
DROPS
DROPPED OBJECTS PREVENTION SCHEME

- **Eliminate injury to people and damage sustained to equipment due to dropped objects throughout the full supply chain;**
- **Ultimately to deliver a ‘second-nature’ dropped objects prevention strategy for all industry sectors.**

- **BEST PRACTICE** ☑
- **RECOMMENDATIONS** ☑
- **GUIDANCE** ☑
- **COMMITMENT** ☑
- **POLICIES** ☑
- **RESOURCES** ☑

COMMON DROPS OBECTIVES

- MEMBER FUNDED, MEMBER DRIVEN ☑
- GLOBAL REPRESENTATION ☑
- REGIONAL CHAPTERS AND COMMITTEES ☑

Collating ‘Best in Class’ DROPS Guidance

DROPS Global

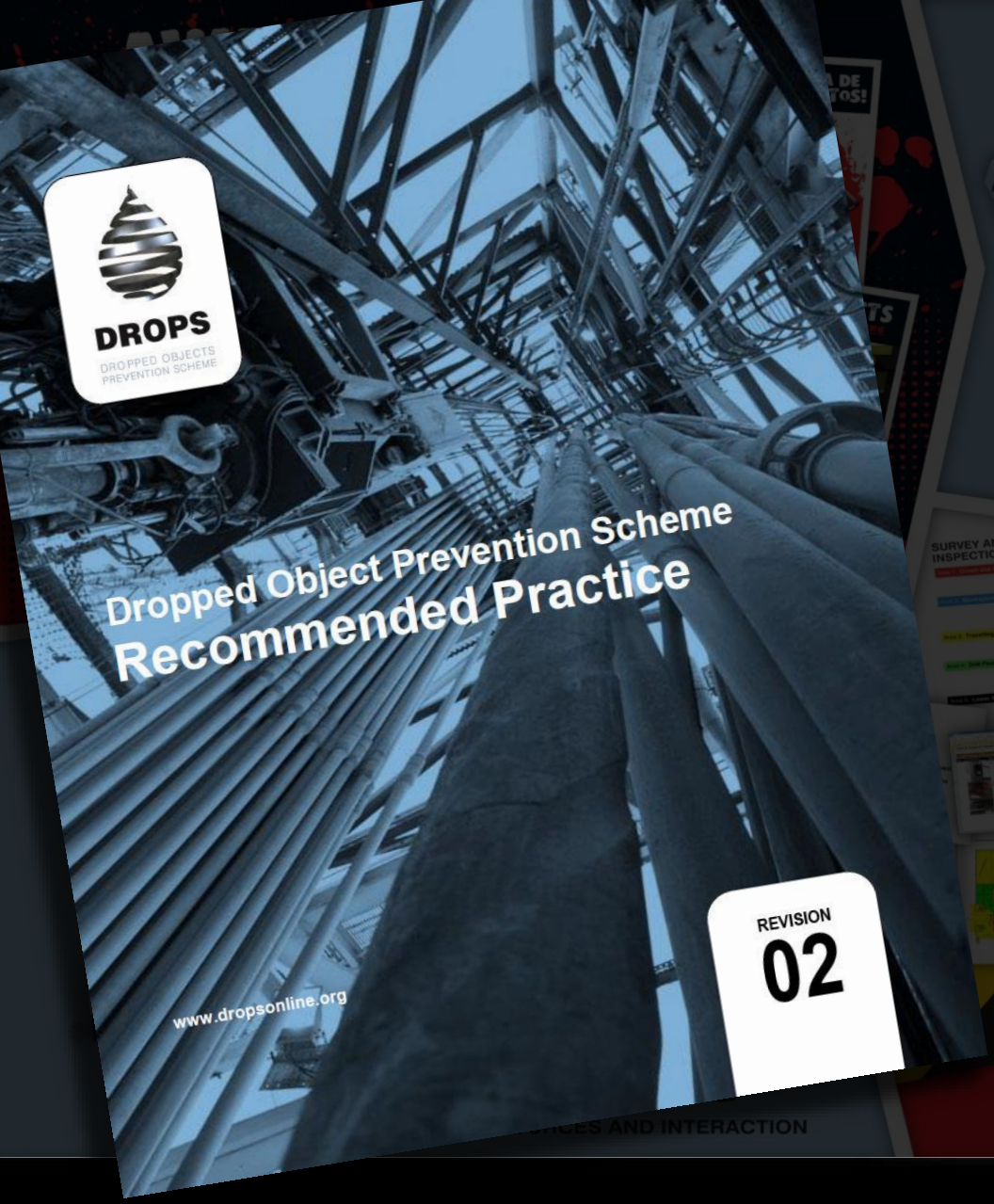
Regional Chapters

STEERING COMMITTEE

- Chaired by Operator(s)
- Representation from Major Drilling Contractors and Service Partners
- Industry Bodies and Specialists

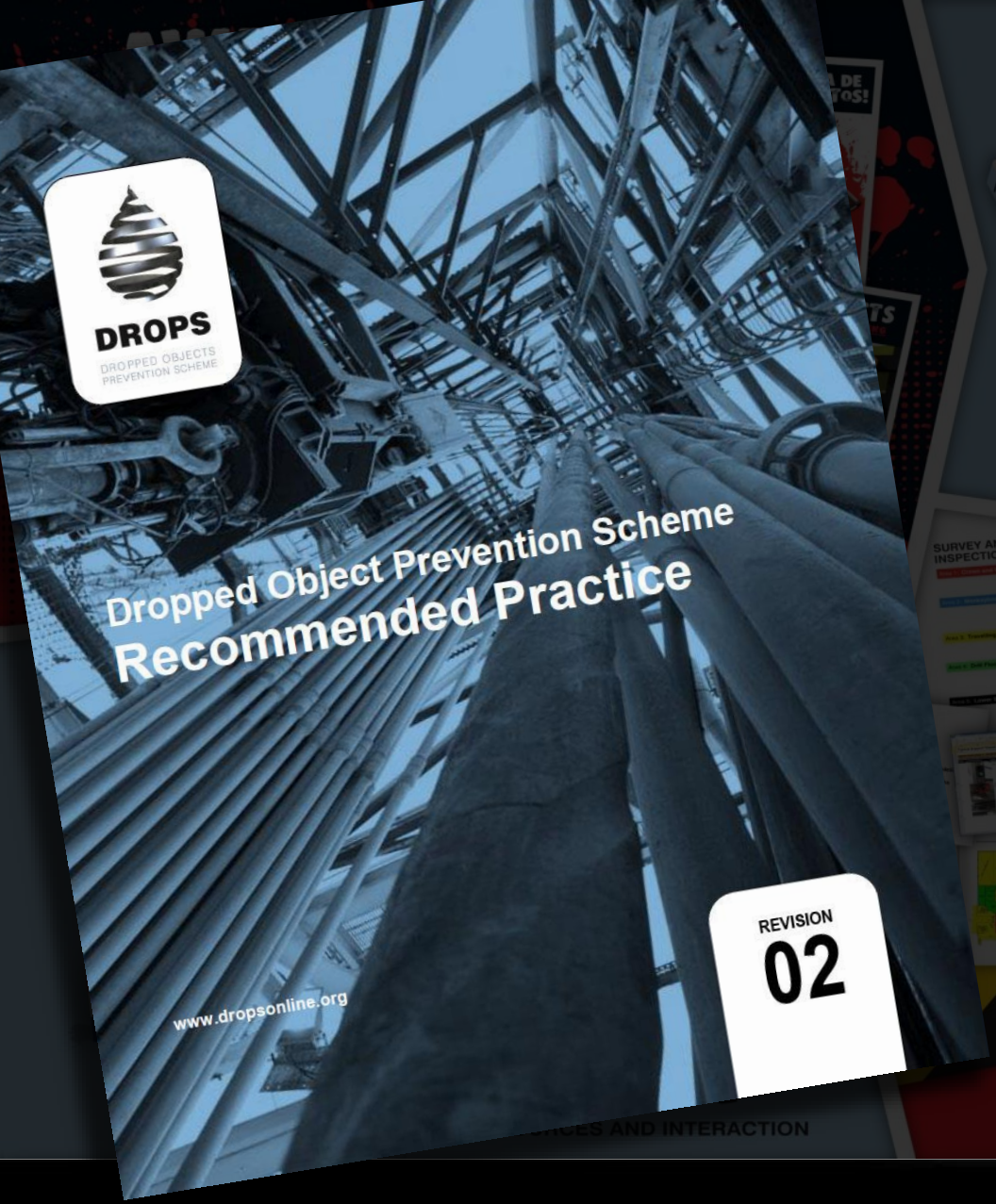
WORK GROUPS

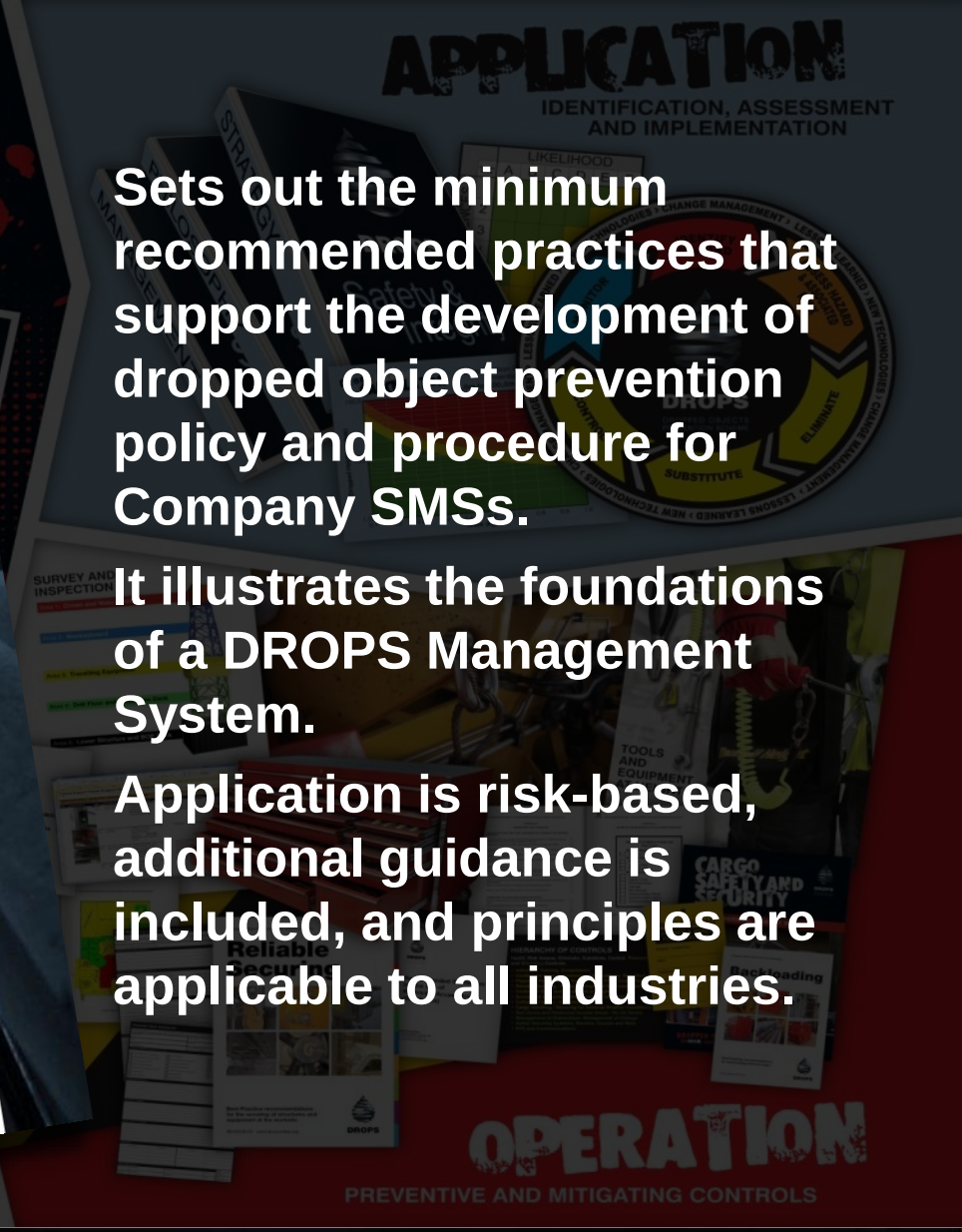
- Quarterly Meetings
- Communications
- Local Events
- Topics and Projects



- DEFINITIONS
- RISK ASSESSMENTS
- CONTROLS
- ROLES
- SMS BRIDGING
- ZONE MANAGEMENT
- MONITORING
- TRAINING
- SURVEY & INSPECTION
- WORKSITE HAZARD MANAGEMENT
- HUMAN PERFORMANCE
- REPORTING
- GAP ASSESSMENT

COMMON APPROACH



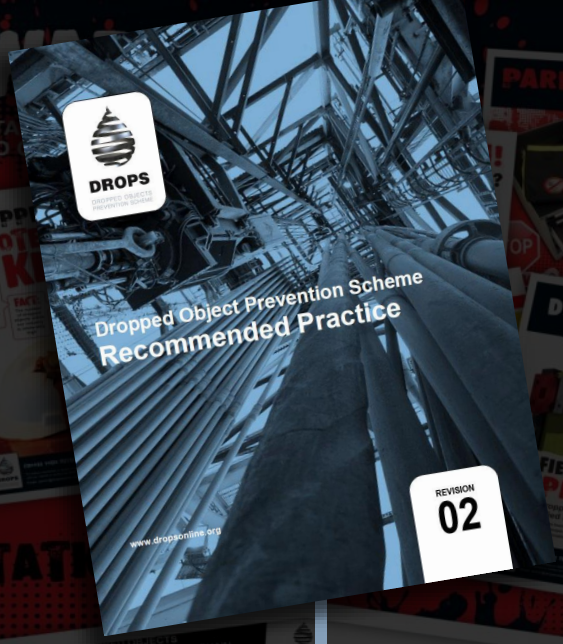


Sets out the minimum recommended practices that support the development of dropped object prevention policy and procedure for Company SMSs.

It illustrates the foundations of a DROPS Management System.

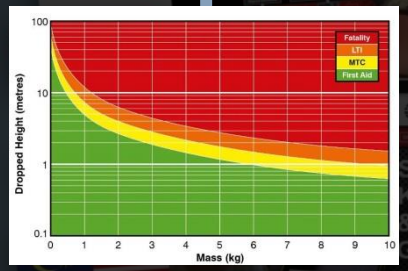
Application is risk-based, additional guidance is included, and principles are applicable to all industries.

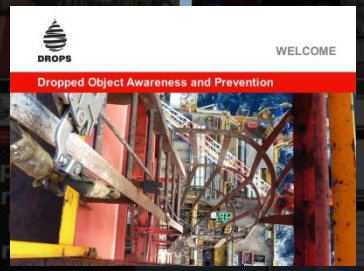
COMMON APPROACH

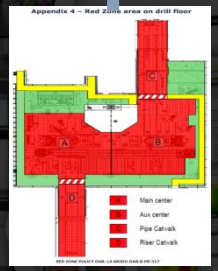


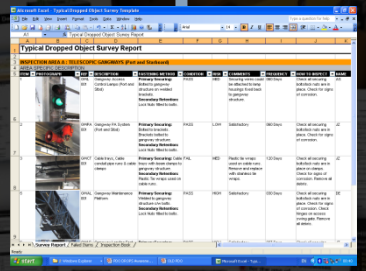
Best Practice and Functional Recommendations.

Linked references, appended guidance materials, templates and checklists.









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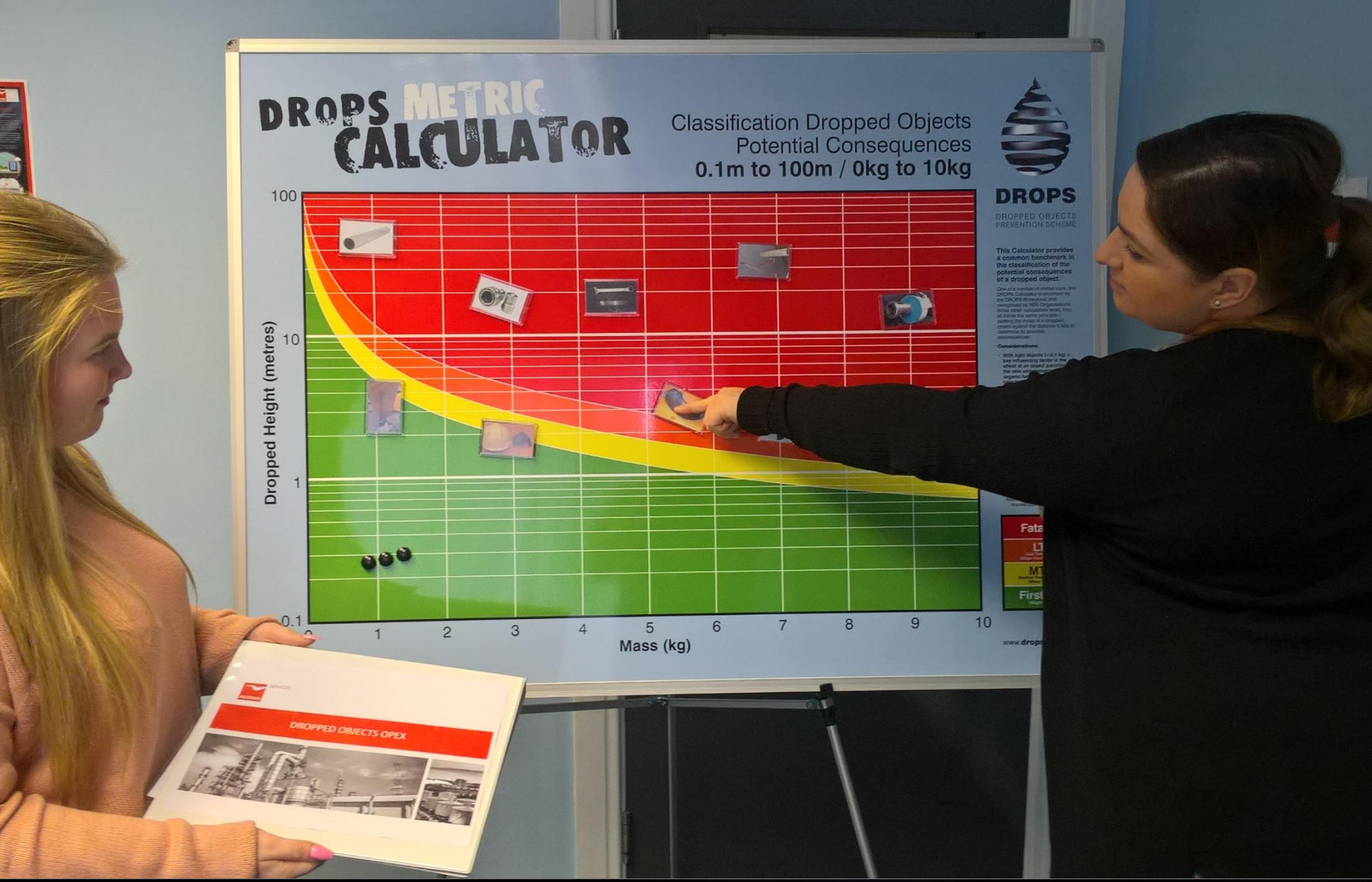
COMMON FREE RESOURCE

FUNCTIONAL RECOMMENDATIONS

- Risk Assessment Guidance
- Worksite Best Practice
- Standardised Definitions
- Lifecycle Opportunities
- Technical Reference
- Training Resource
- Readily Adaptable
- FREE DOWNLOAD

CONSOLIDATED GUIDANCE

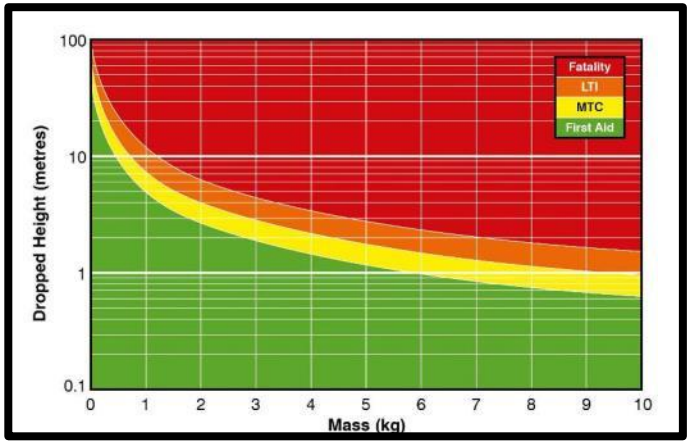


TRAINING AND AWARENESS

WORKING AT HEIGHT

All Personnel. All Activities.

Identification of static and dynamic dropped object hazards and risk assessment shall be documented during all Pre-Task activities and JSAs (e.g. tools and equipment at height, collision checks, environmental factors, housekeeping, removal/replacement of equipment at height, concurrent operations and application of **DROPS Calculator** in the assessment process).



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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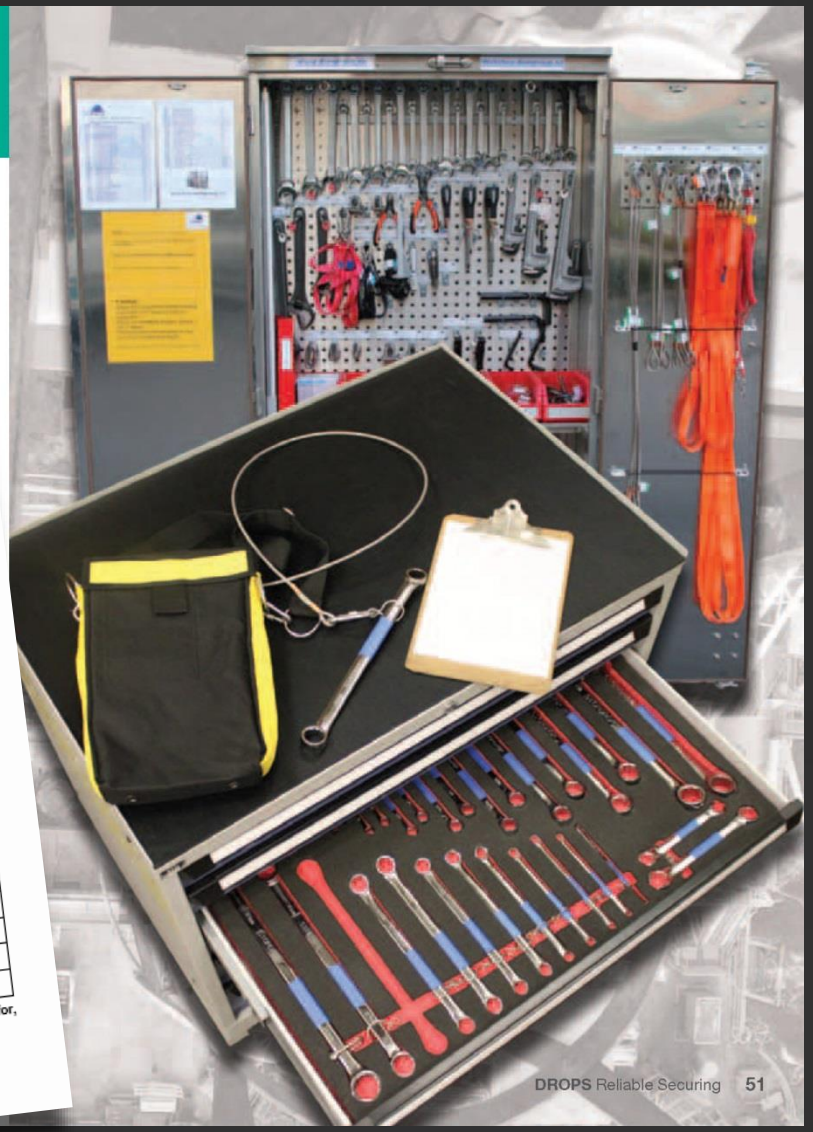

TOOLS & EQUIPMENT AT HEIGHT

WORKSITE BEST PRACTICE

General Tips fo… Object Free Wo…

Before starting any task, consider… dropped objects. Even if your tas… the environment where you will p… activities that may be going on a…

- Pay particular attention to env… factors such as wind, ground d… helicopter downdrafts, heave, s…
- Before commencing the tas… inspect the work area for … dropped object hazards suc… items and debris.
- Check all equipment and stru… area to ensure that all fasten… clips, covers, panels, hatche… guardrails etc are properly se…
- Check all secondary retentio… in place (eg split / cotter pi… lock washers etc).
- Check all safety securing de… are in place, secured to sou…

Dynamic Dropped Objec…

Combining Gravity with … Vibration and Loading, … Pressurised Equipment… for dynamic dropped ob… source if possible. Ensu… tool box talks, risk asse…

DROPS

CHOOSE…

For further … Email: a…

Maintenance H… Best Practice

Detailed task planning and verifi… intrusive inspection, repair or m… reduce the potential for droppe… testing and operational modes.

- Prior to starting, review pre… outs, task risk assessments … learnings relating to the task…
- Review the task steps to id… errors may be made (e.g. re… new snagging hazard; tool… inside/on top of equipment; f… safety securing device after …
- Identify all moving equipm… equipment and areas … significant exposure to … that may cause dropped …
- Create an inventory … equipment and mater… during maintenance to … are removed from … completion.
- Obtain all relevant … drawings to ensur… manufacture and inst… are up to date.

Ensure all dropp… This will include… items removed … debris etc. Alwa… by collisions, s…

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Task Planning and Risk Assessm…

Effective planning and risk assessment … appropriate resources and personnel ar… task to eliminate or reduce the likelihoo…

- Always inspect the worksite prio… starting the job to eliminate pre-exi… potential dropped objects, espe… where recent activities have taken pl… the worksite has been exposed to … environmental factors or dynamic fo…
- Understand each phase of the ta… equipment and tools being used … associated hazards and ch… (securing techniques, access etc)
- Ensure any pre-lift inspection … available and understood.
- Identify and talk through task st… it is more likely that a dynami… object could occur and how t… prevented.
- Be realistic and specific in… potential dropped objects … hardware, debris, hard hat etc…

Always apply Hierarchy o… dropped object has been … administrative controls a… controls are available im…

DROPS

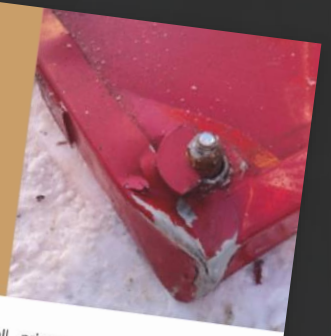
CHOOSE…

For further …

Email: a…

Dynamic Dropped Objects: Inspection Tips

Dynamic Dropped Objects are items that are dislodged or become disengaged due to applied force. Consider each of the following tips during all pre-task checks and inspections, and at any time where dynamic forces are prevalent.



- **Walk through each step of the Task** to identify where dynamic forces will affect fastenings, equipment and structure, ensuring that collision or snagging potential is identified and carefully managed. *(See overleaf for dynamic forces).*
- Where moving or moveable equipment is in **direct contact with structure or other equipment**, ensure all operational and parked positions are fully in accordance with asset procedures and all OEM instructions and recommendations.
- Conduct **tactile checks** of equipment or structure if safe to do so, request movement of any equipment that obstructs effective inspection.
- **Immediately report any defects** such as distortion, abrasions, corrosion *(particularly where damage has caused coating or fabric deterioration).*
- Any **unusual sounds** that might signify excessive vibration, wear, imbalances or shock loading should be reported to the equipment operator and / or Technical Authority immediately.
- Identify and check all primary fastenings and **ensure appropriate secondary retention is in place and functioning correctly** *(e.g. split pins, safety pins, roll pins, lock wire, grubs screws, washers, locking devices etc).*
- Check applications and positions of all primary fastenings and secondary retention devices to **ensure they cannot be dislodged or damaged** by nearby equipment or other forces.
- Where safety securing devices such as nets and wires are applied, ensure these are appropriately rated, installed correctly and **do not present a snagging hazard.**
- During activities involving the use of lifting equipment, **ensure collision checklists are developed** and adapted as required to suit current environmental and worksite factors.
- **Ensure all new or modified equipment is carefully risk assessed** to ensure all fastenings, components and associated inspection criteria address the potential for dynamic forces to cause dropped objects.

Question the robustness of all fastenings and devices that are subjected to continuous dynamic forces, including any internal components.

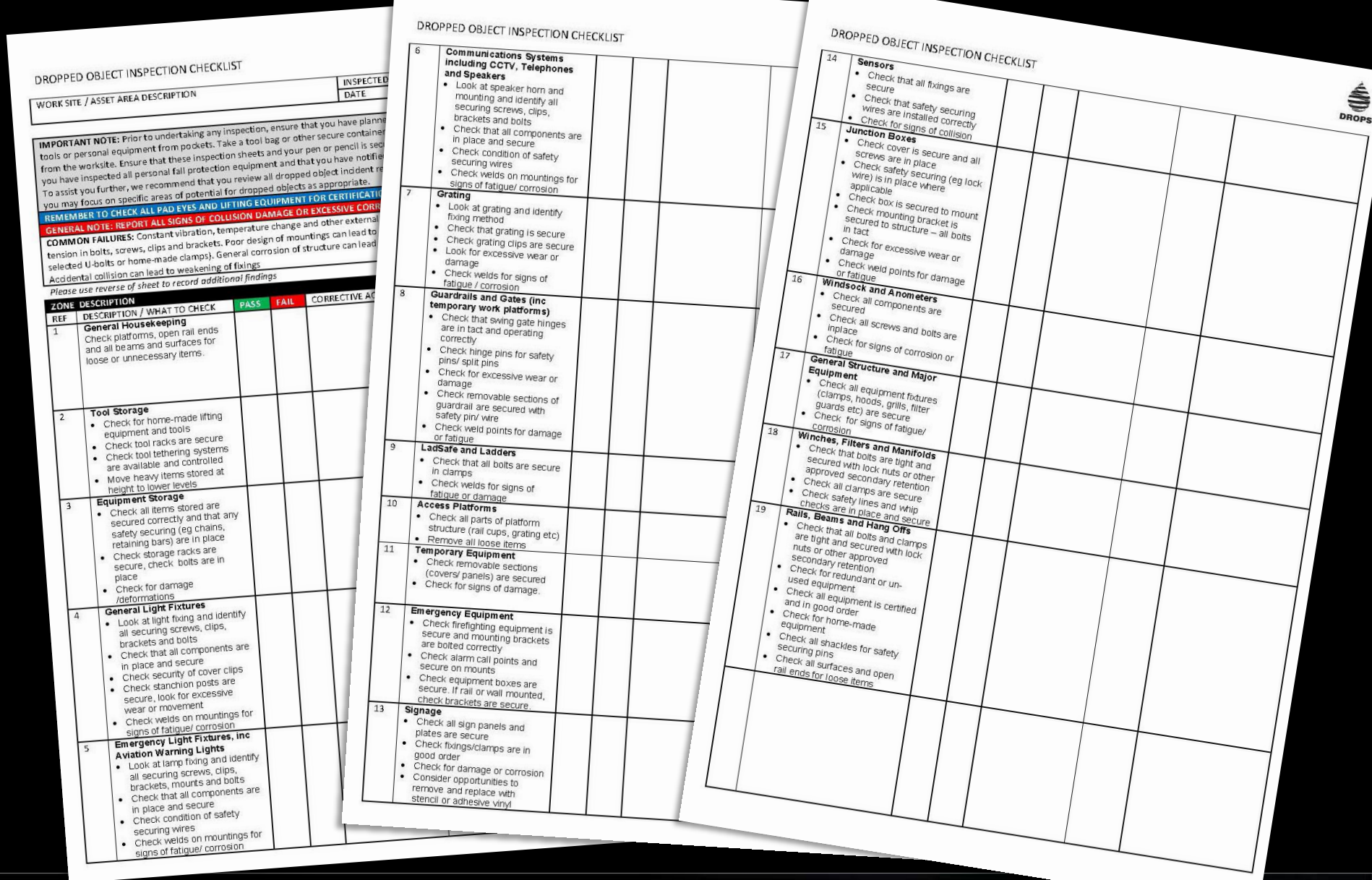
In addition to routine visual inspections, consider how items and objects are affected by vibration, continuous loading and exposure to multiple factors in the local environment. Request assistance from Technical Authorities and Manufacturers in determining any requirements for enhanced inspection and preventive maintenance.

For more info on DODI SEMS Dropped Object Prevention, please speak to the SDR or to your Supervisor.

CHOOSE YOUR FUTURE MAKE A DIFFERENCE

DIAMOND OFFSHORE

DROPS



DROPPED OBJECT INSPECTION CHECKLIST

WORK SITE / ASSET AREA DESCRIPTION | INSPECTED | DATE

IMPORTANT NOTE: Prior to undertaking any inspection, ensure that you have planne
tools or personal equipment from pockets. Take a tool bag or other secure containe
from the worksite. Ensure that these inspection sheets and your pen or pencil is sec
you have inspected all personal fall protection equipment and that you have notifie
To assist you further, we recommend that you review all dropped object incident re
you may focus on specific areas of potential for dropped objects as appropriate.

REMEMBER TO CHECK ALL PAD EYES AND LIFTING EQUIPMENT FOR CERTIFICATI

GENERAL NOTE: REPORT ALL SIGNS OF COLLISION DAMAGE OR EXCESSIVE CORR

COMMON FAILURES: Constant vibration, temperature change and other external
tension in bolts, screws, clips and brackets. Poor design of mountings can lead to
selected U-bolts or home-made clamps). General corrosion of structure can lead
Accidental collision can lead to weakening of fixings

Please use reverse of sheet to record additional findings

ZONE REF	DESCRIPTION / WHAT TO CHECK	PASS	FAIL	CORRECTIVE AC
1	**General Housekeeping** Check platforms, open rail ends and all beams and surfaces for loose or unnecessary items.			
2	**Tool Storage** • Check for home-made lifting equipment and tools • Check tool racks are secure • Check tool tethering systems are available and controlled • Move heavy items stored at height to lower levels			
3	**Equipment Storage** • Check all items stored are secured correctly and that any safety securing (eg chains, retaining bars) are in place • Check storage racks are secure, check bolts are in place • Check for damage /deformations			
4	**General Light Fixtures** • Look at light fixing and identify all securing screws, clips, brackets and bolts • Check that all components are in place and secure • Check security of cover clips • Check stanchion posts are secure, look for excessive wear or movement • Check welds on mountings for signs of fatigue/ corrosion			
5	**Emergency Light Fixtures, inc Aviation Warning Lights** • Look at lamp fixing and identify all securing screws, clips, brackets, mounts and bolts • Check that all components are in place and secure • Check condition of safety securing wires • Check welds on mountings for signs of fatigue/ corrosion			
6	**Communications Systems including CCTV, Telephones and Speakers** • Look at speaker horn and mounting and identify all securing screws, clips, brackets and bolts • Check that all components are in place and secure • Check condition of safety securing wires • Check welds on mountings for signs of fatigue/ corrosion			
7	**Grating** • Look at grating and identify fixing method • Check that grating is secure • Check grating clips are secure • Look for excessive wear or damage • Check welds for signs of fatigue / corrosion			
8	**Guardrails and Gates (inc temporary work platforms)** • Check that swing gate hinges are in tact and operating correctly • Check hinge pins for safety pins/ split pins • Check for excessive wear or damage • Check removable sections of guardrail are secured with safety pin/ wire • Check weld points for damage or fatigue			
9	**LadSafe and Ladders** • Check that all bolts are secure in clamps • Check welds for signs of fatigue or damage			
10	**Access Platforms** • Check all parts of platform structure (rail cups, grating etc) • Remove all loose items			
11	**Temporary Equipment** • Check removable sections (covers/ panels) are secured • Check for signs of damage.			
12	**Emergency Equipment** • Check firefighting equipment is secure and mounting brackets are bolted correctly • Check alarm call points and secure on mounts • Check equipment boxes are secure. If rail or wall mounted, check brackets are secure.			
13	**Signage** • Check all sign panels and plates are secure • Check fixings/clamps are in good order • Check for damage or corrosion • Consider opportunities to remove and replace with stencil or adhesive vinyl			
14	**Sensors** • Check that all fixings are secure • Check that safety securing wires are installed correctly • Check for signs of collision			
15	**Junction Boxes** • Check cover is secure and all screws are in place • Check safety securing (eg lock wire) is in place where applicable • Check box is secured to mount • Check mounting bracket is secured to structure – all bolts in tact • Check for excessive wear or damage • Check weld points for damage or fatigue			
16	**Windsock and Anometers** • Check all components are secured • Check all screws and bolts are inplace • Check for signs of corrosion or fatigue			
17	**General Structure and Major Equipment** • Check all equipment fixtures (clamps, hoods, grills, filter guards etc) are secure • Check for signs of fatigue/ corrosion			
18	**Winches, Filters and Manifolds** • Check that bolts are tight and secured with lock nuts or other approved secondary retention • Check all clamps are secure • Check safety lines and whip checks are in place and secure			
19	**Rails, Beams and Hang Offs** • Check that all bolts and clamps are tight and secured with lock nuts or other approved secondary retention • Check for redundant or un-used equipment • Check all equipment is certified and in good order • Check for home-made equipment • Check all shackles for safety securing pins • Check all surfaces and open rail ends for loose items			

DROPS

DROPS SURVEY & INSPECTION

Introduction

This document is intended to help eliminate the risk of dropped objects. It embraces the requirement for worksite hazard management and illustrates best practice recommendations for Reliable Securing.

The content applies to all personnel, tools, equipment and structures associated with design, supply, transportation, installation, maintenance, operation and dismantlement activities across industry.

Reliable Securing is an independent publication developed in close collaboration with equipment suppliers and users. It's purpose is to disseminate knowledge and best practice.

In many cases, the recommendations presented in this handbook will identify opportunities for improvement.

Whilst it may be impracticable to adhere to all the recommendations, the content sets a standard we should aspire to.

Should you choose to adopt Reliable Securing best practice, the onus is on you to effectively manage any subsequent changes to existing equipment, systems and working practices.

The recommendations presented in this document do not affect, replace, or supersede any applicable industry Codes, Standards, Type Approvals or OEM Recommendations.

Please be advised:

- ***Any modifications made to equipment, tools, structure or working methods - even if they provide a safer solution – will be subject to Management of Change.***
- ***Always identify Original Equipment Manufacturer (OEM) recommendations with regard to securing.*** *(In many cases, appropriate retention methods may already be integrated or are available on request.)*
- ***Always identify all associated ownership, maintenance, inspection and certification of equipment, tools and structures.***
- ***Always confirm that you have the authority, knowledge, experience and skills to proceed before applying any of the tools or techniques presented in this document.***

What is Reliable Securing?

In simple terms, Reliable Securing is the appropriate selection, application and management of all fastenings and fixings. To achieve and assure the required levels of performance, these should be designed accurately, installed properly and maintained consistently.

Reliable Securing provides a safeguard against potential yielding, displacement or failure of fastenings which can lead to equipment or structure falling.

This revised edition of DROPS Reliable Securing demonstrates dependable retention methods and technologies.

Reliable Securing reduces the Probability of dropped objects through good design, planning, inspection and application of preventive controls and barriers.

Reliable Securing reduces the Consequences of dropped objects through implementation of appropriate safety securing systems, mitigating practices and processes.

Reliable Securing outlines the key factors that contribute to dropped objects and identifies opportunities to improve hazard identification and risk assessment processes.

RELIABLE SECURING DEFINITIONS

Primary Fixing

The primary method by which an item is installed, mounted and secured to prevent the item falling, *(eg bolted connections, screws, pins, buckles, clips, welds etc.)*

Secondary Retention

The engineered method for securing the primary fixing to prevent loss of clamping force or displacement of fastening components, *(eg locking washers, locking wire, split pins / cotter pins, etc.)*

Also referred to as Second Barrier or Fail Safe feature in some engineering descriptions.

Note: Double Lock-nutting or Dual Nutting is NOT recommended as a reliable method for retaining loads in tensioned bolting.

Safety Securing

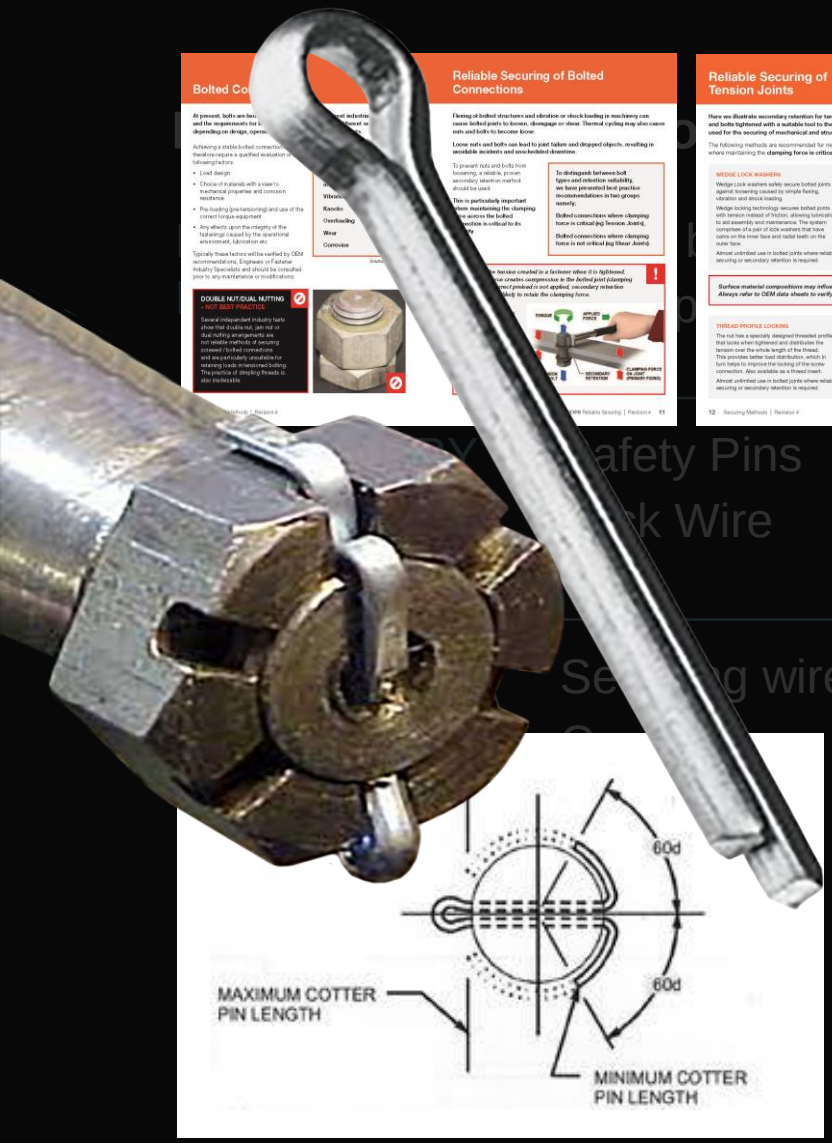
An additional mechanism for securing the item to the main structure, suitably selected to restrain the item or its components from falling should the primary fixing fail, *(eg rated steel or synthetic nets, lanyards, baskets, wires, slings, chains etc.)*

STANDARISED DEFINITIONS / PRINCIPLES

Primary Fixing, Secondary Retention and Safety Securing

PRIMARY FIXINGS	Nuts, bolts, screws Clamps, Pins, Hinges	Brackets, Turnbuckles Welds	PREVENTIVE
SECONDARY RETENTION	Safety Pins Lock Wire	Locking Nuts Locking Washers	PREVENTIVE
SAFETY SECURING	Securing wire Connectors	Nets and Baskets Safety Chains	MITIGATING

STANDARISED DEFINITIONS / PRINCIPLES



Bolted Co
Reliable Securing of Bolted Connections
DOUBLE NUT/DUAL NUTTING – NOT BEST PRACTICE


Reliable Securing of Tension Joints


Reliable Securing of Other Bolted Connections

Locking Wire

Locking wire should only be applied by competent persons specifically trained in its correct use.

LOCKING WIRE / SAFETY WIRE

Wire locking of bolts is a method adopted from the aviation industry. In brief, the method involves threading a wire through holes in bolt heads to prevent loosening due to vibration and other forces.

The wire is twisted before being threaded and is locked to the next bolt.

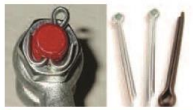
Areas of use:
Used extensively for locking external bolted connections on machinery and equipment, in particular where there are no through-bolts. The presence of locking or safety wire may also serve to indicate fasteners have been properly tensioned.

BEST PRACTICE RECOMMENDATIONS:

- No more than three bolts should be lock wired together and span between bolts should not exceed 150mm
- Lock wire should be stainless steel suitable for the operational environment
- Lock wire diameter should suit application and respective bolt size.

May stretch, break or corrode if not properly fitted, allowing fastener rotation and loosening when exposed to dynamic loading.

Split Pins / Cotter Pins



A split pin is a metal fastener with two 'tines' or 'prongs' that are bent during installation. Also known as a cotter pin or cotter key (USA), these are used to secure other fasteners such as bolts, nuts and clevis pins.

BEST PRACTICE RECOMMENDATIONS:

- Split pins should be the correct diameter and length for the application and should be bent (or splayed) sufficiently to prevent them from being knocked out, as shown in the image above
- Extended Prong type pins should be used on 4 part shackles
- Split pins should be made of a stainless steel suitable for the operational environment
- Split pins should only be used once and should be inspected regularly and replaced when they no longer function as intended.

Split Pins should only be used as a secondary retention method (ie. to retain nut on a shackle, to retain castle / crown nut etc).

Linch Pins, R-Clips, Spring or Roll Pins, Nappy Pins, or any other type of pin device that can spring or be knocked out should be avoided when used on lifting and hoisting equipment or for securing of equipment or structure at height.

LINCH PIN | SPRING PIN | R-CLIP | NAPPY PIN

SECONDARY RETENTION

Dropped Objects Awareness and Prevention

Reliable Securing

REVISION 04

Best Practice Recommendations for the securing of structures and equipment at the worksite.

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Safety Nets and Meshes

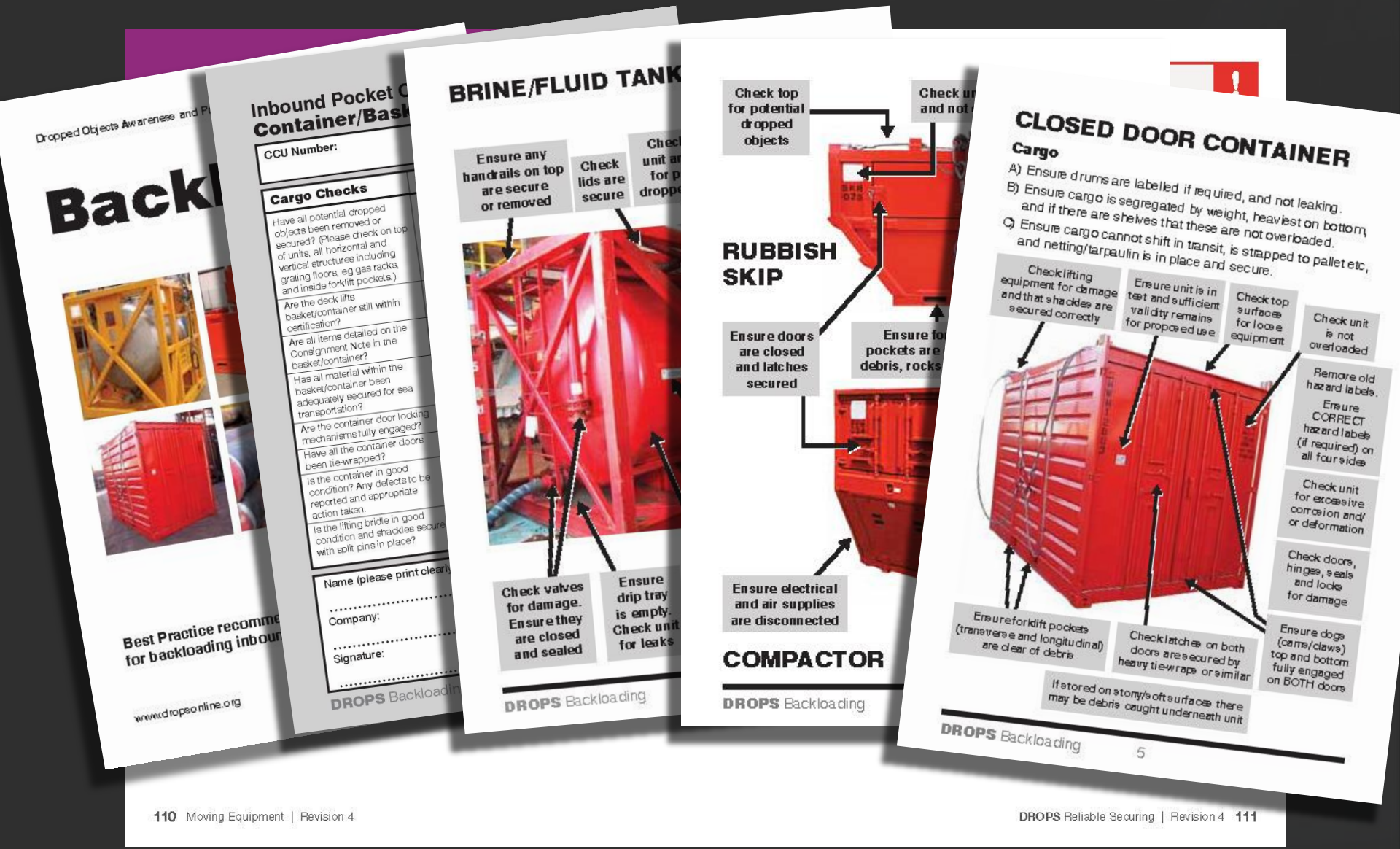
These safety securing devices fully enclose equipment fixed at height that presents a high risk of becoming a dropped object.

Designed to be easily installed, they are particularly well suited to applications where equipment or its components are assessed to be at risk of failure due to factors such as numerous components, design quality, internal or external corrosion, vibration and so on.

BEST PRACTICE RECOMMENDATIONS:

- Always refer to net or mesh manufacturer's recommendations for appropriate selection, installation, maintenance and product life limitations
- Ensure product is suitable for the operation and the environment, with due regard to potential galvanic corrosion
- Detailed risk assessment should consider catastrophic failure of primary fixings both with and without safety nets, meshes or safety wires
- The operational integrity of any electrical equipment should not be compromised or impeded by the introduction of safety nets or meshes
- As with all other safety securing devices, safety nets and meshes should be regularly inspected and replaced if they no longer perform their intended function
- Carefully assess any impact on other activities such as general maintenance access or snagging hazards.

TECHNICAL REFERENCE & GUIDE



WORKGROUP OUTPUTS

ADDRESSING DROPS EXPOSURE

- **GET INVOLVED**
- **Continually raise awareness of dropped object hazards throughout Supply Chain**
- **Exploit DROPS Guidance to inform Task Risk Assessment and apply Hierarchy of Control**
- **Review task specific assessments** *(and procedures)* **to ensure all dropped object hazards are identified and eliminated or controlled**
- **Question robustness of securing devices**
- **Keep DROPS at the forefront of the Business.**

DROPPED OBJECTS

STILL HARMING
STILL KILLING

DROPS

DROPPED OBJECTS PREVENTION SCHEME

Thank You

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