! Feedback

IOGP welcomes feedback on our reports: publications@iogp.org

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Revision history

VERSION	DATE	AMENDMENTS
2.0	August 2022	Major revision
1.0	April 2006	First release!!/

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#Introduction

In 2006, IOGP published a Recommended Practice for lifting and hoisting operations. Fatal and serious accidents continued to occur in lifting and hoisting operations, and it is clear that more effort is required to eliminate accidents from this activity. The first phase of this renewed effort was to revise the existing document to consider the required competence of people involved in all phases of lift planning and execution, new technologies, new processes, and feedback that IOGP had received from its Member Companies.

This recommended practice applies equally to onshore and offshore lifting and hoisting operations, including associated transport and handling. This Report's recommendations are relevant throughout the entire lifecycle of an oil and gas operation, and can be applied to all offshore and onshore mechanical lifting and hoisting activities in the exploration and production industry, with the exception of:

- Drilling crown block, travelling block, and top drive operations
- Goods and personnel elevators
- Ship anchor handling, marine towing, and routine ship operations not directly associated with Upstream activities (e.g., ship maintenance)
- Tree cutting and associated movement of lumber
- Mining and earth moving
- Helicopter lifting operations
- Fall protection and rope access equipment
- Manual handling
- Jacking
- Diving operations
- Vehicle maintenance lifts
- Piling machines

IOGP strongly recommends that all companies conducting lifting activities have a management system that includes specific procedures based on a full assessment of the risks and control measures required. Further guidance on the development and implementation of such systems can be found in IOGP Report 510 - *Operating Management System Framework*.

IOGP recommends that organizations performing marine lifting operations refer to the International Marine Contractors Association (IMCA) Guidelines for Lifting Operations as well. This IMCA guideline provides detailed technical and health and safety information on all matters pertaining to marine and subsea lifting and hoisting operations, much of which can equally be applied in other situations.

The IOGP Life-Saving Rules and the supporting Start-Work Checks are consistent with the recommendations in this report. For more on the Rules, see IOGP Report 459 – *Life-Saving Rules*.

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Safe Mechanical Lifting

Plan lifting operations and control the area

- I confirm that the equipment and load have been inspected and are fit for purpose
- I only operate equipment that I am qualified to use
- I establish and obey barriers and exclusion zones
- I never walk under a suspended load

Bypassing Safety Controls

Obtain authorisation before overriding or disabling safety controls

- I understand and use safety-critical equipment and procedures which apply to my task
- I obtain authorisation before:
  - disabling or overriding safety equipment
  - deviating from procedures
  - crossing a barrier

Confined Space

Obtain authorisation before entering a confined space

- I confirm energy sources are isolated
- I confirm the atmosphere has been tested and is monitored
- I check and use my breathing apparatus when required
- I confirm there is an attendant standing by
- I confirm a rescue plan is in place
- I obtain authorisation to enter

Driving

Follow safe driving rules

- I always wear a seatbelt
- I do not exceed the speed limit, and reduce my speed for road conditions
- I do not use phones or operate devices while driving
- I am fit, rested and fully alert while driving
- I follow journey management requirements

Energy Isolation

Verify isolation and zero energy before work begins

- I have identified all energy sources
- I confirm that hazardous energy sources have been isolated, locked, and tagged
- I have checked there is zero energy and tested for residual or stored energy

Hot Work

Control flammables and ignition sources

- I identify and control ignition sources
- Before starting any hot work:
  - I confirm flammable material has been removed or isolated
  - I obtain authorisation
- Before starting hot work in a hazardous area I confirm:
  - a gas test has been completed
  - gas will be monitored continually

Line of Fire

Keep yourself and others out of the line of fire

- I position myself to avoid:
  - moving objects
  - vehicles
  - pressure releases
  - dropped objects
- I establish and obey barriers and exclusion zones
- I take action to secure loose objects and report potential dropped objects

Work Authorisation

Work with a valid permit when required

- I have confirmed if a permit is required
- I am authorised to perform the work
- I understand the permit
- I have confirmed that hazards are controlled and it is safe to start
- I stop and reassess if conditions change

Working at Height

Protect yourself against a fall when working at height

- I inspect my fall protection equipment before use
- I secure tools and work materials to prevent dropped objects
- I tie off 100% to approved anchor points while outside a protected area

Figure 1: Safe Mechanical Lifting and the other Life-Saving Rules

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Start-Work Check

Mechanical Lifting

WHEN TO COMPLETE – Before the start of any **MECHANICAL LIFTING** activities

Confirm each control/ safeguard below before starting work		Guidance for confirming each control/safeguard	Person(s) Performing Work	Start-Work Verifier
I HAVE CONFIRMED:				
1	**The lift has been planned**	• The lift method, equipment, and number of people required has been assessed and determined • When required, an approved lift plan or procedure is in place and has been evaluated by a competent person • The lift has been assessed for: – load weight – load size – center of gravity (e.g., lifting points) • The lifting equipment's current capacity and condition has been assessed • Equipment operator and lifting crew have discussed the written lift plan prior to lifting		
2	**The hazards are identified and controlled**	• Complete a task risk assessment specific to the scope of work • Discuss hazards with the work team prior to the start of work • Identify overhead hazards and/or other obstructions (e.g., overhead power lines), making sure to check: – load path – swing radius – overhead hazards – pickup/lay-down zones • Check for simultaneous operations that may introduce any additional hazards • Discuss stop work considerations if work situation changes including change of weather **Note**: Consider how to apply "hands-free lifting" (e.g., use of push poles and/or taglines)		
3	**Workers involved with the lift are qualified to perform their task**	• Lifting equipment operator and lifting crew are qualified to perform their task **Note**: To be "qualified" may require certification and/or assessment to meet company or applicable legal requirements		
4	**The lifting equipment is stable and potential for unplanned movement has been assessed**	• Lifting appliance is level and/or placed on stable ground • Matting has been assessed for stability and is level for the lifting equipment • Outriggers are deployed • Loads have been assessed for stability, taking into account: – load securing – workplace conditions – travel path – equipment capacity • Equipment is operated per OEM requirements (e.g., weather, sea state and temperature)		
5	**The lifting and rigging equipment is:** **• certified** **• inspected** **• rated for the lift**	• Pre-use crane inspection has been completed • Safety and monitoring devices are in place and functioning • Manufacturer's load chart is available • The rigging equipment has been inspected prior to lift • The rigging equipment is rated for the lift **Note**: If load chart does not exist, assume equipment is not rated for the lift; **stop** work and identify alternative lifting equipment that is rated for the load		
6	**A communication plan and responsibilities are agreed to by the lift crew**	• Communication method(s) (e.g., hand signals, radio) have been agreed to and tested • Equipment operator and lifting crew have discussed the emergency response, including what emergency stop signals be used • The person in charge of the lift has been identified as per the lift plan or procedure • The members of the lift crew have agreed to their individual roles and responsibilities for the lift • The signaler for the lift has been identified (banksman/flagman/dogman/spotter)		
7	**The load has been inspected prior to lift**	• Every load has been inspected for integrity and stability (e.g., center of gravity) – The load and its packaging can withstand the forces/motion caused by the lift • Loose objects have been secured or removed prior to lift • Loose and small objects are well packaged or placed in lifting basket		
8	**Barriers and exclusion zones are in place**	• Exclusion zones have been identified and controls are in place to protect people from line of fire hazards, including: – working under suspended loads – moving objects – dropped objects • Access to exclusion zones is controlled (e.g., attendant or physical barriers) • Escape routes are unobstructed and known by the work crew		

Confirm these controls/safeguards are in place and verified prior to starting work.
Stop and seek help if anything changes.

	Printed Name & Role	Signature	Date
Start-Work Verifier			

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Start-Work Check

Mechanical Lifting

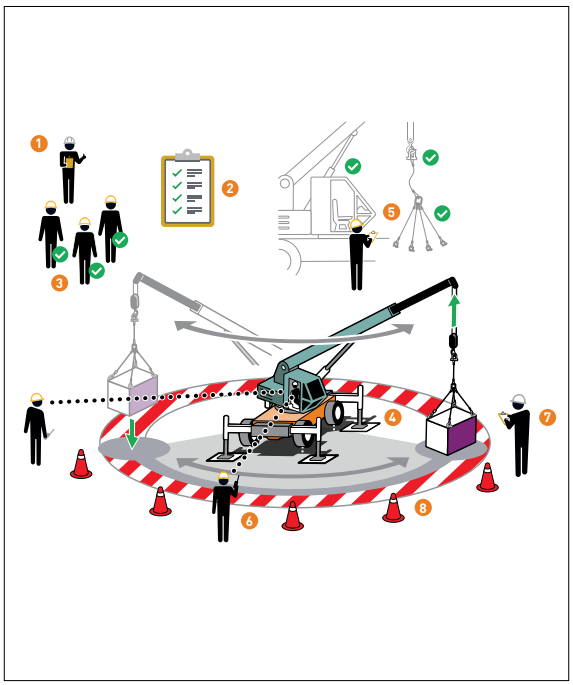

Figure 2: Mechanical Lifting Start-Work Check

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#1.Ten principles for lifting

Table 1: Ten principles for lifting

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Principle 1		All lifting operations are categorised by the Person in Charge to reflect the risk of the lift. This then defines the required controlling documents and the competence of the people involved.
Principle 2		All persons involved in planning, performing, lifting and maintaining lifting equipment are trained and assessed as competent for their role. Competence is assured through relevant experience, initial and refresher training, and periodic assessments.
Principle 3		One person in the lift crew is designated as the Person In Charge of the lifting operation. All personnel involved in the lifting operation have their individual responsibilities clearly defined and communicated prior to commencement of the lifting operation.
Principle 4		A risk assessment is required for every lift, regardless of category. A lift plan is required for every lift, with the level of detail required defined by the category of lift. A Permit to Work may also be required subject to lift complexity and company policy. *NOTE: Category 1 lifts may be addressed through a generic lift plan, while Category 2 and 3 lifts require a specific lift plan. All Category 3 lifts require a Permit To Work.*
Principle 5		An approved competent person (Lifting Technical Authority, Advisor, Engineer or Subject Matter Expert) is engaged in assuring that all lifting operations are correctly planned and managed.

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!!! table

Principle 6		A Red Zone is established. All non-authorised personnel are restricted from entering the Red Zone[1], and all personnel are kept clear of suspended/travelling loads and lifting equipment or between the load and any heavy immovable object.
Principle 7		Lifting Equipment is thoroughly examined on a regular basis by an inspector who is sufficiently independent[2] from the on-site lifting crew, and who may be external or an in-house appointee. The examination refers to an acknowledged Standard for scope, methodology and acceptance/rejection criteria. All safety and monitoring devices installed on lifting equipment are operational and not by-passed or disabled. *NOTE: Periods of inspections can be influenced by the nature and robustness of use and application as well as the environments of use.*
Principle 8		All lifting equipment is visually inspected by a competent person before and after use. Equipment integrity is maintained and faulty equipment is removed from serviced and tagged as such. Inspection and maintenance activities are recorded in an equipment register.
Principle 9		Periodic audits and inspections are conducted by an Approved Competent Person.
Principle 10		Any Lifting of personnel is classified to the category requiring the highest level of controls (IOGP Category 3) and a rescue plan is included as part of the Lift Plan. Any equipment used for lifting personnel is certified for the specific activity and used according to recognised international standards.

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[1] Red Zones, sometimes also known as Exclusion Zones or No-Go Zones, are areas where access is controlled and no one can enter unless authorized to do so. They should be clearly marked, ideally with physical barriers, so that a person cannot accidently enter one.

[2] A sufficiently independent inspector is someone not influenced or controlled in any way by the company or organization executing or responsible for the task.

2.Lift categorization

To ensure adequate planning and safe execution of lifting operations, all lifting operations need to be categorised according to their degree of complexity and associated risks. This section provides a lift categorization example to help organizations apply Lifting Principle 1.

!!!table

Principle 1		All lifting operations are categorised by the Person in Charge to reflect the risk of the lift. This then defines the required controlling documents and the competence of the people involved.

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Different naming conventions for categorizing are used globally. This document categorizes lifts as a category 1, 2, or 3 lift. If your organization or partners use a different nomenclature, ensure that the controls are appropriate for the complexity and risk of any lift being performed. Some organizations use more or less than three categories; what is most important is that the categorization leads to the definition of controls appropriate for the complexity and risk of the lift being performed.

Table 2 provides an example of a simple methodology for categorizing a lift, alternatives may include:

- Critical, non-critical
- Routine, non-routine simple, non-routine complex
- Simple, complicated, critical, complicated/critical

Table 2: Example methodology for categorizing a lift

!!!table

Companies can modify the specific criteria listed to reflect their operations and equipment.		
Answer the questions starting at the top and not jumping any. Your lift category matches the category of the first question you answer 'yes' to.		
CATEGORY 3	**Y**	**N**
Is the gross load weight over 90% of the certified load radius curve of the crane?		
Does the operation involve the lifting or lowering of personnel?		
Will the lift involve tandem lifting using powered lifting appliances?		
Could the lift be affected by any proximity hazards, i.e., restricted area, power line, confined space etc.		
Will the load be lifted over or in close proximity to live plant?		
Will the lift take more than one shift to complete?		
Will the lift plan require technical input or calculations from a technical expert (i.e., load distribution in rigging and appliances)?		
Will the load be transferred from one powered lifting appliance to another?		
Will the load be lifted from one marine vessel to another?		

During the lift, will the crane operator's visibility of the load be restricted/limited (i.e., 'blind lift')?		
Is the load to be rotated, up-ended/up-righted (roll-up, tailing or special lifting operations) or transferred from one appliance to another during operation?		
Will the lift be subsea?		
Will the lift involve proof load testing of appliances or lifting equipment?		
If you've answered YES to ANY of the above, the lift is CATEGORY 3. If you've answered NO to ALL of the above, check the next set of questions		
CATEGORY 2	**Y**	**N**
Is the gross load weight over 80% of the certified load radius curve of a mobile crane?		
Is the lift outside normal operating conditions for the equipment or the asset?		
Is the weight distribution uneven, or does it have the potential to shift?		
Will environmental conditions place restrictions on lifting operations?		
Is the load of an unusual shape?		
Is the weight of the load estimated (i.e., not known)?		
Does the load have any hazards such as sharp edges?		
Is the load subject to permanent deformation?		
Absence of designed and tested lifting points?		
Does the load have excessive dimension (limited clearance from crane structures, surroundings)?		
Is the operation taking place during SIMOPS or interfering with other concurrent activities?		
If you've answered YES to any of the above, the Lift is CATEGORY 2. If you've answered NO to ALL of the above, the lift is likely Category 1.		
CATEGORY 1	**Y**	**N**
Are all these three conditions present?		
1. You have you answered "No" to all questions in Category 3 and Category 2		
AND		
2. The personnel involved in the lift are trained, assessed as competent and authorised to perform their specific role		
AND		
3. The lifting equipment and the load are simple to use and lift		
Only if ALL the 3 conditions for Category 1 are present, is the lift classified as CATEGORY 1.		

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Tables 3 and 4 provide examples of the different control measures and the personnel required depending on the category of lift. For example a lifting operation during 'SIMOPS'(Simultaneous Operations) would be categorized as a Category 2 at minimum (see Table 1 categorization questions), and therefore have a specific lift plan approved by the Site Lifting Competent Person, a permit to work for the entire SIMOPS scope, a specific risk assessment, and so on.

Table 3: Example of documentation and control measures for each category of lift

!!!table

Type of measure	Category 3	Category 2	Category 1
Lift Plan	Specific	Specific	Generic for the type of lift
Permit to Work	Required	Might be required by procedures or operating instructions (e.g., required where SIMOPS involved)	Might be required by procedures or operating instructions
Risk Assessment	Specific	Specific	Generic for the type of lift
Toolbox Talk[1]	Required pre-lift	Required pre-lift	Recommended pre-shift
Start Work Checks[2]	Mechanical Lifting Work around mobile equipment (if relevant) Man-riding (if relevant) Work at height (if relevant)	Mechanical Lifting Work around mobile equipment (if relevant) Work at height (if relevant)	Mechanical Lifting Work around mobile equipment (if relevant) Work at height (if relevant)

Note 1 – a second talk may be conducted post operation to collect lessons learned – e.g. 'After action review'
Note 2 – more Start Work Checks may apply depending on activity/operation

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Table 4: Example of personnel involved for lifts of different category
(See next section for more details on personnel)

!!!table

Type of role	Category 3	Category 2	Category 1
Person In Charge[+]	✓	✓	✓
Appliance operator[#]	✓	✓	✓
Slinger/Rigger	✓	✓	As required by operating instructions
Banksman	✓	✓	As required by operating instructions
Site lifting competent person	✓ (Site approval of lift plan)	✓ (Site approval of lift plan)	✓ (Site approval of lift plan)
Approved Competent Person*	✓ (Technical approval of specific lift plan)	If required by operating instructions	✓* (Periodic review approval of generic lift plans)

[+] Please note that most organizations have different names and different categorizations for who is considered the Person in Charge of a lifting and hoisting operation.

[#] An appliance operator can also be the Person in Charge in some Category 1 operations, for example a forklift truck operator or winch operator.

* An Approved Competent Person (e.g., lifting technical authority, advisor, engineer or subject matter expert) is usually involved in the review process of Category 2 and 3 Lift Plans in line with their tasks as described in section 3.3. For Category 1 lifts, an Approved Competent Person vets the generic lift plans and/or operating procedures, usually this is a one-off exercise with a scheduled review frequency.

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