
**STRATEGY
FOR ELIMINATING
INCIDENCE OF
DROPPED OBJECTS
WITHIN
DRILLING DERRICKS**



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FOREWORD

I am pleased to present to the Industry a Strategy to eliminate dropped objects from drilling derricks and masts. The work group was originally set up in Shell Expro in September 1997. Later in mid 1998, after a presentation of the draft strategy to BP-Amoco World Wide Drilling Managers, BP-Amoco joined the Workgroup. Eventually the Workgroup joined the Cross Industry Drilling Safety Workgroup as part of the Step Change Initiative.

I would like to thank the team:

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And all the drilling Contractors working for Shell and BP-Amoco at the time of developing this document and who contributed to it.

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J.L. Klok
 Shell Expro Team Leader

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INTRODUCTION

It has been recognised that over the years within the Industry, there have been a high number of incidents of dropped/falling objects within drilling derrick structures.

The potential for this type of incident to severely injure personnel or cause material damage on the drillfloor and in the surrounding area is very high. In extreme cases, fatal injuries to personnel have resulted.

Typical examples of these types of incidents are shown in Figure 1.

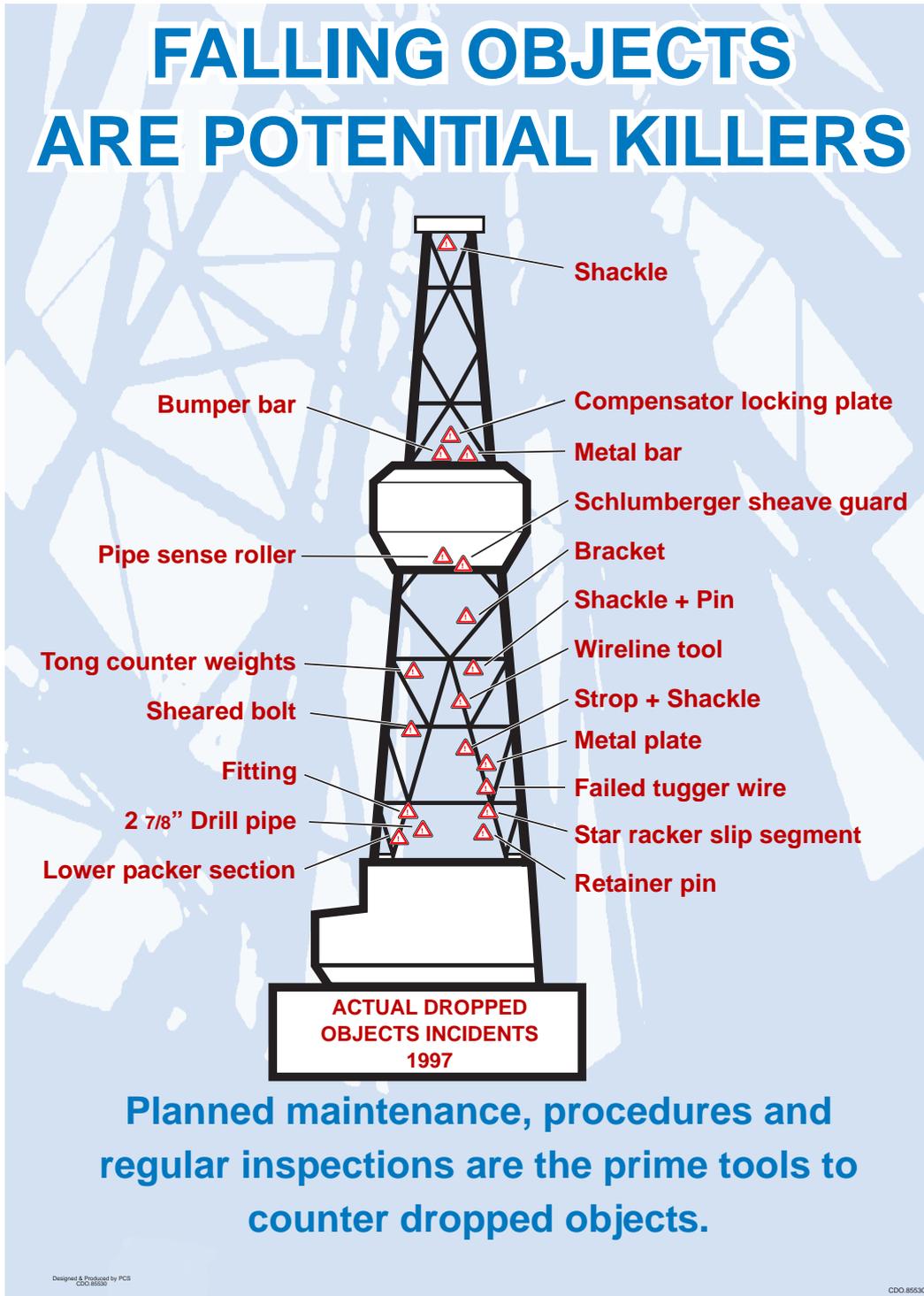


Figure 1

This situation cannot be tolerated and allowed to continue. Action requires to be taken to eliminate this type of incident from occurring.

It is not an Operator's problem or a Rig Owner's problem – it is a **COMMON PROBLEM** for anyone who uses a Drilling Derrick.

It occurs within Drilling Derrick structures on fixed installations, mobile drilling units and land rigs.

As such, it therefore means that the solution is not an individual one, but a **COMMON SOLUTION** and should be one that can be utilised by **EVERYONE** who is involved in working inside a Drilling Derrick.

Analysis of the data received from the Health and Safety Executive tells us that 35-40% of Dropped Objects within Drilling Derrick structures are failed fixtures, and this should be used as support to the starting of Steps 1, 2 and 3.

OBJECTIVES

The overall objectives of the strategy are:

- Eliminate injury and damage to people.
- Eliminate the incidence of damage sustained in the derrick structure.
- Eliminate damage to other associated derrick equipment.
- Eliminate damage to the drillfloor.

This can be achieved by eliminating the incidence of Dropped Objects from within Drilling Derrick structures.

STRATEGY

Overall

The strategy outlined is one which has had success in reducing the number of Dropped Objects from within Drilling Derrick structures and is recommended as a model to follow.

The strategy is as follows:

- Form a joint workgroup with the locations and sites involved, with identified Focal Points from each involved party at those locations.
- Identify the common problem areas.
- Develop an action plan.
- Carry out and monitor the action plan.

Workgroup

A 'Dropped Objects Workgroup' should be formed comprising, as a minimum, the following persons:

- An identified Chairman - a Senior Manager (to give the workgroup credibility).
- Identified Focal Point from each location/site within the relevant company operating unit, eg derrick owner Drilling Engineer.
- An HS&E Advisor.
- Focal Points from identified derrick main equipment manufacturers and suppliers.
- Top Line Management support.

The workgroup once formed should set out its Terms of Reference, agree the strategy to be followed, agree an action plan, commit to deliverables versus a time line and meet regularly to monitor progress and effectiveness of the action plan.

Common Problem Areas

The Workgroup should identify Common Problem areas.

These can be arrived at by analysing historical data such as incident reports, near miss reports, location drilling reports, reviewing operational procedures and data from Planned Maintenance Systems.

The identified problem areas can be used to form the basis of a remedial action plan.

Develop Action Plan

The Action Plan should be developed to tackle the identified problem areas and is best planned as and Steps as follows:

- Step 1 - Awareness Campaign**
- Step 2 - Action Plan**
- Step 3 - Remedial Action**
- Step 4 - Manufacturers and Suppliers**
- Step 5 - Automated Derrick Systems**
- Step 6 - Third Parties**
- Step 7 - Operations**
- Step 8 - Continuous Improvement**

Step 1 – Awareness Campaign

Raise the awareness of and alert everyone as to the nature of the problem and the actual and potential consequences of Dropped Objects from within Drilling Derricks.

This may be achieved by reviewing site specific incident reports for this type of event and highlighting the problem utilising a poster campaign. For an example of this see Figure 1.

Conversations should be held with individuals and teams to raise awareness of the problems and its consequences and what has to be done to eliminate the problems.

Step 2 – Action Plan

Take a complete inventory to find out and list what is within the location/site Drilling Derrick structure and identify that which has a potential to drop.

This inventory listing exercise can be achieved as follows:

- Divide the derrick into small manageable sections (eg crown block area, 20' below crown block area, monkey board area, 20' sections below monkey board area down to drillfloor). See Figure 2 as an example.

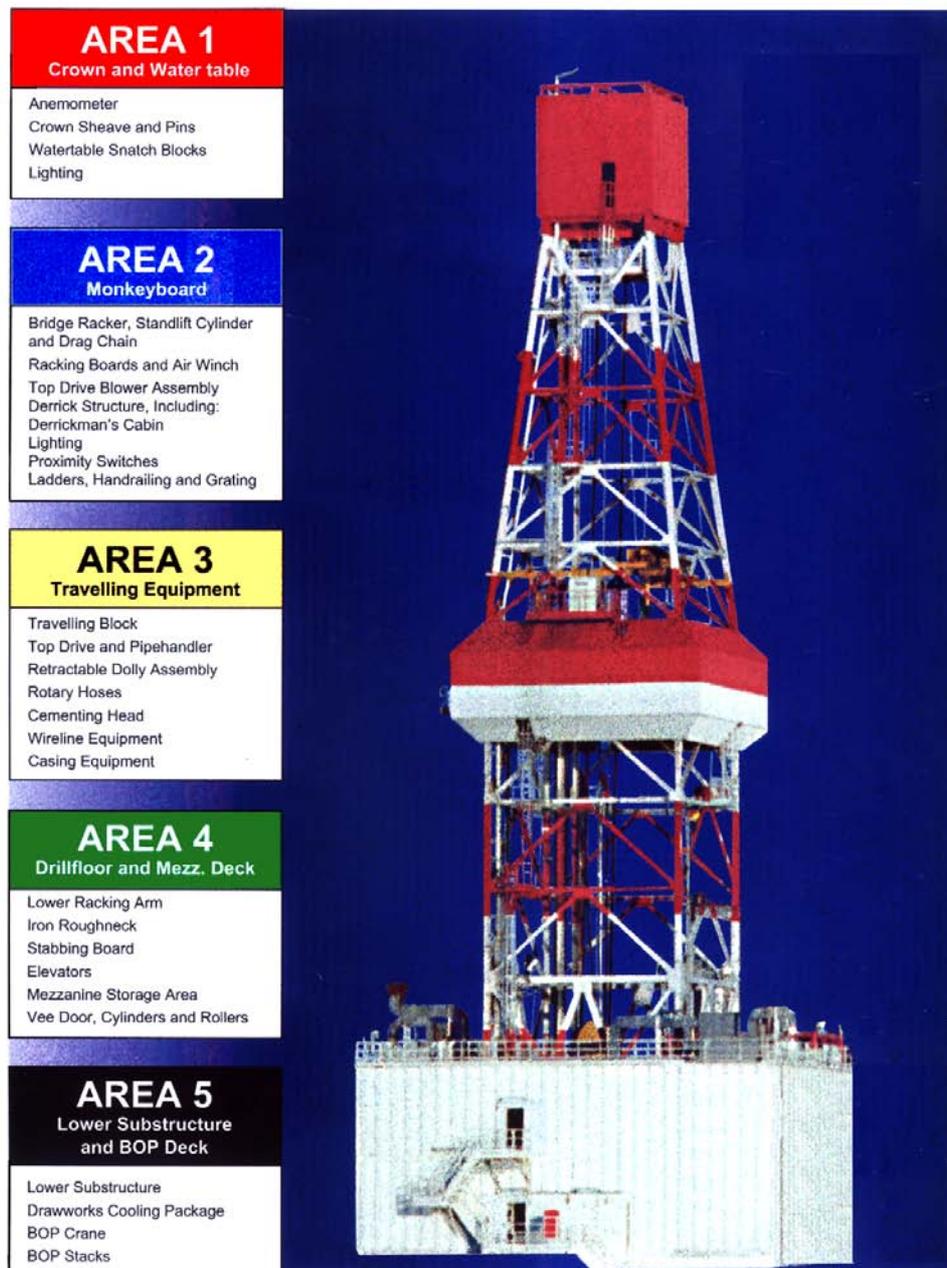


Figure 2

- Identify and remove all redundant equipment.
- Inventorise and map on a plan each section for:
 - Common items (eg light fittings, PA speakers, sheaves, shackles) and items that are permanent features of each section.
 - Whether they are a common or singular item.
 - Verification of item design – is it the same common item model?
 - Snagging areas, eg cables and wires.
 - 'Temporary equipment' for which no-one can remember why it's there.

- Identify the Risks associated with the inventorised items in terms of likelihood and consequence to fall.

Categorise these risks into Low, Medium and High and act to reduce the risk of a Dropped Object to As Low As Reasonably Practicable. See Figure 3 as an example.

EQUIPMENT	RISK	FASTENING	CONTROL
13.3 Sheave Brackets & Plates	Low	Single bolt & lock wire	Daily Derrick Inspection
13.4 Deadline Restrainers	Low	Single nut & cotter	Daily Derrick Inspection
13.5 Fastline Kite	Low	Shackles & safety wire	Daily Derrick Inspection
13.6 Block Hang-off line.	Low	Safety sling and shackles	1019 inspection
13.7 Hang-off clamp	Low	Bolted Clamp	1019 inspection
13.8 Wireline hang-off line	Low	Safety sling and shackles	1019 inspection
14. Crown Padeye Sheaves:			
14.1 Sheave Block Body	Low	1 MT Safety sling	Sling register
14.2 Sheave center pins	Low	“R” Clips.	Daily Derrick Inspection
14.3 Supporting shackles	Low	Tie Wraps	Daily Derrick Inspection
14.4 Diverter sheave brackets	Low	Pin & Lock plates	Daily Derrick Inspection
15. Bridge Racker:			
15.1 Hydraulic manifold.	Low	Bolts c/w single nuts.	Daily Derrick Inspection
15.2 Hydraulic pipework.	Low	Bolted pipe clamps	Daily Derrick Inspection
15.3 Main Support Beams.	Low	Single nut/spring washer	Daily Derrick Inspection
15.4 Support beam shims.	Low	Inserted from above.	Daily Derrick Inspection
15.5 Standlift Cylinder	Low	Mounting brackets	Daily Derrick Inspection
15.6 Mounting Bracket	Low	Single nut & cotter pin	Daily Derrick Inspection
15.7 Cylinder guide beam	Low	Single nut & cotter pin.	Daily Derrick Inspection
15.8 Cylinder guide sheave	Low	Pin c/w lock plate.	Daily Derrick Inspection
15.9 Diverter sheave support	Low	Single nut/spring washer	Daily Derrick Inspection
15.10 Diverter sheave	Low	Pin c/w lock plate.	Daily Derrick Inspection
15.11 Wire hoist line	Low	Socket/grip-pin & cotter	Daily Derrick Inspection
15.12 Hoist line swivel.	HIGH	Clevis pin & cotter.	Daily Derrick Inspection
15.13 Bridge Beams.	Low	Bolts c/w spring washer.	Daily Derrick Inspection
15.14 Bridge beam tracking	Low	Bolts c/w spring washers	Daily Derrick Inspection
15.15 N-S Dragchain trough.	HIGH	Bolts c/w spring washers	Daily Derrick Inspection
15.16 E-W Dragchain trough	HIGH	Bolts c/w spring washers	Daily Derrick Inspection
15.17 Trolley end stops/Buffer	Low	Anti-derailer frames.	Daily Derrick Inspection
15.18 Trolley end truck.	Low	Single nut/spring washer	Daily Derrick Inspection
15.19 Anti-derailer	Low	Single nut/spring washer	Daily Derrick Inspection
15.20 Trolley Wheels	Low	Axle & lock nut.	Daily Derrick Inspection
15.21 Trolley side Rollers	Low	Lock Nut and washer	Daily Derrick Inspection
15.22 Dragchain bracket.	Low	Capscrews.	Daily Derrick Inspection
15.23 N-S Dragchain	HIGH	Link Rods & tie-wraps.	Daily Derrick Inspection
15.24 E-W Dragchain	HIGH	Link Rods & tie-wraps.	Daily Derrick Inspection
15.25 Proximity Switch & plate	Low	Cap screws & single nut.	Daily Derrick Inspection
15.26 N-S Travel cylinders.	Low	Mounting Brackets	Daily Derrick Inspection
15.27 Mounting Brackets	Low	Single nut/spring washer	Daily Derrick Inspection
15.28 Pistons	Low	Clevis pin and plate.	Daily Derrick Inspection
15.29 Horizontal Trolley	Low	Wheels & Rollers	Daily Derrick Inspection
15.30 Trolley Wheels	Low	Bolt c/w lock washer.	Daily Derrick Inspection
15.31 Side Roller assembly	Low	Lock washers & nuts	Daily Derrick Inspection
15.32 Traverse motor.	Low	Bolt & lock washer.	Daily Derrick Inspection
15.33 Gearbox & bracket	Low	Lock nut & lock washer	Daily Derrick Inspection
15.34 Dragchain Bracket	Low	Lock nut & lock washer	Daily Derrick Inspection
15.35 Wire-guide	HIGH	Bolt & lock washer	Daily Derrick Inspection
15.36 Hydraulic Swivel	Low	Capscrew & lock washer	Daily Derrick Inspection
15.37 Control valve assembly	Low	Hydraulic hose & fittings.	Daily Derrick Inspection
15.38 Slewing motor.	Low	Bolt & lock washer	Daily Derrick Inspection
15.39 Drive pinion	HIGH	Cap Screws.	Daily Derrick Inspection
15.40 Vertical column	Low	Bolts c/w safety wire.	Daily Derrick Inspection
15.41 End Stop	Low	Bolts and Lockwashers	Daily Derrick Inspection
15.42 Hose Reel bracket.	Low	Bolt and spring washer	Daily Derrick Inspection
15.43 Position Sensor	Low	Capscrew & lock washer	Daily Derrick Inspection
15.44 Racker head assembly	Low	Socket/grip-pin & cotter	Daily Derrick Inspection
15.45 Anti-Fall device	Low	Shaft & keeper plate	Daily Derrick Inspection

Figure 3

- Identify and list major equipment items (eg crown block, travelling block, compensator, top drive unit, pipe handling and racking systems, fingerboard) by Manufacturer and model number. See Figure 4 as an example.

DERRICK EQUIPMENT		
EQUIPMENT TYPE	EQUIPMENT MANUFACTURER	DERRICK OWNER
Crown Block	Dreco 7 x 60	Sedco-Forex
	Continental Emsco RA-60-8	Diamond
Travelling Block	Oilwell - A 650	Sedco-Forex
	National 760-H	Diamond
	Continental Emsco RA-60-7-750	Transocean
	Continental Emsco RA-60-7-750	Maersk
Compensator	Vetco 960-125-C	Sedco-Forex
	Shaffer 18-400	Sedco-Forex
	Houston System DM-BP-600-18	Transocean
	Shaffer XS DSC 18-400	Diamond
Top Drive	Varco TDS-5	Sedco-Forex
	Varco TDS-4S	Diamond
	Varco TDS3	Transocean
	Varco TDS-4	Maersk
Pipehandler	Varco PH 85	Sedco-Forex
	BJ Hughes 3 arm Vertical System	Transocean
	Varco PHS-85	Maersk
Pipe Racking System	Varco PRS-3	Maersk
Swivel	Oilwell P-650	Sedco-Forex
Hook	BJ 5750 Dynaplex	Transocean
Raised Back-up System	Varco RBS-111	Sedco-Forex
	Varco RBS-11	Transocean
Block Retraction System	Varco 114715-24-S	Maersk
Cherrypicker	Moelven SH-201	Diamond
Fingerboard	MOS - Pneumatic Fingers	Transocean

Figure 4

- These more technical items of equipment will require a technical input from the Manufacturers/Suppliers into how they should be positioned and fastened. See Step 4 - Manufacturers and Suppliers.

Step 3 – Remedial Action

- Review and update all existing Derrick inspection checklists, Planned Maintenance Systems and other auditing tools in use, to ensure that they cover all items identified by the inventory check. See Figure 5 as an example.

**WEEKLY DERRICK INSPECTION - AREA 2
MONKEYBOARD**

Equipment	Drawing Ref:	<input checked="" type="checkbox"/>	Initial	Comments/Non-Conformance
Bridge Racker				
Bridge Racker 1. Check fastenings on traverse motor and bracket. 2. Visually check fastenings on slew motor 3. Check fastenings on long travel cylinders 4. Check fasteners on wire guide 5. Check roller assemblies on racker head 6. Check fasteners on claw assembly and claw motor 7. Check springs on anti-fall device.	MH Drgs: MH 1946-81 MH 1943-03			
Standlift Cylinder 1. Visually inspect fasteners on mounting brackets 2. Visually inspect fasteners on support bracket and sheave 3. Check hoist wire and swivels	MOS Drg: CTOO-DA1-210			
Drag Chain 1. Check tie rod fasteners and seizing wire 2. Check fasteners on troughs.	MOS Drg: CTOO-DA1-200			
Racking Boards				
Racking Boards 1. Check fasteners, pins and safety wires on drillpipe latches. 2. Check fasteners, pins and safety wires on drill collar latches 3. Check pins, cotters and safety wire on kick flap	SM62930			
Air Winch 1. Check winch holding down bolts 2. Check wire rope, chain shackle and hook	MOS Drg: CTOO-DA1-1031			
Top Drive Blower Assembly				
1. Check blower assy foundation fasteners 2. Ensure all safety devices are secure on hose suspension arrangement.				
Derrick Structure				
1. Check fastenings on ladders, back scratchers and platform gratings 2. Remove or secure loose items on platforms, walkways & Derrickman's Cabin 3. Visually check fasteners on derrick light fixtures and cameras. 4. Visually check fasteners on clash avoidance proximity switches. 5. Visually check fasteners on derrick hydraulic, degasser & standpipe pipework 6. Visually check fasteners on tong counter-weight frame.	NA			

.....SignatureDateRig SuptDate

Figure 5

- Identify what prevents items within the derrick from falling.
- A common securing method for each common item should be resourced, fitted and a picture taken for use with inspection checksheets.
- The derrick checksheets should be revised in detail and reflect any changes undertaken.

his pictorial addition to the checksheets will enable the 'inspector' to see exactly how each item should be retained from falling. See Figures 6a and 6b, as examples.

- Identify and implement an effective control for temporary equipment used within derricks, e.g. hand tools used during maintenance, equipment taken up the derrick for operations such as wireline work. The old age adage of "what goes up must come down" is extremely relevant.
- This control may take the form of:
 - Utilisation of the location Permit To Work System.
 - Derrick hand tool logbooks. See Figure 7. as an example

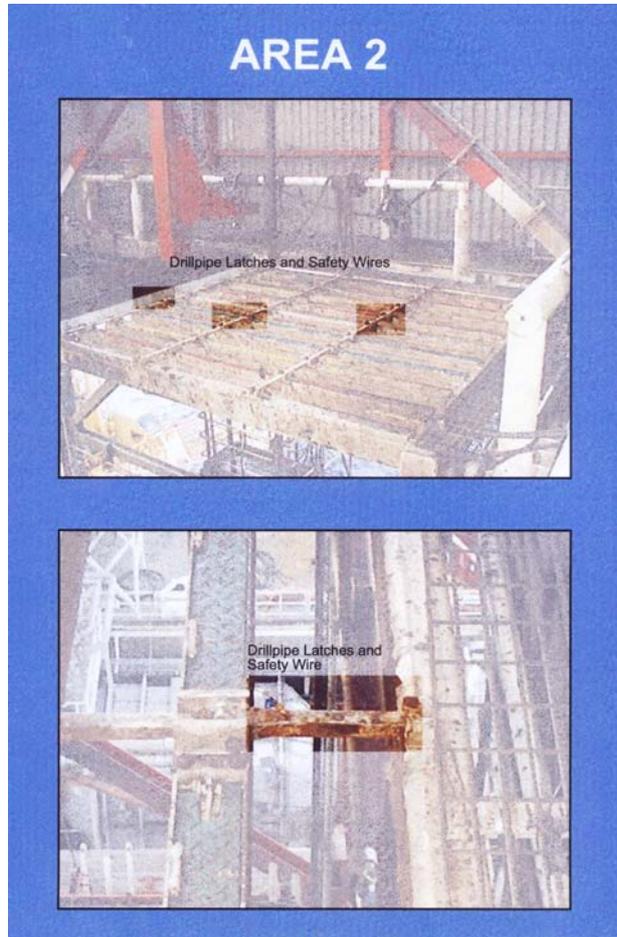


Figure 6a

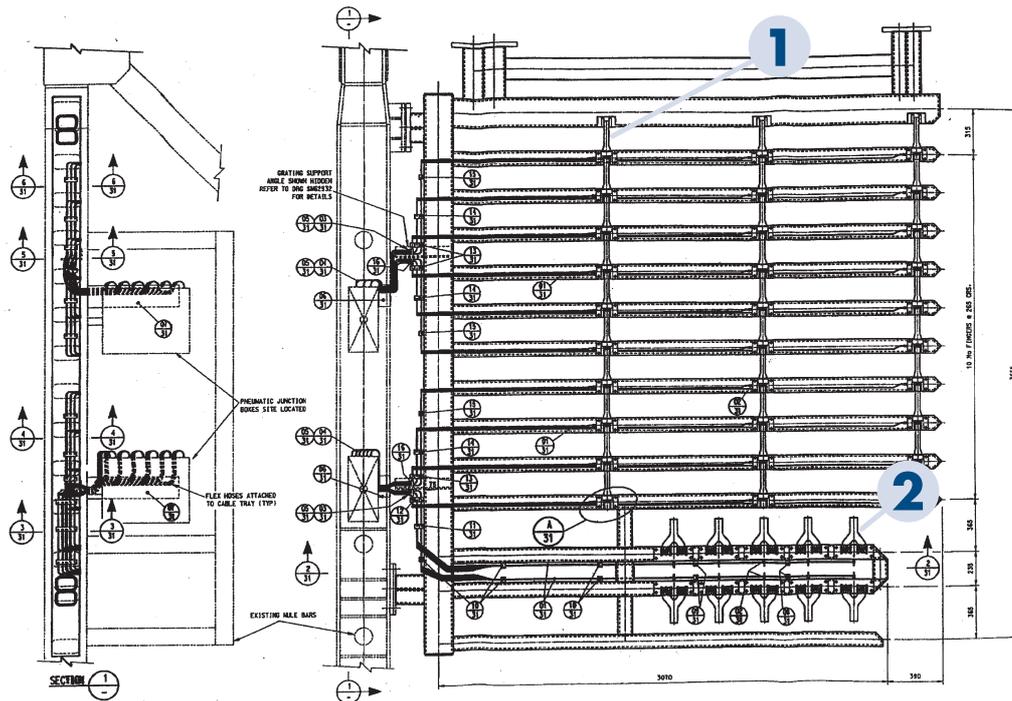


Figure 6b

LOG SHEET - TOOLS/EQUIPMENT IN DERRICK

Qty	Description of Tool/Equipment	Used On	Permit No.	Sign In By	Driller	Date	Sign Out By	Driller or Comments	Date
1 off	Traverse Motor	Bridge Racker	H123456	S. Lovett	M. Reed	1/1/98		Installed, old unit removed from derrick	
6 off	5/8" Bolts, c/w nuts and washers	Bridge Racker	"	S. Lovett	M. Reed	1/1/98		Installed, old bolts removed from derrick	
2 off	15/16" AF Ring Spanners	Bridge Racker	"	S. Lovett	M. Reed	1/1/98	D. McCarrrol	S. Dowds	2/1/98
1 off	1/2" Drive Ratchet Spanner	Bridge Racker	"	S. Lovett	M. Reed	1/1/98	D. McCarrrol	S. Dowds	2/1/98
1 off	15/16" AF Socket	Bridge Racker	"	S. Lovett	M. Reed	1/1/98	D. McCarrrol	S. Dowds	2/1/98
1 off	Grease Gun	Lubrication PMR	H234567	J. Smith	M. Reed	3/1/98	J. Smith	M. Reed	3/1/98

Sample Sheet

Figure 7

Step 4 – Manufacturers and Suppliers

The information provided from the equipment Manufacturers and Suppliers should be scrutinised as to applicability to the location/site equipment.

- From the identified items of major equipment, contact the Manufacturers and request:
 - The relevant information of the item type and model number.
 - All available Bulletin Notes and Product Newsletters produced.
 - All equipment modification notices.
 - All maintenance procedures relevant to the identified equipment.
- A Risk Assessment of the equipment to be undertaken in conjunction with the Manufacturers to ensure all potential risks are identified.

Location/Site Planned Maintenance Systems should be reviewed to ensure that all current Manufacturer maintenance recommendations have been incorporated into the system.

This long process needs to be undertaken to ensure that the equipment being used in the Derrick Structure is as per design.

It will also ensure that any modifications or changes to equipment and its maintenance requirements is as per the Manufacturer's latest recommendations.

Step 5 – Automated Derrick Systems

The principles as described in this document for preventing dropped objects, do not change in the automated environments of remote controlled drilling systems. Dropped objects as a result of collision can be avoided by making sure that in the design phase, the Anti-collision System and Rig Remote Control System form the basis for the Anti-clash and co-ordination, which should be designed to prevent interference between hoisting and drillfloor/derrick equipment. The method used mostly is to identify the zones and spatial corridors which more than one piece of equipment can occupy.

Zoning depends on equipment installed in the derrick and on the rig floor, taking into account maximum height and position etc.

Example: Zone 1

Between Drillfloor and top of Iron Roughneck:

Mud Bucket, Top Drive, Iron Roughneck, Pipe Handler (lower) are all able to occupy the zone. The working point for the zone would be fixed due to the maximum height of relevant equipment, plus a safety distance.

The rig can have up to five or six zones depending on the system/equipment installed.

From the **dropped objects** point of view, the most critical activity is the **override mode**.

NOTE: During override mode of (all) Rig Remote Control Systems, there is no Clash Protection active. Only the operator is responsible for control and intervention to ensure that equipment collision does not occur.

Needless to say that this needs to be managed properly and may be controlled under a Permit to Work.

Step 6 – Third Parties

Check that the independent Third Party Hoisting and Lifting Surveys and Inspections are effective.

Some checks to ensure this effectiveness are as follows:

- The selection process for the chosen inspection company is adequate.
- The competence of the inspectors.
- The workscope given by the location being inspected is sufficiently detailed.
- That the follow-up of inspection findings is completed.

Third Party rented equipment handled and used in the derrick should be viewed in the same way once all Rig owned equipment has been considered.

Categories of equipment that fall under this heading are:

- Equipment supplied by a third party needing a fixture in the derrick and from which it is to be suspended.
- Equipment supplied by a third party working in the main load line of the derrick hoisting equipment.
- Equipment supplied by a third party that is installed on top of drill/casing/tubing string or used to convey wellhead equipment. This may sometimes be parked in the derrick.
- Equipment that is part of the drill string and can be racked in the derrick for any time.
- Coiled tubing units and equipment.
- Snubbing units.
- Hydraulic workover units.
- Wireline equipment.
- Slickline equipment.

Factors to be considered and taken into account when using this equipment are:

- An equipment rig-up plan.
- Working load envelope of the equipment/job.
- Securing methods of individual pieces of equipment to prevent Dropped Objects, especially of detachable items.
- Verification of equipment employed (load test, MPI critical parts, pressure test, etc).
- Design verification and in accordance with Lifting Equipment Bulletin API 8c.
- Supplier to carry out/show evidence of a Dropped Object Hazop on the equipment.
- Last test data.

Figure 8 and 8a are examples of 3rd party equipment control mechanisms prior to using the equipment.

CONSENT TO OPERATE THIRD PARTY EQUIPMENT

COMPANY		DATE	
EQUIPMENT DETAILS			
Company		Identity No.	Third Party Representative.
DESCRIPTION (tick)			
Portable Generator	<input type="checkbox"/>	Well Test Equipment	<input type="checkbox"/>
Portable Welding Plant	<input type="checkbox"/>	Hazardous Material	<input type="checkbox"/>
H2S Container	<input type="checkbox"/>	ROV	<input type="checkbox"/>
Suitable for use (tick as appropriate) Safe Area <input type="checkbox"/> Zone 2 <input type="checkbox"/> Zone 1 <input type="checkbox"/>			
Has the equipment been identified as being safety critical within the unit's 'written scheme of verification'? Yes/No			
If yes, has the equipment and certification been reviewed against the performance criteria to ensure full compliance? Yes/No Comments			
CERTIFICATION DOCUMENTATION		No.	Dated
ACCEPTANCE (tick as appropriate)			
• Certification/checklist completed	<input type="checkbox"/>	• Electrical connection certificate completed	<input type="checkbox"/>
• Electrical checklist completed	<input type="checkbox"/>	• Equipment to operate under PTW (Yes/No)	<input type="checkbox"/>
• Mechanical checklist completed	<input type="checkbox"/>	• IVB certification/documentation (if applicable)	<input type="checkbox"/>
Being satisfied that the above noted equipment and installation of same meets the requirements as specified in the certification/documentation referred to above and the relevant checklists (attached), and that the use of the said equipment does not contravene the safety management system, I hereby authorise the said equipment to be put into use until further notice.			
OFFSHORE INSTALLATION MANAGER			
Name		Signature	Date
WARNING IF ANY MATERIAL CHANGE IN THE CONDITION OF THE EQUIPMENT OR THE OPERATIONAL STATUS OF THE UNIT OCCURS SUCH THAT IT AFFECTS THE EQUIPMENT'S FITNESS FOR PURPOSE THEN OPERATION OF THE EQUIPMENT IS TO CEASE IMMEDIATELY AND THE OIM IS TO BE INFORMED. PRIOR TO BEING PUT BACK INTO OPERATION, A NEW 'CONSENT TO OPERATE THIRD PARTY EQUIPMENT' MUST BE ISSUED.			
THIRD PARTY REPRESENTATIVE			
Name		Signature	Date
DEPARTURE			
The equipment noted above has been demobilised, manifested and is now secured ready for back-loading			
THIRD PARTY REPRESENTATIVE			
Name		Signature	Date

Figure 8

CHECKLISTS FOR THIRD PARTY EQUIPMENT

No.

COMPANY		IDENTITY No.			
Description					
.....					
.....					
CERTIFICATION/DOCUMENTATION		Yes	No	N/A	Remarks
1.	Lifting Certification				
2.	Pressure test				
3.	Third Party Liability Insurance				
4.	Deck Loading Satisfactory				
5.	Electrical Certification				
6.	Supervisor Competency Certificates				
7.	Maintenance Records				
8.	IVB Certification/Documentation (Where applicable)				
OFFSHORE INSTALLATION MANGER					
Name		Signature			Date
ELECTRICAL		Yes	No	N/A	
1.	Purge and shut-downs operational				
2.	Equipment suitably rated for proposed site				
3.	Exterior cabling and transit satisfactory				
4.	Vents and fire dampers operational				
5.	Emergency lighting operational				
6.	Ground bonding complete				
7.	Drawings available and relevant				
8.	Electrical insulation and connections satisfactory				
9.	Battery in satisfactory				
10.	Fire/gas detection operational*				
* When item 10 is satisfactorily completed by the ET, he should indicate by signing in the 'Remarks@ column					
Having inspected the above equipment I recommend that the OIM does/does not** give permission for its operation on board					**Delete as appropriate
RESPONSIBLE ELECTRICAL PERSON					
Name		Signature			Date
MECHANICAL		Yes	No	N/A	
1.	Unit shut-downs operational				
2.	Instrumentation operational				
3.	Escape hatches free and unobstructed				
4.	Services (Air, water etc) properly connected				
5.	Non-metallic fan				
6.	Drip trays fitted and clean				
7.	Fuel lines fire resistant and secure				
8.	Fuel isolation valve fitted and free				
9.	Machinery guards in place and effective				
10.	Flame/spark arrestor in good condition				
11.	Over-speed check tested				
12.	Emergency stop tested				
13.	Appearance of unit satisfactory				
Having inspected the above equipment I recommend that the OIM does/does not** give permission for its operation on board					**Delete as appropriate
RESPONSIBLE MECHANICAL PERSON					
Name		Signature			Date
If this checklist is being submitted by the Third Party Representative he should sign below					
THIRD PARTY REPRESENTATIVE					
Name		Signature			Date

Figure 8a

Step 7 – Operations

According to the Health and Safety Executive statistics 1994-1997, 20% of dropped objects are caused by winch operations. The principle of reducing the incident is based on the fact that the winch is designed/installed and maintained properly. The operation of the winch is such that the people are knowledgeable of the system, are trained banksmen and operate the winch within the design criteria.

(Air) Winch categories to be considered are:

- Design review of the system.
- Operating corridor.
- Inspection/maintenance.
- Drive mechanism.
- Training.

Factors to be considered for each category are:

- Design Review.
 - Have all items been identified in Step 1 of the Dropped Objects process?
 - Identified in correct section of the derrick?
 - SWL – check all components (hook, chain, swivel, etc).
 - Is SWL clearly indicated on each item?
 - Sheave and padeye rated for at least twice the SWL?
 - Are these items identified in Step 1 of this process?
 - Down rated for efficiency of cable terminations (this ranges from 100% – 75% depending on spliced/clamped or socket ends).
 - Clamp of bulldogs – right orientation, made up to correct torque?
 - All items conform to LOLER/API 8c?
 - Wire line type sheaves – no snatch blocks.
 - Safety lines and locking devices.
- Operating Corridor.
 - Any snagging points in the derrick sections in the wire corridor?
 - Any interference with other equipment in the derrick?
 - Any guide roles used when using the winch for dragging equipment from the catwalk?
 - Any rotating/moving equipment in the operating corridor?
 - How is that managed?

- Inspection/Maintenance

- Maintenance as per manufacturer's instructions.
- SWL for system components and inspections in line with LOLER.
- Mounting of airwinch MPI 1/2 yearly.
- Programmed change-out for wire.
- No free wheel options on winch.
- Clear marking for operating handles.
- Brake efficiency checks.
- Guards/spools installed.
- Hooks have safety latches.

The operating pressure for the winch, be it hydraulic or pneumatic, should be impossible to tamper with! The setting must be checked/logged during all routine inspections. This is to avoid operating outwith the working envelope of the system.

- Standard Operations.

- Responsible person for winch operation must be identified each shift.
- Instructions to winch operator must be in the same format as for crane operators and should be posted on the rig floor.
- Unless line of sight is not obstructed, a second man must be appointed.
- Control of line speed.

- Non-standard Operations.

- Require high level approval (OIM).
- Need an engineering design check, when winches are used at different fleet angles or with additional snatch blocks attached or any other form of non-conventional
- Require a Job Safety Analysis and Tool Box Talk before rigging takes place.
- Reference API 8c.

Step 8 – Continuous Improvement

In order to keep the dropped object in a live system, the system needs to be updated whenever changes are made to the derrick inventory or the structure itself.

To keep the focus and management attention to this problem, a 'Derrick Inspection Performance Report' is to be introduced.

An example of such a system is given/explained in this section and should be customised to the chosen way of derrick inventory and weekly inspections.
See Figure 9.

DERRICK INSPECTION PERFORMANCE REPORT

The factors shown in the penultimate columns are representative of total number of checks identified on the Weekly Derrick Inspection sheets for the respective derrick areas. The actual number of checks carried out multiplied by the factor will provide the optimum points score for the area. Points are deducted from the optimum figure as follows to arrive at the total score for the area:

- For each Dropped or Missing Object 50 points
- For each Outstanding Non-Conformance 20 points
- For each Insecure Item Found 10 points

The Rig Toolpusher is responsible for completing this report and for forwarding to the Rig Manager on a Weekly basis.

AREA 1 – CROWN AND WATERTABLE						
	Crown		Anemometer			Score
No. Items Inspected per Check Sheet	[]	+	[]		+	8 x 100
No. Dropped or Missing Objects	[]	+	[]			
No. Outstanding Non-Conformances	[]	+	[]			
No. Insecure Items Recorded	[]	+	[]			
						Total

AREA 2 – MONKEYBOARD							
	Bridge Racker	Racking Boards	TD Blower Assy	Derrick Structure		Score	
No. Items Inspected per Check Sheet	[]	+	[]	+	[]	+	25 x 100
No. Dropped or Missing Objects	[]	+	[]	+	[]	+	[]
No. Outstanding Non-Conformances	[]	+	[]	+	[]	+	[]
No. Insecure Items Recorded	[]	+	[]	+	[]	+	[]
							Total

AREA 3 – TRAVELLING EQUIPMENT									
	T. Block	Top Drive	Dolly	Hoses	Cment	W/Line	Casing	Score	
No. Items Inspected per Check Sheet	[]	+	[]	+	[]	+	[]	+	34 x 100
No. Dropped or Missing Objects	[]	+	[]	+	[]	+	[]	+	[]
No. Outstanding Non-Conformances	[]	+	[]	+	[]	+	[]	+	[]
No. Insecure Items Recorded	[]	+	[]	+	[]	+	[]	+	[]
									Total

AREA 4 – DRILLFLOOR & MEZZANINE LEVEL							
	Lower Racker	IR	Stab Bd	Elevators	Mezz. Storage	Vee Door	Score
No. Items Inspected per Check Sheet	[]	+	[]	+	[]	+	38 x 100
No. Dropped or Missing Objects	[]	+	[]	+	[]	+	[]
No. Outstanding Non-Conformances	[]	+	[]	+	[]	+	[]
No. Insecure Items Recorded	[]	+	[]	+	[]	+	[]
							Total

AREA 5 – BOP DECK & LOWER SUBSTRUCTURE				
	Lower Substructure		BOP Deck	Score
No. Items Inspected per Check Sheet	[]	+	[]	15 x 100
No. Dropped or Missing Objects	[]	+	[]	
No. Outstanding Non-Conformances	[]	+	[]	
No. Insecure Items Recorded	[]	+	[]	
				Total

Figure 9

.....Rig Supt. / / Date

CONCLUSIONS

This methodology is not the panacea for the elimination of all Dropped Objects from within Drilling Derrick Structures, but is one that can be used to significantly reduce the number of Dropped Objects incidents.

It will take time and commitment.

There are periods when operations will need to be suspended to undertake certain elements of the strategy.

It is a long-term strategy that requires total commitment from EVERYONE involved and support from Senior Management if success is to be achieved.