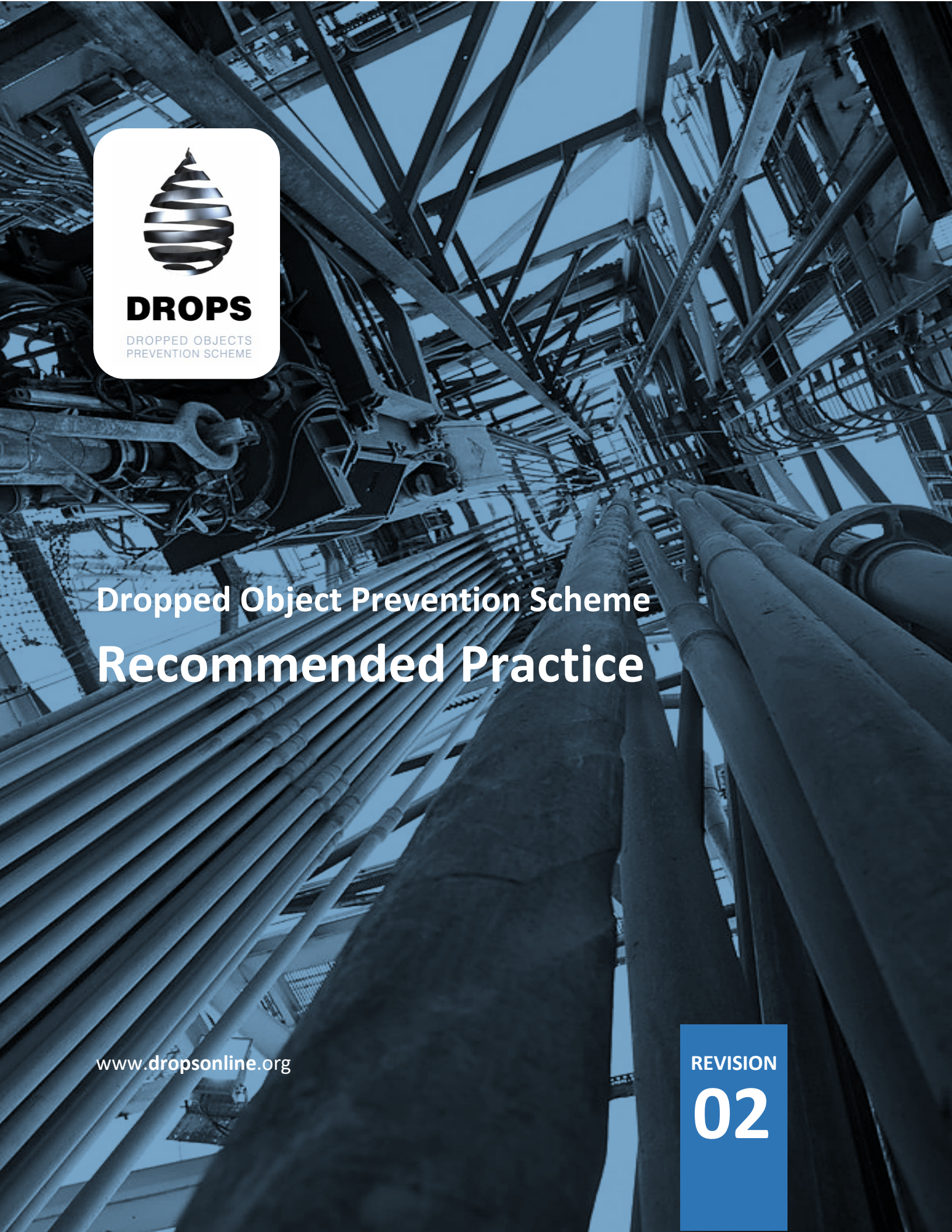

DROPS

DROPPED OBJECTS
PREVENTION SCHEME

Dropped Object Prevention Scheme

Recommended Practice

www.**dropsonline**.org

REVISION

02

Revision Record

Revision	Date	Comment	Issued by:
Issue 1	06.23.2017	First formal issue	DROPS
Issue 2	03.31.2020	Widen scope, add Maintenance and Equipment Selection, update information based on feedback and changing stakeholder policy, elimination of components not integral to a management system, inclusion of clear and concise minimum requirements.	DROPS

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DROPS Guidance and Best Practice

These documents represent 'Best Practice', as agreed by a consensus of the members of the DROPS Workgroup. Certain processes and procedures detailed in these documents may require modification to suit specific locations, activities or facilities. However, the underlying guidelines are a recommended component of any integrated dropped object prevention scheme. These guidelines are subject to regular review and update in response to improved methodologies and technologies.

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1 INTRODUCTION

1.1 Background

Dropped Objects pose the number one risk of serious injuries, fatalities, and equipment damage in industries across the globe. DROPS is the global initiative focused on preventing Dropped Objects by providing supporting engagement and learning materials as well as setting recognized best practices. The goal of this Recommended Practice is to consolidate and promote the minimum criteria of a dropped object prevention management system as agreed by the consensus of DROPS Members.

1.2 Purpose

This Recommended Practice was developed by a coalition of oil and gas professionals with the aim of setting basic requirements for Dropped Object prevention that can be incorporated into existing company Safety Management Systems (SMSs).

This document sets out minimum recommended practices that support the prevention of Dropped Objects and the development of policies and procedures for company SMSs. It is not intended to be considered the finalized requirements of a company Dropped Object Prevention Scheme (Scheme).

1.3 Scope

The content in this document is intended to be applied to operations in which Dropped Objects could cause harm to people, equipment, and/or the environment, including both worksites and Company premises.

Operations need to be risk-assessed to determine applicability of these guidelines. Exclusions may apply (e.g., man overboard, tools lost in hole, aircraft operations, well control events).

This document may include examples from the oil and gas industry, but principles contained within may be applied across industrial bounds.

The recommended practices herein set out requirements to be applied within a Dropped Object Prevention Scheme. Additional Guidance sections provide best practice examples in the application of the recommended practices.

1.4 Definitions

ALARP

As low as reasonably practicable, or ALARP is a term often used in the regulation and management of safety-critical and safety-involved systems. The ALARP principle is that the residual risk shall be reduced as far as reasonably practicable

Area Owner

A singular individual responsible for completion of scheduled DROPS inspections and required maintenance within a specified area per company standards

Assurance

Systematic verification of one's own activity

At Height

6 feet (1.8 meters) above ground level or where there is potential for a person or equipment to fall 6 feet or more below the work surface or into a body of water

Barrier

A function or safeguard planned to prevent, control, or mitigate undesired events or accidents

Barrier Owner

An individual responsible for creation or maintenance of a healthy barrier

Bridging Document (i.e., Interface Agreement)

A documented plan that defines how diverse organizations agree on which safety management elements are used when co-operating on a project, contract, or operation

Company

The individual, partnership, firm, or corporation that incorporates dropped object prevention into existing safety management systems

Competent Person

An individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions and who has the authority to take prompt corrective measures to eliminate them

Contractor

The individual, partnership, firm, or corporation that comes to a contractual agreement with an Operator to provide goods and services

DROPS

An industry collaborative organization that supplies supporting material and recommended practices for managing dropped object hazards. This may refer to the organization itself or endorsed principles

Dropped Object Prevention Scheme (Scheme)

A set of principles and methodologies that are put in place as part of a company's safety management system to identify potential dropped object hazards, prevent their occurrence, and mitigate their outcome. In this document, the terms Dropped Object Prevention Scheme, Dropped Object Scheme, or Scheme, may be used interchangeably

Dropped Object

Any item with the potential to cause injury, death, or equipment/environmental damage, that falls down or over from its previous position. Dropped Objects may be further classified as static or dynamic.

Dynamic Dropped Object

Any Dropped Object whose failure may be attributed to applied forces (e.g., from the impact of equipment, machinery or other moving items, severe weather, helicopter downdraft, manual handling etc)

High Potential (HiPo) Incident

A near miss or other incident that has a strong potential to cause a fatality, life altering injury, major equipment or asset damage, severe environmental harm, or significant operational loss

Human Factors

The range of physical, psychological, social, or organizational influences which affect Human Performance and how people carry out their activities. It is also a scientific discipline that focuses on the design of equipment, processes and work activities to reduce mistakes and increase efficiency.

Human Performance

What individuals do as part of their daily activities and how they carry out individual and group tasks. Identification and management of Human Performance ensures robust operations.

Incident

An unexpected event or chain of events that has resulted in or has the potential to cause harmful consequences, such as injuries, illnesses, property damage, or environmental impact

Independent Auditors

Independent auditors are recognized Subject Matter Experts and build assessments based on a company's scheme as well as original equipment manufacturer (OEM) recommendations and recognized best practices. Independent auditors have no connections to the company which they are auditing

Jarring

The process of dynamically transferring stored energy to free stuck drill pipe

Lagging Indicator

Lagging indicators measure the impact of workplace incidents after an incident has occurred; examples include number of fatalities, number of injuries, and severity rates or potential severity rates

Leading Indicator

Leading indicators are proactive, preventative, and predictive measures that monitor and provide current information about the effective performance, activities, and processes of a health, safety, and environment (HSE) management system that drive the identification and elimination or control of risks in the workplace that can cause incidents and injuries

Management of Change (MOC)

A process utilized to ensure that safety, health, and environmental risks and hazards are properly controlled when an organization makes changes to their facilities, operations, or personnel

Maintenance Management Program

A process utilized to keep specified equipment in proper working order. Specifically relating to dropped objects, inspection points during routine maintenance can be pointed out and verified in compliance

Near Miss

An event or chain of events that has not resulted in injury, illness, physical damage, or environmental damage, but had the potential to do so in other circumstances

Operator

The individual, partnership, firm, or corporation having control or management of operations on the leased area or a portion thereof

Original Equipment Manufacturer (OEM)

A company that creates a part or subsystem that is utilized within another company's product or package

Picture Book
A detailed visual guide showing specific equipment and its proper methods of retention. This may be created by a company, independent auditor, or requested of an OEM in a contractual agreement at time of initial purchase

Primary Fixing
Principal method by which an item is installed, mounted, and secured to prevent the item from falling (e.g., bolted connections, screws, pins, buckles, clips, welds)

Qualified Person
An individual who possesses the knowledge, experience, and training to fulfill the competencies of the defined role(s)

Reliable Securing
The appropriate selection, application, and management of fastenings and fixings

Risk Management Process
A procedure within a company's safety management system that formally evaluates potential for Dropped Objects within given circumstances and/or areas

Risk Register
A document created during the early stages of planning that is utilized as a tool for tracking known or found issues and eliminating or mitigating risks as they arise

Safety Management Systems (SMS)
A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies, and procedures

Safety Securing
An additional mechanism for securing the item to the main structure that restrains the item or its components from falling (e.g., rated steel, synthetic nets, lanyards, baskets, wires, slings)

Secondary Retention
The engineered method for securing the primary fixing to prevent loss of clamping force or displacement of fastening components (e.g., locking washers, locking wire, safety pins)

Static Dropped Object
Any Dropped Object whose failure may be attributed to gravitational or natural forces (i.e., without an applied force, unsecured items, or failure of fixings)

Subject Matter Expert
A person who has proven through experience or training to be an authority in a particular area or topic

Third Party
The individual, partnership, firm, or corporation, who provides a service outside of the scope of the contractual agreement between the Operator and Contractor

Training
The process by which an individual gains the required level of skill and knowledge to perform a function or task

Tripping
The physical act of running a drill string in or out of the wellbore

1.5 Abbreviations

CI
Continuous Improvement

DROPS
Dropped Object Prevention Scheme

HSE
Health, Safety, and Environment

KPI

Key Performance Indicator

MoC
Management of Change

PIC
Person in Charge

PPE
Personal Protective Equipment

2 DROPPED OBJECT PREVENTION SCHEME

2.1 DROPS SMS Minimum Requirements

No.	Area	Description
1	Management System	Where dropped object hazards are present, a Dropped Object Prevention Scheme shall be in place
2	Roles & Responsibilities	Companies shall create job specific roles, responsibilities, training, and competencies for dropped object prevention
3	SMS Interface	While work is being conducted between multiple companies, prevailing DROPS shall be clearly communicated and understood by all present
4	Risk Assessment	Risk assessments shall be conducted prior to beginning work to identify job-specific dropped object hazards and put controls in place
5	Inspection	Companies shall implement full inspection programs including Independent Inspections minimally every 3 years, systematic inspections for specifically identified equipment, unplanned inspections, and train competent personnel to properly inspect
6	Equipment Design	Manufactured equipment shall be designed to eliminate dropped object exposure where possible
7	Equipment at Height	All equipment at height shall be inspected and maintained per Original Equipment Manufacturer recommendations and Company policy
8	Reliable Securing	All equipment at height that is not an integral part of the primary structure shall be reliably secured
9	Working at Height	While working at height, all portable tools shall be transported in a secure manner and tethered while in use
10	Tubular Handling	Tubular handling mechanisms shall be measured, independently checked, and have functionality verified prior to use
11	Lifting & Hoisting	A Lifting & Hoisting program shall be in place that minimally meets the requirements of IOGP 376
12	Shipping & Transport	Pre-shipping inspections shall be completed prior to transporting equipment
13	Zone Management	Restricted Access & No-Entry Zones shall be established within the job plan based on job scope and dropped object risks present
14	Assurance	Methods of assurance shall be implemented to show effectiveness of DROPS implementation

2.2 Risk Assessments

Recommended Practice

Risk assessments are conducted prior to commencing work in both scope planning and pre-job meetings, as well as at intervals defined by each company's SMS. Assessment of the risk potential of dropped objects are discussed as part of every risk assessment. Risk assessments are conducted by qualified person(s) and cover area-specific activities and conditions. The purpose of a risk assessment is to identify and prevent or mitigate the risk of Dropped Objects following the Hierarchy of Controls (see section 2.4).

Key components for risk management are as follows:

- Identifying and assessing the risks
- Maintaining or adding controls and/or barriers
- Developing or improving risk management measures to further manage these risks.
- Periodically monitoring effectiveness of risk management measures and status of actions
- Compiling and reporting risk information
- After Action Reviews to incorporate feedback into existing controls

The DROPS Calculator (see Annex A) is a tool for measuring the potential consequences of Dropped Objects and is utilized during job planning to identify hazards and implement both prevention controls and zone management.

Additional Guidance

To maintain and track identified risks, a risk register is utilized. A Dropped Object risk register is created by a qualified person (e.g., the area owner) for at-risk equipment. Equipment of high complexity may require technical guidance from OEMs on how to position, fasten, secure, and inspect at height. The risk register categorizes the Dropped Object potential risk of the equipment (i.e., low, medium, or high) regarding likelihood of falling and consequential harm.

The register contains the following:

- Relative risk of equipment aloft
- Equipment identification
- Equipment location

- Methods of positioning, fastening, and securing
- Visual guides

High and medium risk items are typically photographed to monitor potential deterioration. An example of visual guidance included in a risk register can be found in Annex F.

2.3 DROPS Calculator

Recommended Practice

The DROPS Calculator provides a common benchmark in the classification of the potential consequences of a Dropped Object. It is endorsed by the DROPS workgroup and globally recognized by HSE organizations.

Additional Guidance

The DROPS Calculator is a guide only and provides a general idea of the potential severity of a Dropped Object. A detailed risk assessment delivers a more accurate calculation of potential severity.

The DROPS Calculator is:

- Designed to be employed during task planning and risk assessment to determine potential severity rating
- Used in reporting processes to determine potential outcome of an actual dropped object incident
- Considered during design and manufacture to address requirements for positioning, fixtures, and fittings for items to be secured at height

Considerations and tips for using the DROPS Calculator:

- With light objects (i.e., with a weight <0.1 kg), a key influencing factor is the likelihood of an object piercing the skin and damaging tissue and organic functions
- The calculator assumes a blunt object and does not take into consideration sharp objects (e.g., broken glass, metal shards)
- The wearing of standard personal protective equipment (i.e., hard hat, safety boots, and eye protection) is assumed in the calculator

- Do not subtract the height of an individual; measure fall distance to ground level
- The DROPS Calculator and similar tools are guides, providing only cursory indication of possible outcome, not precise predictions

2.4 Hierarchy of Controls

Recommended Practice

The Hierarchy of Controls is a system utilized to eliminate or minimize exposure to hazards. The methodology is applied as part of the risk assessment in order to make the operation as safe as possible. The order of effectiveness begins with elimination of the hazard present and ends with the use of personal protective equipment (PPE) if there is no alternate control.

The system is taught through training to personnel (see section 2.9) and is promoted as standard guidance for managing recognized hazards.

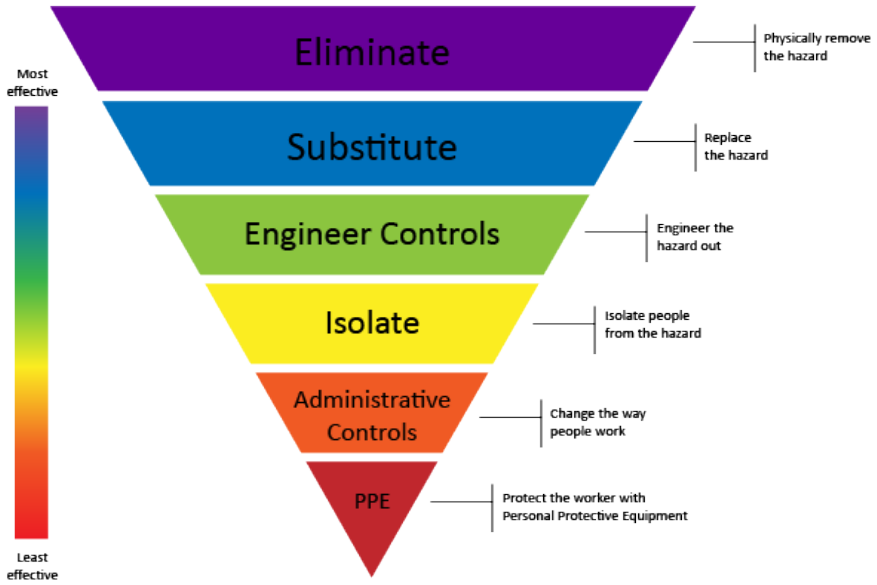


Figure 1 – The Hierarchy of Controls

Additional Guidance

The Hierarchy of Controls can be applied in different forms; examples of the application of the Hierarchy of Controls include:

- Proactive measures – Preventing Dropped Objects

- Conduct systematic risk review of fixed equipment in the derrick to identify potential Dropped Objects and potential consequences;
- Identify and implement a Preventive Control; and/or
- Implement routine self-verification of Protective Controls

➢ Reactive Measures – Incident Investigation

- Challenge investigation teams to identify a Preventative (Level 1 – Level 3) Control;
- Self-Verify Proactive Controls; and
- Conduct retrospective review of Dropped Object Incidents

2.5 Company Roles and Responsibilities

Recommended Practice

Dropped Object prevention is a shared responsibility of all personnel. Successful Schemes clearly define roles and responsibilities for personnel at-risk of Dropped Objects exposure.

Job positions within a company are evaluated to identify at-risk personnel as well as barrier owners. Assigning responsibilities to the personnel identified in a company's Scheme ensures that control measures have proper ownership, are well maintained, and are communicated throughout the company.

Personnel adhere to the governing Scheme (see section 2.6), and a Focal Point or Field Champion of applicable competency is appointed to implement the principles contained within at each location.

Additional Guidance

The following are examples of common roles and responsibilities identified in company Dropped Object Schemes in the oil and gas industry.

➢ Operations Managers – Verify personnel conformance with Dropped Object controls as detailed in the site-specific procedures

➢ Worksite Supervisors – Implement the Scheme and verify personnel conformance. Worksite Supervisors perform regular verification inspections of equipment and worksites, report non-compliances, and implement controls to prevent Dropped Objects

- Barrier Owner – Ensures controls applied are suitable and maintained
- DROPS Focal Points and Field Champions – Represent the company as the Dropped Object regional and/or local subject matter experts and communicate and facilitate implementation of the Scheme
- Employees and Contractors – Conform to the governing Dropped Object Scheme
- HSE Functions – Support operations management in verifying personnel maintain compliance with the Scheme

Each identified role has the applicable, documented level of training associated with its responsibilities.

2.6 Safety Management System Bridging

Recommended Practice

When multiple companies are working together in operations with potential for Dropped Objects, a bridging document is created between the companies that states where accountability lies and what Scheme is to be followed. An assessment is completed during tendering to ensure that the minimum DROPS requirements employed by the Company are met or exceeded. If minimum requirements are not met, then Contractors must demonstrate ability to comply with Company standards.

Personnel comply with the procedures in the bridging document and know where to access it.

Each company evaluates its Scheme against the minimum guidelines in this document to identify gaps or areas for improvement (see section 5.2). Deviations from the recommended practices in this document are addressed in a bridging document.

Additional Guidance

When a Company is working with both a Contractor and Third Party, the Scheme of the organization responsible for the equipment or service retains accountability unless stated otherwise in the bridging document, providing that Scheme meets Company minimum requirements. document. An example bridging document interface table is shown in Annex H.

2.7 DROPS Zone Management – No Entry and Restricted Access Zones

Recommended Practice

A comprehensive review or risk assessment is conducted for different areas of the facility to determine the potential for Dropped Objects and measures are implemented to restrict or prevent access to areas where hazards are present.

At a minimum, the following zones are defined in the Dropped Object Prevention Scheme:

- Restricted Access Zone – An area in which a Dropped Object potential has been recognized during Risk Assessment (see Section 2.2). The area is communicated to all personnel when established and authorized entrants are limited to the personnel needed to perform the work. Physical barricades and signage clearly identify the covered area and the specific risk of the zone.

- No-Entry Zones – An area in which a Dropped Object potential has been recognized (e.g., where moving equipment is present, where personnel are working at heights) and personnel are not permitted while the hazard is present or active. These zones are identified in the permit-to-work, controlled to prevent unauthorized access, and differentiated from the Restricted Access Zones by barricades and signage.

Restricted Access and No-Entry Zones apply to personnel at the location (e.g., service partners and providers who perform work or visit the location).

Restricted Access Zones and No-Entry Zones can be further classified as follows:

- Permanent Zone – An area where a permanent barrier has been established to raise awareness of potential Dropped Object hazards. An area only entered by personnel authorized and permitted to conduct work during that time.

- Temporary Zone – An area where a temporary barrier has been established to raise awareness of potential Dropped Objects hazards and to prevent personnel from unauthorized entry (e.g., using of barrier tapes, barrier chains, signage, handrails).

Zone classification and management are based on the usual, routine operations and activities in the area. A change in operations in the area can alter the risk zones and may require a temporary change in zone classification, depending on the risk assessment.

Zones and their access points are clearly marked. When temporary zones are established, personnel at the location are notified to prevent accidental entry.

In each zone, authority is identified to control the respective zones. Roles and responsibilities are clearly established, delegated, and communicated to ensure effective implementation.

Emergency access and egress are addressed when establishing No-Entry and/or Restricted Access Zone(s) to ensure that personnel are not hindered from exiting a zone or space in the event of an emergency.

Additional Guidance

Despite established barriers, zones can still be violated when people make mistakes. Each Company evaluates how Performance Influence (or Shaping) Factors (See **Error! Reference source not found.**) influence their personnel and take necessary steps to establish working barriers that maintain integrity even when mistakes are made.

Each zone is controlled by one person who oversees authorizing entrants. This individual is designated by the Supervisor and manages authorized entrants within the zone.

Site diagrams are posted in common areas and at the location of the managed zone(s) to ensure personnel are aware of the access protocol and how to navigate through and around it. Signs are in English and any other predominant language(s) at the location.

During the development of zone management processes, reference may be made to DROPS "Recommended Guidelines to Use of Restricted Access Areas (Red Zones)."

2.8 Monitoring and Measurement of Safety Performance

Recommended Practice

Each company defines its Key Performance Indicators (KPIs) for Dropped Object safety performance. Findings from these KPIs drive corrective actions. The company needs to actively monitor leading and lagging indicators, as inputs that drive both corporate and site-specific objectives and targets. These goals include a designation of responsibility and the means and timeframe by which they are to be achieved.

Additional Guidance

Lagging indicators are used to monitor performance and drive HSE objectives, and are tracked monthly for each business unit or department. These can include:

- Dropped Object Incident Rate

- $\frac{\#\ Dropped\ Object\ incidents\ (as\ defined\ by\ the\ company)}{Man-hours} \times 200{,}000$

Leading indicators are a predictive tool to forecast where Dropped Object exposures are present and identify weaknesses in the Scheme

Leading indicators can include:

- Inspections completed per schedule
- Number of No-Entry and Restricted Access Zone violations
- Number of DROPS inspection findings
- Change in the number of entries in overhead tool logs
- Number of overdue and deferred actions related to DROPS inspection findings
- Degree of implementation of DROPS controls

2.9 Training

Recommended Practice

Dropped Object Prevention Schemes include risk-mitigation training for personnel exposed to Dropped Object risks. Personnel are trained according to their role. Training includes the following:

- Awareness Training – Mandatory for personnel exposed to Dropped Objects risks. This training includes the communication of bridging document expectations (see section 2.6) and how to apply the Hierarchy of Controls to identified risks (see section 2.4). Awareness training consists of competency verification on the company DROPS policies, and is managed and tracked through the Company Training Matrix (See Annex B) or similar Company policy.
- Inspector Training – Personnel performing inspections of equipment are deemed competent by the company on the function and inspection criteria of the equipment that is inspected. This requires a level of training or experience above Awareness as well as familiarity with the OEM specifications of the specific equipment.
- DROPS Focal Point/Field Champion Training – The company Scheme Focal Point(s) or Field Champion(s) is deemed competent by the Company as Subject Matter Expert through training, experience, or a combination, and supports the full implementation of the company's Scheme.

Personnel exposed to Dropped Object risks are trained during the new hire process as well as in refresher courses every year.

- Initial Training – At-risk personnel complete the Company Dropped Objects Awareness Training prior to performing operations
- Refresher Training – At-risk personnel complete refresher training to obtain annual recertification or as needed when identified by verifications, inspections, audits, or incidents

Additional Guidance

See example training matrix in Annex B.

DROPS Train the Trainer courses are an industry resource that presents industry agreed dropped object prevention best practices and instructs attendees how to deliver dropped object prevention training. Subject matter does not train participants on Company DROPS Policies and is not used for Awareness or Inspector training. Rather, attendance is recommended for DROPS focal Points or Subject Matter Experts who will be designing Company training content for their respective organizations.

2.10 Human Performance

Recommended Practice

The presence and control of Dropped Object hazards is influenced by several individuals within the Company and Contractor organizations interacting with processes and equipment. Human Performance (HP) is the consideration of what personnel are required to do as part of any activity. Organizations recognize that people will make mistakes, but those mistakes are due to underlying conditions and systems that allow for or promote errors to occur. Because many controls to prevent Dropped Objects rely on personnel, it is important to establish HP methodologies to reduce the influence of error on these barriers.

Human Performance programs focus on identifying the nature of the tasks required for personnel (critical steps, constraints, etc.), what errors could potentially occur, the Performance-Shaping Factors (PSFs, See Annex J) that make those errors more likely, organizational factors (OFs) that allowed the PSFs to exist, and finally challenge the controls that we have in place to manage those PSFs/OFs.

A Human Performance Program is comprised of the following elements, at a minimum:

HP Integration: Either embedded in an SMS or stand-alone, a HP Strategy is documented that outlines the HP goals, HP competency program, HP resources, and approach to managing HP risks.

HP Competency: A program to develop competency in HP focus areas at the awareness level for all employees, and the skill level for Company-identified roles (operational leaders, HSE advisors, etc.).

HP in Proactive Learning: Tools such as task analysis or the Task Improvement Process are utilized proactively in job planning and procedure development to identify opportunities for error and contributions of PSFs ahead of the activities.

HP in Investigations: The consideration of HP is embedded into the investigation process where underlying causes to contributing behaviors (PSFs) of incidents are identified and recommendations systematically target those PSFs using the Hierarchy of Controls (See Section 2.4).

Additional Guidance

For online resources available to assist in developing comprehensive HP and education programs, please See Annex K.

3 DROPS INSPECTION

Dropped Object inspections are conducted to find and correct exposures relating to specified equipment or areas. Inspections are one of the strongest preventative measures and are needed to maintain compliance with the recommended practices of this document.

Dropped Object inspections are performed in accordance with company inspection criteria and performed by personnel of the Inspector-trained level (see section 2.9).

Inspections, intervals, and criteria are determined by risk assessments and through guidance from the OEM. Tools, equipment, and material that cannot be eliminated through the Hierarchy of Controls and are maintained at height are inspected including lifted equipment.

3.1 Independent Dropped Objects Inspections

Recommended Practice

Independent Dropped Object inspections, or DROPS surveys, are conducted prior to startup of operations where dropped object potential exists and then at least every three years thereafter on location.

Independent Dropped Object inspections include surveys of permanent structures, equipment, machinery, ancillary items used at height, and their individual primary, secondary, and safety securing features. The survey utilizes OEM drawings, specifications, and user manuals as well as documented changes that have been made to the original equipment. This is conducted and documented on units prior to commencing operations as agreed upon in the contract. Included in Independent inspection is verification of maintenance programs for equipment installed at height, supporting working at height, or with potential to be used at height.

Independent auditors or DROPS Surveyors demonstrate competence to the company on OEM inspection requirements and are informed of modifications to the equipment to be inspected. Additionally, auditors test the implementation of the site's governing Dropped Object requirements (see section 2.6). A review confirming the scope of the Independent Inspection is conducted prior to site visits.

Upon completion, the independent auditor, , provides the contracting company with a comprehensive review of findings that include: items to be corrected, a review of the implementation of governing Scheme requirements, suggested corrective actions, and suggestions on the application of industry best practices. These findings are formally tracked by the Company as part of their Assurance program (See Section 3.5).

Additional Guidance

The independent auditors provide a method of visual guidance, identifying secured permanent equipment and machinery that is secured at height (See Section 3.2, Additional Guidance). Guidance consists of unit-specific photographs identifying the correct securing and placement of inspected items and are used as reference tools during systematic inspections (See Section 4.6).

Reference the example excerpt from Equipment at Height inspection guidance in Annex F.

Further guidance can be found in DROPS Common Guide to Dropped Object Surveys.

3.2 Systematic DROPS Inspection Program

Recommended Practice

A systematic or planned Dropped Object inspection program includes a survey of site equipment annotated with Dropped Object exposures and their identified inspection requirements. The inspection program is scheduled:

- During equipment installation at work site
- Upon completion of equipment commissioning
- Upon completion of major overhaul or maintenance
- During routine maintenance activities
- As recommended by OEM

Both permanent and temporary equipment at height is inspected. Inspectors have a level of training (see section 2.9) that deems them qualified by the company.

Systematic DROPS inspections may be a part of:

- Planned Dropped Object visual inspections:
    - Visual inspections of structures, equipment, machinery, and work areas to remove, record, and report Dropped Object hazards are performed in accordance with the unit-specific DROPS criteria and inspection frequency as recommended by the OEM and equipment owner
    - Inspections are reported within a reporting or tracking system
- Pre-job risk assessments and checks:

- Identification of potential dynamic Dropped Object hazards and associated risk assessment are documented during planning and pre-task activities and tool box talks (e.g., collision checks, environmental factors, housekeeping, removal or replacement of equipment at height, temporary equipment, concurrent operations, tools and equipment at height). See section 2.2 for more information about risk assessments

Corrective actions stemming from systematic inspections are to be tracked to closure. If the recognized deficiency poses an immediate threat, the deficiency is corrected before proceeding with work.

Additional Guidance

A unit-specific visual guide displaying items and materials at height that are correctly installed per OEM and DROPS guidance is used for inspection (see sections 3.1 and 4.6). Formerly "Picture Books," these guides can also be included within a digital Systematic Inspection Program. Dropped Object visual inspection guides include:

- OEM-provided inspection recommendation and frequency
- Modifications to original OEM equipment and associated retention methods of that equipment at height
- A unique identifier and equipment location
- Photographs of the proper installation of equipment with primary and secondary retention as well as safety securing

Each component to be inspected has pass/fail criteria. After an inspection is complete, failed components are to be properly installed or replaced before being put back into service or subject to external forces (i.e., vibration). Reference the example visual guide in Annex F.

3.3 Unplanned Inspections

Recommended Practice

Unplanned inspections include inspection criteria as laid out in section 3.2. However, the frequency in which these inspections are conducted is indeterminate. Unplanned inspections are completed prior to work restarting after unanticipated events. Events that require an unplanned inspection include but are not limited to:

- Dropped Object incidents
- Collisions
- Overload
- Bad weather
- Excessive vibration

> Note: Jarring and hard drilling can result in the top drive, traveling equipment, pipe racking systems, and the derrick and mast structure being subjected to severe vibration and shock loads on all types of drilling rigs. While it is not practical to remove or disconnect this equipment from the drill string prior to jarring operations, it is imperative that the equipment operators perform equipment inspections immediately following these events. More frequent intervals of inspection are completed during jarring operations as deemed necessary by the Person In Charge (PIC).

The post-jarring inspection guideline is developed as a rig-specific document based on the following:

- Existing Dropped Object surveys
- OEM user manuals and applicable product bulletins

There may be additional areas that need to be inspected that are not listed on the post-jarring checklist. The intent of the post-jarring checklist is to focus attention on specific components, checking for loose, worn, or missing components.

Additional Guidance

Reference the sample post-jarring checklist in Annex C.

3.4 Transportation of Equipment and Loads

Recommended Practice

Prior to transporting equipment to or from worksites, the responsible party inspects for Dropped Object risk potential. To document the inspection and guide the personnel conducting it, the equipment owner develops a checklist or incorporates potential Dropped Object inspection points into existing pre-shipment checks that are part of governing procedures for shipping. The checklists address the following:

- Inspection activities related to the type of equipment being transported, which may include:
    - Visually inspecting associated lifting equipment
    - Removing or securing loose objects prior to transporting or lifting
    - Inspecting for loose or missing fastening hardware and ensuring proper retention is in place (e.g., bolts, nuts, pins)
    - Ensuring equipment being used meets industry standards
    - Ensuring loads are appropriately distributed and secured in containers and baskets
- Shipment origin and destination
- Cargo identifier(s)
- Shipment weight
- Name(s) of person(s) completing the inspection and the date the inspection was completed

Completed checklists are kept on file for auditing purposes. Equipment condition and packaging requirements are communicated to the worksite to ensure compliance in return of equipment.

Additional Guidance

Develop a checklist that identifies common Dropped Objects for inspecting equipment and loads. Completed checklists are signed off by the site DROPS Focal Point.

Reference the sample cargo checklist in Annex G. For more guidance on backloading, refer to: the DROPS Backloading Booklet.

3.5 Assurance

Recommended Practice

A complete Dropped Object Prevention Scheme includes a component of assurance that documents conformance to applicable requirements. Assurance is performed by the company to verify that the work is in conformance with its own practices and procedures and with those of its contractors.

Assurance consists of different methodologies that evaluate the governing Scheme as agreed to in the bridging document (see section 2.6).

- Self-Verification – DROPS inspection is completed by site personnel, as a level of self-verification. Action items are tracked to closure by the assessment owner. Assessors are deemed competent after receiving the appropriate level of training (see section 2.9).
- Company-Verification – DROPS inspection is completed by a company representative outside of site operations for company self-verification. Auditors have completed DROPS Focal Point training or are recognized SMEs, and action items are tracked to closure by the company auditee.
- Independent-Verification – Independent Inspection or survey (see section 3.1) is performed by a qualified external auditor or internal auditors outside of the Business Unit being audited, every three years or when deemed appropriate by the company. Action items are tracked to closure by the auditee.

Additional Guidance

Task-level and System-level reviews are components of self-verification conducted periodically as defined in a company's SMS, and are implemented within the Self-Assurance process.

- A task-level review is an evaluation of whether a barrier (e.g., device, system, or action) is in place and fully functional
- A system-level review is an evaluation of conformance to, and effectiveness of, a practice, procedure, or combination of technical requirements in delivering the intended outcomes

4 DROPS HAZARD MANAGEMENT

At every worksite, measures are taken to prevent Dropped Objects through common, industry accepted, practices. Several common hazards and exposures are referred to here as part of Worksite DROPS Hazard Management.

4.1 Engineering Design & Equipment Selections

Recommended Practice

Design of equipment to eliminate dropped object exposures is considered in the process of equipment selection. Exposure is eliminated by minimizing the number of parts utilized in design, encapsulating parts within the assembly where possible, and incorporating recognized secondary retention methodology (see section 4.2). Equipment and equipment systems are easily accessed to perform maintenance and inspections, and critical components are easily assessed in order to complete condition-based monitoring. Design considerations include but are not limited to:

- Equipment system interaction and anti-collision measures
- Inherent reliable securing where achievable
- Safety factors of equipment and reliable securing methods
- Effects of corrosion
- Limiting equipment mass where feasible
- Equipment Dropped Object History
- Continuous Improvement

Where a tool or piece of equipment is not originally designed to integrate with the rest of the operational system, or a decision is made to not use equipment that has dropped object prevention barriers integrated into its design, a demonstration of ALARP is performed.

Additional Guidance

Personnel involved in engineering design are trained in Company Dropped Object Prevention methodology.

Original Equipment Manufacturers include recommended Systematic DROPS inspection criteria for each piece of equipment that addresses installation procedures, commissioning procedures, a user manual, and established periodic inspection requirements.

4.2 Reliable Securing

Recommended Practice

The main risk for static Dropped Objects is the constant sustaining of equipment at height. Companies ensure that reliable securing methods are used to sustain equipment at height with the appropriate selection, application, and management of fastenings and fixings. Reliable securing is an effort to maintain equipment at height when Elimination and Substitution elements of the Hierarchy of Controls are unattainable. Three levels of securing are present as part of Reliable Securing and are integrated into maintenance and Dropped Object Inspection programs (see section 3.2):

- Primary Fixing – The primary method by which an item is installed, mounted, and secured to prevent the item from falling (e.g., bolted connections, screws, pins, buckles, clips, welds).
- Secondary Retention – The engineered method for securing the primary fixing to prevent loss of clamping force or displacement of fastening components (e.g., locking washers, locking wire, split pins/cotter pins).
- Safety Securing – An additional engineered method applied to or around the item and secured back to the main structure, designed to restrain the item should the primary fixing fail (e.g., rated steel or synthetic nets, baskets, wires, slings). Safety Securing is necessary in situations where Secondary Retention is not feasible.

Additional Guidance

Factors that can inhibit reliable securing include but are not limited to:

- Improper securing equipment during severe weather
- Improper rating and safety factor devices and connectors (e.g., shackles, lanyards, secondary securing)
- Galvanic corrosion due to improper material selection
- Improper tools used at heights
- Loose grating or missing fastening clips

For additional guidance, see DROPS Reliable Securing Rev 04

4.3 Tubular Handling

Recommended Practice

For activities involving elevators to lift or hoist tubulars, a pre-activity check is conducted and includes physical verification and validation through measurement of internal diameter of the elevator versus external diameter of the tubular. Additionally, the load rating and full functionality of the lifting apparatus is tested and confirmed. All pieces of equipment designed to handle tubulars is provided or certified by the OEM. Compliance is maintained with existing API or Regulatory required inspections.

During tripping operations, all areas containing moving parts is classified as a Restricted Access Zone (see section 2.7) and non-essential personnel clear the floor area.

Forklifts used for tubular handling are fitted with an OEM-approved load retention method that is suited for the activity to prevent pipe from inadvertently rolling off the forklift.

The protocol implemented to prevent incidents during tubular handling operations apply to personnel working in the area of activity.

Additional Guidance

Tubular handling checklists can be found in Annex D.

4.4 Lifting and Hoisting

Recommended Practice

In all industries, lifting and hoisting operations have the greatest exposure to Dynamic Dropped Objects, and a lifting and hoisting SMS is required for applicable operations. A lifting and hoisting SMS includes a risk assessment process for lifting and hoisting operations, the integrity of the load, and lifting equipment. This process contains inspections to identify and mitigate the risk of part or all of the load falling or the lifting equipment failing.

To ensure that no Dropped Object exposures are present and that lifting controls are in place, lifts should be classified according to the level they have been risk assessed. At a minimum, lift classification should follow the guidance of IOGP 376 (see section 6.1) for:

- Routine Lifts – Lifts in routine crane operations, repetitive lifting operations using the same equipment, and routine lifting operations with loose lifting equipment.
- Non-Routine Lifts – Simple or complicated lifting operations using loose lifting equipment, complex/critical lifting operations requiring a lift plan, heavy lift requirements.

Prior to starting a lifting or hoisting activity, an inspection is conducted and includes physical verification that no loose items are present in, or around, the objects being lifted (e.g., inside the tubular[s], loose thread protectors, on top or in between frames). All lifting equipment is verified to be within inspected dates and has required certifications.

At minimum, the expectations detailed in IOGP 376 are incorporated into the governing lifting and hoisting SMS.

Additional Guidance

In addition to the crane operator's log, a separate log is maintained by the rigging crew detailing a description of the load, weight of the load, SWL of lifting equipment, and accountability for inspection of loads prior to lifting.

Before a lifting activity, ten questions to a safe lift are answered to ensure proper planning and execution of work.

Annually, or every 6 months for equipment used to lift people, a competent person inspects all lifting gear and the lifting register, removes any deficient equipment, and certifies lifting gear for use.

Reference 10 Questions to a Safe Lift in Annex I.

4.5 Portable Tools and Equipment

Recommended Practice

To prevent Dropped Objects from occurring while working at height, preventative tethering tools and/or tool kits with engineered tethers are utilized. These tools and tool kits must meet the following criteria:

- Tools that have removable attachments (e.g., ratchets with sockets) have a positive-locking system to prevent Dropped Objects.
- A pre-job and post-job inventory checklist is developed to facilitate inspection of tethering devices and to ensure items do not remain aloft. In the event an item logged out within the checklist is not returned upon completion, the job is stopped and the work area inspected until the item is found. In cases where the item cannot be located, the Person in Charge (PIC) must give permission for work to resume
- Tethers for tools are properly engineered and rated for their weight to prevent them from dropping if released while working at height
- Secure, approved carrying pouches are utilized while transferring tools and equipment to and from heights
- Radios, gas detectors, and other PPE are secured using engineered clips. If engineered clips are not available, radios are secured in the carrying pouch only when necessary
- Companies conform to their SMS for Working at Height
- Carabiners utilized for securing of portable tools and equipment are designed to prevent accidental rollout

Additional Guidance

Examples of checklists to log tethering tools prior to utilization as well as an inventory checklist for work at height can be found in Annex E.

Additional guidance for Working at Height can be found through DROPS Recommended Guidelines for Safe Use of Tools and Equipment at Height, OSHA Standards (General Industry) and the Technical Guide (Health and Safety Executive).

4.6 Local Containment

Recommended Practice

In situations where materials and/or equipment cannot be secured during work at height and an exposure exists for a fall from height, local containment is put in place.

- Primary Local Containment – The principal method of storing equipment for use at the worksite. Examples include toolboxes, certified carrying pouches, or containers used at the worksite. Primary Local Containment is used to store all non-secured tools and equipment, and small pieces such as nuts and bolts that may slip through openings at ground level.

- Secondary Local Containment – A covering of the work area that prevents small tools or equipment from falling through grating, handrails, or deck penetrations. Examples include canvas bags and tarps. Secondary Local Containment is large enough to cover gaps in the immediate work area, maintains integrity, and covers handrails up to the guard rail where necessary.

When work is completed, all containment methods are removed from the workplace and returned to their storage areas.

Additional Guidance

Primary Local Containment is not filled over 80% of its maximum depth which is clearly marked on all containers used for this purpose.

Secondary Local Containment is ensured to cover clearances in deck penetrations, especially where pipe passes through. While work is ongoing, the containment method can be secured in these areas by taping to penetration to create a gapless seal.

4.7 Permanent Equipment at Height

Recommended Practice

When Hierarchy of Controls is applied and equipment is left at height for extended periods of time or permanently, reliable securing methods are implemented (see section 4.2). To minimize Dropped Object exposure, a variety of equipment types and components can be permanently affixed at height. The following must first be done:

- Upon approval through an MoC, including engineering design review, equipment not in use is removed, and equipment at risk of being struck by moving equipment is evaluated to determine whether it is to be moved or removed (see section 2.2).

- Equipment and spare parts ordered have DROPS specification documentation, and the necessary integrated retention and securing is installed by the manufacturer (see section 4.2).
- Selection, application, and management of fastenings and fixings are necessary to achieve the required levels of performance and safety. Permanently installed equipment and components are designed accurately, installed properly, and maintained consistently with a list kept for systematic inspections (see section 3.2).

Maintenance routines (see section 4.10) include inspection of primary and secondary retention methods and safety securing to ensure they remain in good condition and fit for purpose. Permanent equipment at height is inspected systematically.

For new installations or when installing and securing devices on existing equipment, an MoC is completed. After installation, a permanent equipment at height log is updated with the equipment type, identifier, location, and new equipment is included within the systematic inspection program.

Additional Guidance

Upon completion of risk assessment (see section 2.2) or independent inspection (see section 3.1), a visual guide or reference is created and utilized that contains at least the following information:

- Description of the equipment or object location
- Visual guidance of each item to be inspected
- Unique identifier (e.g., a, b, c) for each item
- Inspection method(s) and description of primary securing method(s)
- Inspection method(s) and description of secondary retention method(s)
- Means of documenting condition
- Desired inspection frequency

A visual guide is utilized during systematic inspections to showcase the proper condition, fixing, and securing of equipment at height (see sections 3.1 and 3.2).

Reference methods of inspection of permanent and temporary equipment at height utilizing visual guidance in Annex F.

The affixing of life craft at height with means to deploy to water follows the latest edition of IMO IE982E – Life Saving Appliances, or local laws and regulations where there is any conflict.

4.8 Temporary Equipment at Height

Recommended Practice

Installation of temporary equipment at height is approved through an MoC and evaluated through a risk assessment that considers Hierarchy of Controls, corrosion, poor design, maintenance and inspections, lack of awareness, and contact with other equipment that may contribute to the potential for dropped objects.

The requirements for permanent equipment at height (see section 4.6) are also applicable to temporary equipment.

Within the temporary equipment register, important data-to-be-maintained includes the equipment identification number, certification status, safe working load (with the date it was put into service), and inspection requirements. Items with inspection requirements in the temporary equipment register are to be included in the systematic inspection program (see section 3.2).

Additional Guidance

If temporary equipment is left at height for a period of time (e.g. 30 days), it is treated, inspected, and included within the Company Systems in the same manner as permanent equipment at height.

Any equipment supplied for use through third party or service provider organizations, is assessed for compatibility with existing systems. Inspections and maintenance criteria of this equipment is shared with the Company and is duplicated within inspection and maintenance systems while interface exists.

Reference methods of inspection of permanent and temporary equipment at height in Annex F.

4.9 Temporary Work Platforms

Recommended Practice

A documented procedure, including inspection requirements, exists for the assembly, disassembly, installation, and removal of components or equipment at height, including temporary work platforms and scaffolding. Procedures and inspections are executed and actioned by a Competent Person.

Company Working at Height, Fall Protection, Equipment at Height, and Tool Retention Procedures are followed on temporary work platforms, If the platform is greater than 6’ in height, inspected and maintained fall arrest equipment is utilized minimally for access and egress.

Additional Guidance

Temporary Work Platforms are inspected daily by a Competent Person for signs of deterioration and to assess stability. All platforms should be tagged, communicating their current condition and date inspected.

Reference ANSI/ASSP 10.8 for minimum scaffolding requirements.

4.10 Maintenance

Recommended Practice

Applicable maintenance management programs include Permanent and, where applicable, Temporary Equipment at Height. Programs include individual repair, maintenance and inspection frequencies, requirements, and procedures. Maintenance management programs consider OEM recommendations and changes made by the equipment owner. The maintenance program is updated after installation or removal of equipment at height.

Prior to equipment being put in service, a verification is completed that assesses the current condition of equipment, completion of required inspections, and presence of required certifications.

Additional Guidance

The maintenance program is assessed on a continual basis. An internal verification is completed annually to assure that all equipment with dropped object potential have up to date inspections and conform to OEM requirements (see section 3.5); additionally, a verification of maintenance program execution is performed during Independent inspections (see section 3.1)

5 REPORTING AND PERFORMANCE

To drive alignment throughout and cross industry boundaries, companies adhere to specific reporting requirements.

5.1 Minimum Reporting Requirements

Recommended Practice

Each company's incident reporting procedure requires personnel to report all dropped object incidents, whether or not the incidents result in injuries. The following is included in the report, specifically for incidents related to dropped objects:

- Incident location and area
- Weight and height of potential dropped object
- Whether the dropped object occurred within a specific No-Entry or Restricted Access Zone as defined by the company (or as defined in section 2.7)
- Number of people present in the DROPS No-Entry or Restricted Access Zones at the time the object dropped
- Dropped-object-related incidents (e.g., unsafe act or condition, near miss, incident with consequences) with the results of using the DROPS Calculator included in Annex A

Each company defines its own criteria for determining when a Dropped Object incident is to be investigated. Underlying causes and Performance Shaping Factors are considerations within the Company investigation process (See Section 2.10).

Additional Guidance

- The incident investigation process identifies the basic cause(s), contributing factors, and root cause(s) of an incident. Corrective and/or preventive actions are then developed to address each relevant contributing factor and root cause. The results of the incident investigation are used to develop a "Lessons Learned" report. An example incident entry might read as follows:

  "The crew was in the process of using an impact wrench with an attached 1¼-inch socket to loosen the BOP bonnet bolts when the socket unexpectedly released from the tool, fell 11 feet, and came to rest in the pollution pan below. The socket, weighing four pounds,

came free when the retainer pin (used to secure it) failed, allowing the socket to release. The area below work had No-Entry Zones established with the closest person approximately 15 feet away. An all-stop was called, the retainer pin was replaced, the job was reevaluated for hazards, and the job continued without incident. This incident ranks as minor on the DROPS Calculator."

- When reporting events to OEM, include item or equipment part number(s) to assist in root-cause analysis.
- OEM Recommendations:
    - OEM of equipment involved in incident is contacted immediately for assistance and given preliminary information acquired during onsite root-cause analysis.
    - OEM has a system in place for documenting incidents and root-cause analysis efforts. Customer name, rig name, equipment model and serial number, date and description of incident, and photos, if available, are provided.
    - OEM has a product bulletin process in place to communicate product advisories to affected equipment users. Product bulletins report HSE incidents as soon as possible and should be revised to report findings, recommendations, or corrective action based on lessons learned.

5.2 Self-Assessment

Recommended Practice

A self-assessment evaluates a company's SMS and compares it to its industry best practices and standards. This assessment can be an evaluation of company performance, a review of the application of DROPS principles, a leading indicator appraisal, or a baseline comparison of implemented standards to the recommended practices in this document.

A self-assessment is conducted within an organization to determine the status and improvement areas of the company's Dropped Object Prevention Scheme, with goals tracked through Assurance processes. (see section 3.5). These are completed every 3 years or when there is a change in policy.

Additional Guidance

An example of a self-assessment against the recommended practices in this document can be downloaded from dropsonline.org.

6 OTHER INDUSTRY STANDARDS

6.1 Industry Standards and Document Number

In this recommended practice, reference is made to the following publications:

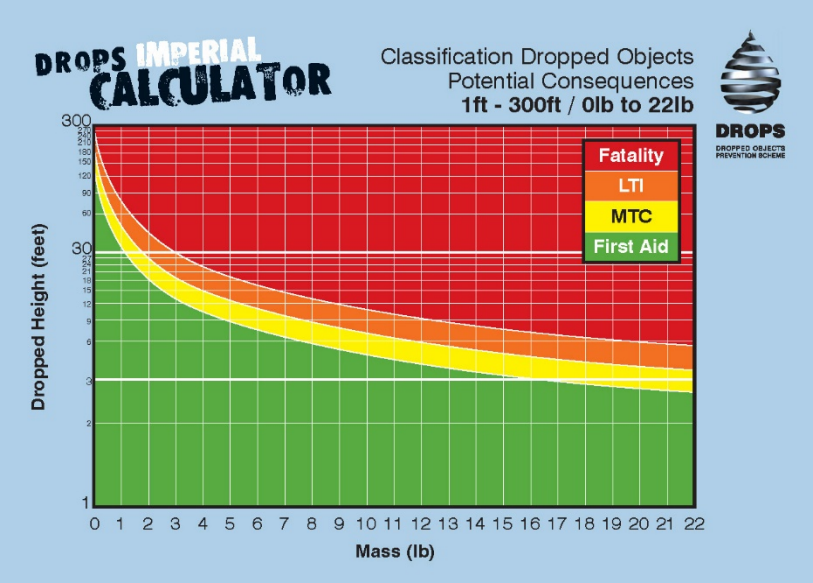
> Note: Only the latest edition of each publication is applicable, along with its amendments, and/or supplements (unless the date of a previous version is specified).

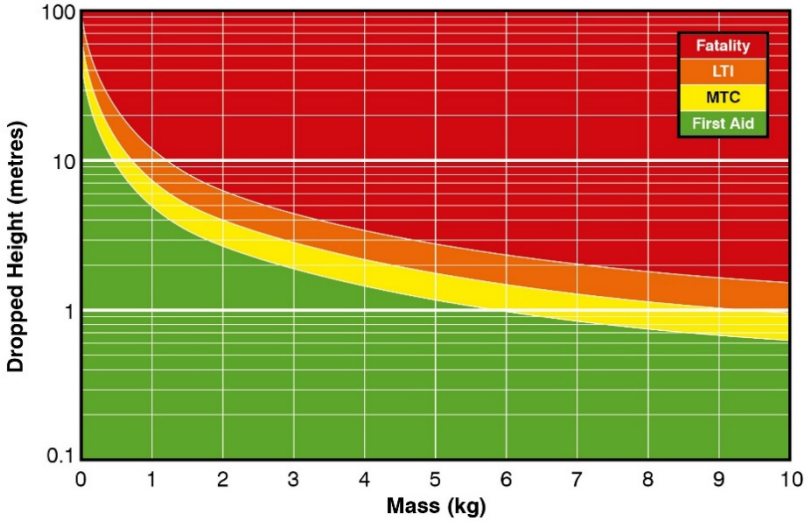
- IOGP Lifting and Hoisting Safety Recommended Practice - IOGP 376
- Step Change in Safety Lifting and Mechanical Handling Guidelines
- DROPS Common Guidelines for Independent Dropped Object Surveys
- DROPS Recommended Guidelines for the Safe Use of Tools & Equipment at Height
- Step Change in Safety Best Practice Guide to Handling Tubulars
- Step Change in Safety Best Practice Guide to Man-riding Safety
- DROPS Reliable Securing
- DROPS Backloading Guidance Booklet
- OGUK guidance on backloading
- ANSI/ASSP 10.8 Scaffolding Safety Requirements
- IADC Oilfield Gin Pole Truck Guidelines
- IMO IE982E – Life Saving Appliances

Annex A
DROPS Calculator

DROPS Calculator

See DROPSonline.org link for additional guidance and supporting materials.





Annex B
Training Matrix

Figure B. 1 – Sample Training Matrix

Training	Content	Target Audience	Requirement	Frequency
Prevention of Dropped Objects (DROPS)	Introduction to DROPS Program and supporting documents Understand, identify, prevent and mitigate potential dropped objects Awareness Level	Exposed Workers Front Line Supervisors/ Managers Worksite DROPS Lead DROPS Subject Matter Experts	Mandatory	Once
Minimum Requirements for Lifting and Hoisting, Rigging and Crane Operators	Minimum requirements with respect to key controls for safe lifting and hoisting operations, rigging and crane operations. As per jurisdictional requirements Knowledge Level	Front Line Supervisors Safety Leaders Worksite DROPS Lead DROPS Subject Matter Experts	Mandatory	Once
DROPS Learning Packs: -No-Entry Zones and Restricted Access Zones -Reliable Securing -Tubular Handling -Lifting and Hoisting -Backloading -Management of Change (MoC) -Working at Heights -Portable Tools and Equipment -Permanent Equipment at Height -Temporary Equipment at Height -Scaffolding Operations	Learning packs for face to face training on specific topics pertaining to DROPS to educate site based staff on mandatory and recommended controls as included in the DROPS Manual and supporting documents Knowledge Level	Worksite DROPS Lead DROPS Subject Matter Expert Specified locally	Recommended	Specified locally

Annex C
Post Jarring Checklist

Figure C. 1 - Post-Jarring Checklist (Part 1 of 3)

POST JARRING CHECKLIST

This Checklist is provided as a guide. Inspection should not be limited to this list alone and all hardware, mountings and fittings should be inspected for damage and security.

DESIGNATION / ITEM	OK or NA	COMMENTS
Elevators		
Link Block Bolt Assemblies Secured	_____	
Hinge Pin retainer in Place	_____	
Latch Pin Retainer in Place	_____	
Pipe Handler		
Guard Pin Secured	_____	
Bell Guide Bolts Secured (same as stabbing guide)	_____	
Hinge pin Retainer Bolts Inspect	_____	
Die Retainer Bolts Secured	_____	
Jaw Retaining Bolts Tight	_____	
Torque Wrench Mounting Bolts Secured	_____	
Bolts On Die Spring Covers Secured	_____	
Pins for Die Springs Secured	_____	
Lift Cylinder Pins Secured	_____	
Torque Cylinders/Torque Tube Secured	_____	
Hanger Nuts for IBOP Cylinders Secured	_____	
Hanger Pin for Pipe Handler/Rotating Head Secured	_____	
Fasteners for Stabbing Guide (PH-50/75/100)	_____	
Pins/Cotter Pins for Lift Cylinder Stop Tubes	_____	
Bolts on Torque Backup Clamp Assemblies	_____	
Fasteners- Clamp Clevis to Clamp Cylinder Piston (PH-85)	_____	
Torque Cylinder Rod Gland Retaining Screws (PH-85)	_____	
Hinge Pins/Fasteners on PH-50 Clamp Cylinder Assy.	_____	
Clevis/Cotter Pins on Elevator Link Clamps (PH-60/85)	_____	
Locking Rod on Rotating Head Locking Handle (PH-60/85/100)	_____	
Outer Collar/Fasteners on PH-60	_____	
Crank Pin (PH-50/75 Pipe Handlers only)	_____	

Figure C. 2 - Post-Jarring Checklist (Part 2 of 3)

DESIGNATION / ITEM	OK	COMMENTS
IBOP Actuator		
Bolts for Crank Assembly Secured	_____	
Roller Assembly Bolts Secured	_____	
Actuator Arm Pins Secured	_____	
Dolly/Carriage Assembly		
Bolts for Dolly Roller Brackets Secured	_____	
Bolts for Service Loop Clamp Bars Secured	_____	
Bolts for S/Pipe Clamp Secured	_____	
Bolts for Swivel Link Retainer Plates Secured	_____	
Quill Housing Trunnion Cap Bolts Secured	_____	
Swing Bolt Pins/Nuts	_____	
Side Pads Secured	_____	
Cam Follower End Cap Fasteners (where applicable)	_____	
TDS-10/11HP Wear Pads	_____	
Cylinder Attachment Points	_____	
Cracks on Welded Stop Plates/Stop Brackets (Retract Dollies)	_____	
Loose Fasteners on Bolted Plates/Stop Brackets (Retract Dollies)	_____	
Motor Housing/Quill Assembly		
Junction Box Mounting Bolts Secured	_____	
Inspect Junction Box Feet	_____	
Blower Motor Mounting Feet Bolts Secured	_____	
Blower Motor Fan Shroud and Rain Shield Bolts Secured with Lockwire	_____	
Instrument Covers and Mounting Feet Secured and Lock-wired	_____	
Accumulator Retaining Clamp Bolts Secured and Lockwired	_____	
Heat Exchanger Mounting Bolts Secured	_____	
Counterbalance Cylinder Pins Secured	_____	
Counterbalance Shackles Secured	_____	
Motor Armature Position (TDS-3/4/5/6/8) (See Varco Product Bulletin TDS-03-15)	_____	
TDS Lower Gear case to Main Body	_____	
TDS Pressure Filter Bowl	_____	
Retighten Washpipe Packing Box and Holding Nut		
Verify Shaft Liner Assembly is seated (IDS only)		
AC Auxiliary Motor Mounting Feet/Bolts Secured/Not Damaged	_____	
Rotating Head & RLA Fittings/Hardware Undamaged & Secure	_____	

Figure C. 3 - Post-Jarring Checklist (Part 3 of 3)

DESIGNATION / ITEM	OK	COMMENTS
Torque Arrestors		
All Bolts for Solid Body Elevator Plate Secured	_____	
Torque Arrestors/Mounting Pins at Rotating Head Secured	_____	
Bolts for Solid Body Elevator Wear Guide Secured and Lock-wired	_____	
Link Tilt		
Shackle Secured	_____	
Mounting Bolts Secured to Solid Body Elevator	_____	
Check Mounting Feet on Link Tilt Frame	_____	
Stop Adjustment Pins or Lock Nuts Secured	_____	
Pivot Pin and Cotter Pins Secured	_____	
Cable Assembly for Intermediate Stop	_____	
Link Tilt Pin (PH-50)	_____	
Upper/Lower Retaining Bolts (PH-85 with Hydraulic Link Tilt)	_____	
Link Tilt Linkage Pins secured w/cotter pins and slotted nuts(PH-50, 55, 75 & 100)	_____	
Link Tilt Cylinder Rod and Clevis Pins secured with cotter pins and slotted nuts (PH-50, 55,75 & 100)	_____	
Link Tilt Stop Adjustment Bolt secured with lockwire (PH-50, 55, 75 & 100)	_____	
Elevator Link Attachment Clamp U-Bolt Nuts Secured	_____	
Gear Box		
Alignment Cylinder Pins Secured	_____	
Auto Return Cylinder Pins Secured	_____	
Powered Rotating Link Adapter Motor/ Shot Pin Assy Bolts Secured and Lockwired (TDS-8/9/10/11 and PH-85 w/Hyd Rot Head)	_____	
Cooling System		
Extended Intake Inlet Mounting Bolts	_____	
Remote Blower Snorkel Tube Saddle Bolts	_____	
Main Shaft		
Check Exposed Shaft Area for Damage	_____	
Shaft End Play	_____	
Landing Collar Retainer Tabs/Bolts	_____	

Annex D
Tubular Handling Checklist

Description

Tubular Handling present's a significant risk and need to be identified and assessed such that personnel are protected from dropped objects. The purpose of this tool is to test the contractor's SV process for the other management systems needed to effectively manage this risk

Principles:

- Primary goal is to reduce risk by testing and understanding how well the barriers to a potential major accident are being maintained and taking appropriate action if they are not
- The Tubular Handling Oversight tool has been designed for a site representative to oversee a Contractor's SMS
- Evidence from the contactor's self-verification process should be used to answer the Oversight questions along with a balance of direct field observations to validate evidence in the contractor's SV records. (i.e. trust but verify)
- The questions should be answered yes or no, depending on the lines of enquiry being in place. The question should be answered "No" if any of the lines of enquiry listed below the question are not in place. In this case the missing enquiry should be entered as a comment

1. Did the contractor communicate to the workforce the hazards associated with pipe handling?
   - Proper use of tubular handling equipment
   - People positions, pinch points, hands off, etc.
   - Red zone, safe "stand back" areas and the escape route discussed in the event of a dropped tubular

2. Is pipe handling system fully functional?
   - Pipe racking system in derrick, including finger latches
   - Pipe deck pipe handling system, including automated catwalk

3. Are interlocking safety systems confirmed to be functional prior to starting the job?
   - Slips and elevators
   - Racking system
   - Crown-o-matic / Crownsaver
   - Floor Saver

4. Did the contractor verify that systems are dimensionally correct for tubular handling equipment including all of the following?
   - Slips and elevators
   - Pipe racking systems
   - Finger board spacing

5. If the casing or tubing is handled by third party sub-contractor:
   - Drilling contractor verified the sub-contractor's tubular running system is correctly sized
   - Drilling contractor verifies if interlocks are in use and functional prior to the start of the job

6. During the pre-job risk assessment are the following conditions discussed?
   - Stop the job and assess prior to starting work during abnormal or unplanned conditions
   - Spotter not needed to verify the equipment (i.e. finger board latches) is working properly

Annex E
Portable Tools and Equipment

Figure E.1 - Tool Inventory Log

NO DROPS TOOL INVENTORY LOG

Tool Description	Work Location	Time Issued (24 Hr.)	Date Issued (mm/dd/yr.)	Name / Signature: Person Performing Work	Name / Signature: Responsible Person	Time Returned (24 Hr.)	Date Returned (mm/dd/yr.)	Name / Signature: Person Performing Work	Name / Signature: Responsible Person

Figure E.2 - Tools and Equipment At Height Register

TOOLS AND EQUIPMENT AT HEIGHT REGISTER

Brief Description Of Work			
		Start	Finish
		Date:	Date:
		Time:	Time:
Person Performing Work			
Name:	Sign:	Date:	Time:

Drops Tools Required Aloft	Non-Drops Tools Required Aloft	Securing Method for Non-Drops Tools
Tools Issuing Supervisor	Name:	Sign:

Equipment Taken Aloft	Securing Method
All Tools And Equipment Taken Aloft Have Been Inspected And All Securing Methods Used Are Confirmed Suitable.	
Task Supervisor Name:	Sign:

Tools And Equipment Returned To Deck Level	Securing Method
State Any Difference To Items Taken Aloft And Returned To Deck Level	
The Work Is Complete. All Tools And Equipment Have Been Inspected And Returned To Dedicated Storage (If Applicable) Or Quarantined If Not Fit For Use.	

	Name	Sign
Person Performing Work:		
Task Supervisor:		
Tools Issuing Supervisor:		

Note: If work is handed over the work area must be made safe. At handover all tools and equipment must be accounted for, secured at the worksite or returned to deck level.

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Annex F
Permanent and Temporary Equipment At Height

Figure F. 1 – Inspection Quick Reference Guide

Stab-Rite Securing Systems - Quick Reference				
Item	***Description***	***Securing and Retention Method***	***Dwg.***	***Photo***
1	Derrick Adapter Connector (Saddle) - Right	2 Pins each c/w Lynch Pin Retainers / Each Pin c/w Lanyard	1	1
	Derrick Adapter Connector (Saddle) - Left	2 Pins each c/w Lynch Pin Retainers / Each Pin c/w Lanyard		2
	Derrick Adapter Connector (Saddle) - Bottom	1 Bolt / Nut c/w Cotter Pin	1	3
2	Bed Plate	2 Pins each c/w 4 Bolts (Lock Washers)		4 & 5

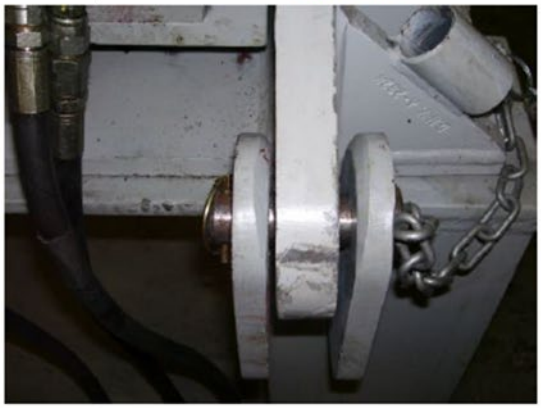
Photo 1	Derrick Adapter Connector (Saddle) – Left Side	***Photo 2***	Derrick Adapter Connector (Saddle) – Right Side
			
Photo 3	Derrick Adapter Connector (Saddle) – Bottom	***Photo 4***	Bed Plate – Left Side
			

Figure F. 2 – Example DROPS Inspection Picture Book

Photograph	Photo Ref	Description/Location	Fastening Method	How to Inspect	Signature
	LWR035	Description: Kite System Location: Level 9 (Monkey Board Level) Port Forward	Primary/Secondary Securing: Secured to derrick structure with snatch blocks, wire rope slings, turnbuckles and four part shackles. Safety Securing: Wire rope secured by snatch blocks.	Inspection Procedure: Check sheaves are secure and in good condition. Check condition of safety sling and shackle ensuring both are in place and secure. Check both snatch block and wire rope are retained. Ensure shackles are fitted with split pins.	
	LWR036	Description: Snatch Block Location: Level 9 (Monkey Board Level) Port Forward	Primary/Secondary Securing: Secured to derrick structure with wire rope slings, turnbuckle and four part shackles. Safety Securing: Wire rope secured to structural beam	Inspection Procedure: Check sheaves are secure and in good condition, check condition of safety sling and shackle ensuring both are in place and secure. Check both snatch block and wire rope are retained. Ensure shackles are fitted with split pins.	
	LWR040	Description: Camera Location: Level 9 (Monkey Board Level) Port Forward	Primary/Secondary Securing: Bolted to mounting bracket with lock nuts/washers Safety Securing: Safety sling with four part shackle	Inspection Procedure: Check all bolts/nuts/washers are in place and secure. Ensure the camera is properly secured. Check condition of safety sling and pin bow shackle checking for signs of corrosion	
	LWR054	Description: Snatch Block Location: Level 9 (Monkey Board Level) Port Forward	Primary/Secondary Securing: Secured to derrick structure with wire rope slings, turnbuckle and four part shackles. Safety Securing: Wire rope secured to structural beam	Inspection Procedure: Check sheaves are secure and in good condition. Check condition of safety sling and shackle ensuring both are in place and secure. Check that snatch block and wire rope are retained. Ensure shackles fitted with split pins	
	LWR105	Description: Fingerboard Location: Level 9 (Monkey Board Level) Port Forward	Primary/Secondary Securing: Bolted to structure with lock nuts and washer Safety Securing: None required	Inspection Procedure: Check for signs of corrosion/damage. Check all nuts and bolts are secure and in place	

Annex G
Transportation and Equipment Loads

DROPS Cargo Securement Checklist

Destination: _____ Origin: _____

Cargo identifier: _____ (Basket #., tote tank #. etc.)

Checked by _____ Date: ____/____/____

If verified, place your initials in the box.

GENERAL	VERIFIED	N/A
Checked suitability and integrity of items being shipped (excessive, rust, damage, etc.)		
Forklift pockets and horizontal ledges of load are clear of debris (rocks, gravel, etc.)		
Checked all 6 sides of load / container for unsecured items (loose tools, wooden chocks, etc.)		
No loose items that are potential debris while in transport. (highway, at sea, crane lift, etc.)		
Excessive ice and water has been cleared.		
If required, all retaining covers / nets in place and secure		
Engineering and certification documentation checked and up to date.		
LIFTING AND RIGGING (Lift Points, Slings, Shackles, D-Rings, etc.)		
Padeyes are inspected and certified as per local requirements (Customer, DNV, etc.)		
Lifting slings are in good condition and certified.		
All shackles that are part of the rigging are the four part shackle type.		
Shackle nuts tight to the shackle bolts with cotter pins in place and turned back correctly.		
BOXED / CONTAINER CARGO (Baskets, Pallet Boxes, Tanks, CCU's, etc.)		
Contents inside the container secured and tubular items chocked to prevent movement.		
Items not protruding outside of the basket or container.		
Verify the SWL, TARE, and MGW, of the container and ensure the container is not overloaded.		
All lids / covers / caps / valves closed and secured		
Drip pans clean with no signs of leaks and drain plugs in place / and secured.		
Weight distributed evenly in the container.		
OPEN FRAMED LIFTS (Skids, Crash Frames, Service Units, etc.)		
Checked in and around the structure / base of open framed lifts (loose tools, plugs, litter, etc.)		
Checked for protruding items that can be snagged / sheared (couplings, eyes, etc.).		
All valves on equipment in closed position and caps secured.		
Drain plugs in skid frames in place and retention devices attached.		
All doors and access panels closed and secured		
TUBULARS AND OTHER SPECIAL LOADS		
Checked pipe bundles internally and removed debris (wooden pieces, litter, loose tools, etc.).		
All end caps and thread protectors are securely fastened.		
All load bundles externally for unsecured items (left tools, wooden chocks, etc.).		
All cylinders secured – primary and secondary with divider		
Any bottles have valve caps installed		

Annex H
Dropped Object Prevention Scheme Bridging

Table H. 1 – Snapshot Interface Table

#	Control Framework Section	Operator Policy	Contractor Policy	Document Reference	Accountable	Responsible	Comments and Remedial Actions
6							
7	Crane and Lifting Operations	X		Company document #			
8	No Lift Zones	X		Company document #			
9	DROPS		X	Company document #	Position	Position	3rd party policies are adhered to for work pertaining to coil tubing operations, wireline, and cementing.
10	Fitness to Work		X	Company document #			

Annex I
10 Questions to a Safe Lift

Question	Answer
1. Do personnel fully understand the lifting and hoisting procedures applicable to the lift?	Personnel operating the lift have been trained by a qualified person to learn the local lifting procedures and required controls (e.g., controls specified in HSE-MS and interface documents). The lifting and hoisting Person in Charge appoints persons to the lifting team members who have undertaken such training.
2. Have all personnel attended the toolbox talk?	The lifting and hoisting PIC ensures that all personnel involved in the lift, or who may be affected by it (e.g., adjacent work parties, owners of equipment in the load path), actively attend the toolbox talk from the start until completion.
3. Has a pre-use inspection of the lifting equipment been carried out and are the lifting accessories tagged or marked with the following? • Safe working load. • Unique identification number. • Valid certification date.	All lifting equipment has been inspected by a competent person prior to commencing work. It is common to use a checklist to ensure all aspects of the inspection are addressed (i.e., appropriate lifting accessories have been selected from the rigging loft and visually inspected by the designated qualified person). If deficiencies are identified, the lift is postponed until deficiencies are rectified.
4. Are all safety devices working?	All safety devices applicable to the lifting equipment are inspected prior to use. If faulty safety devices are present, the lifting equipment is not used.
5. Do all personnel know who the PIC of the lift is?	The PIC is a competent person who has overall control of the lift or hoist activity and acts on behalf of the organization requiring the load to be moved.
6. Is personnel competent and aware of individual tasks?	The lifting and hoisting PIC verifies that personnel in the lifting team understand their roles and responsibilities.
7. Is there an up-to-date lift plan and Job Safety Analysis (JSA), and do personnel understand the job and its precautions?	The lifting and hoisting PIC verifies that a fit-for-purpose JSA and lift plan are prepared for the lift and that the type of lift plan is based on a lifting categorization scheme. If generic lift plans and JSAs are used, these must be reviewed and amended (as necessary), to ensure they accurately reflect current conditions.
8. Do personnel involved know the environmental limits (e.g., maximum permissible wind speed) for the lift?	Prior to a lift, the lifting and hoisting PIC must verify that the environmental conditions are within permissible limits and suspend the lift if limitations are exceeded. The lifting team members must be informed of the “STOP the Job Criteria” with respect to environmental limits (e.g., lightening, wind speed).
9. Is the lift area controlled and is personnel clear on necessary actions to take if the load falls or swings?	Prior to commencing the lift; the lift area, landing area, and load travel path must be assessed and action taken to prohibit incursion by personnel not involved in the lifting and hoisting operation. Barriers and signs are to be used where necessary.
10. Are signaling and communication methods agreed by and clear to you?	Standardized signaling methods must be used (e.g., radios and/or hand signals). Only the signaler (banksman) is to communicate with the lifting appliance operator. The emergency stop signal can be given by any person.

Annex J
Performance Influencing/Shaping Factors

Examples of Performance Influencing/Shaping Factors

Performance Shaping Factors (PSFs) Checklist

Use this list of Performance Shaping Factors (PSFs) to identify things that could prompt a person to make a mistake in certain circumstances and identify opportunities to better manage these potential situations.

Understand which tasks in a job are **critical**.

Identifiy - under **which conditions they can go wrong**.

Explore using the **Performance Shaping Factor** checklist.

PERFORMANCE SHAPING FACTORS	GUIDANCE OR EXAMPLES
Steps where mistakes could be made.	Do you know which stages of the task could result in a high consequence event following a mistake?
Stops that cannot be done or are inefficient to do in reality.	Are there opportunities for the person to find a different way? Think about a cold, dark night - would it get done?
Unusual, infrequent, unfamiliar or novel situations.	Does the person have the necessary skills, experience and capability?
Boring, trivial or repetitive actions.	Could the person "switch off" or do the task on auto pilot? Could new information or changes be missed?
Difficult system or equipment interface labeling, controls, alarms.	If the operator went to the wrong plant area would the labeling and procedure identify that to the operator?
Steps where there might be insufficient time available.	Time pressure can have a big effect on reliability - could perceived or actual time pressure exist?
Complex or difficult to understand steps.	Is it clearly understood what needs to be done? Does the procedure make this clear?
Unclear signs, signals, instruction, or other information.	Is information from signs, signals, documentation etc. unclear, missing detail or confusing?
Difficult working environment (noise, heat, cramped conditions, lighting, ventilator, ease of access).	Look at how the environment can cause a mistake. E.g., noise - can reduce communication quality, lighting and line of sight could cause someone to miss key information.
Relies on recognizing emerging hazard, risk, or change.	Could the person be engaged in activity and miss a situation change?
Potential for interruptions or distractions.	Does the task involve a need for high vigilance or concentration? Is the task completed in a busy area? Can the operator identify potential interruptions?
Involves multi-tasking.	Could the person be distracted by doing something else part-way through task? (e.g., manually filling a tank, etc.)
Right tools might not be available or used.	Does the person have all they need close at hand to complete the activity? (e.g., hand tools, procedure etc.)
Relies on good communications with colleagues, supervision, contractor.	Could information quality be poor during verbal and written communication?

Annex K
Human Performance Online Resources

An eLearn on the key focus areas of Human Performance is available to all by the Energy Institute, Chartered Institute of Ergonomics and Human Factors (CIEHF), and i-Cab (free of charge). Topic areas covered are listed below and there are resources embedded therein including tools on task analysis as well as a Human Performance in Investigation Toolkit.

- Incident Investigation
- Task Analysis
- Designing for People
- HP in Procedures
- Leadership and Culture
- Safety Critical Communications
- Workload, Stress, and Fatigue

The eLearn can be accessed through the following link:

https://lms.i-cab.org/energy/humanperformance

An advanced HP competency framework is also available on the site above where a program has been developed to raise competency to a skill level that results in a certification by the CIEHF.

For more information, a Recommended Practice for Human Performance Integration, and other HP resources, please see the Human Performance in Oil and Gas at:

www.HPOG.org

Annex L
DROPS Recommended Practice Gap Analysis

Click here for the electronic fillable version of the DROPS Recommended Practice Gap Analysis