HAZARDS OF CASING OPERATIONS

IADC HSE&T Conference
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OBJECTIVES

1. Top Threats to Field Crews
2. Fatal Case Histories
3. Common Casing Hazards
4. Recommendations
TOP THREATS

Question:
What is the most dangerous position in the oilfield?
TOP THREATS

Answer:

Inside a motor vehicle ... especially OFF-THE-JOB

62:1
Eagle Ford Shale Planning
Road Safety Strategy after
Fatal Crash on Jan 30, 2014

Source: KZTV
TOP THREATS

1. Motor Vehicles
2. Struck-by
3. Caught-between

Source: NIOSH
TOP THREATS

Question:
What is the most hazardous activity on a drilling rig?
TOP THREATS

A: CASING ACTIVITIES

< 10% of well cycle time

> 10% of injuries sustained

> 50% of drilling deaths

Source: H&P-IDC
1. Swamper struck by dropped joint of casing L/D rathole using rig floor hoist
   *(Open-throated grab hook to lift joint)*

2. Floorman struck by joint of casing picked up V-door using rig floor hoist
   *(Positions of People - standing next to catwalk inside danger zone)*
Floorman Fatality – Standing Alongside Catwalk
3. Stabber crushed by stabbing board
snagged by traveling equipment and
fill-up tool assembly

(stabbing board and casing fill-up tool
incompatible with derrick size/shape)
Stabber Fatality – Stabbing Board Snagged

Tip of fill-up tool bail guide

Parted hoist cable
Potential Fatalities – Dropped Stabbing Board

Fill-up tool snagged the stabbing board
4. Casing stabber struck by traveling equipment or fall protection snagged by traveling equipment as driller lowered the blocks

(Position of people and/or fall protection relative to path of traveling eqpt)
Stabber Fatality – Struck by Traveling Eqpt
5. Bell guide on csg elevators struck box on casing as driller lowered the blocks. Elevators struck stabber’s face. 

(Inadequate maintenance or repair)
Casing Stabber
Struck in Face by Casing Elevators
Stabber Fatality – Inadequate Repair
CASE HISTORIES

6. Floorman struck by dropped casing bales using braided cable sling with sliding, open-throated hook to pick-up (2) 18-ft bales at once and lay-down across rig floor.

(Inadequate rigging / Improper rigging)
Floorman Fatality – Struck by Casing Bales
7. Floorman struck in chest by single joint elevators while installing safety pin in SJE at top of V-door. Punctured lungs.

(Tubular stop on catwalk not adjusted)
Floorman Fatality – Struck by SJE
Floorman Fatality – Struck by SJE
8. Driller struck by LP ball valve used in HP casing fill-up system. Head trauma.

(Violation of company policy using HP mudpump to fill casing. LP fitting in HP fill-up hose. Improper sequence of job steps using HP mudpump to fill casing)
Driller Fatality – Struck by HP Fill-up Hose
• Driller struck on back of head from dropped joint of 9-5/8” casing because wrong size elevators were rigged up by earlier crew. Elevators and casing NOT measured to confirm compatibility.
Critical Safe Practice to ensure Proper Size Elevators
HAZARDS COMMON TO CASING OPERATIONS

1. Large diameter tubulars handling

EVERY DROPPED TUBULAR IS A POTENTIAL FATALITY !!!
Dropped Casing during L/D using PDS
2. Dropped objects during rig-up, running and rig-down from casing operations
Homemade Spring and Side-loaded Chain Links to Hang Power Tongs?
Deflector Shield Fell to Rig Floor @ R/D
3. Pinch-point hazards between rig components and casing running tools.
Top-Drive Track becomes a PPT Hazard
Floorman Caught in PPT Lay Down DP
HAZARDS COMMON TO CASING OPERATIONS

4. Falls from Heights or Stabbers struck by traveling equipment
4. Casing Stabber

Falls from Heights or

Struck by Traveling Equipment
5. Unsafe tools and equipment to include: worn out L/D machines, casing elevators, casing tongs, stabbing boards, slings and rigging.
Unsafe Lay Down Bucket Attachment
Unsafe Lay Down Bucket Assembly

1/4 inch
6. Human Error while operating tools, equipment and new technologies

7. Impaired crews due to fatigue, drugs and alcohol

8. Sense of urgency or sense of objective
9. Braided cable slings with open-throated sliding choker hooks to P/U casing joints

10. Contractor casing fill-up hose fitted with 2-inch Fig 1502 wingnut made-up to incompatible 2-inch Fig 602 or Fig 1002 thread on third party fill-up swedge.
HAZARDS COMMON TO CASING OPERATIONS

11. Driller running in the hole too fast or working pipe to bottom, hits a bridge and throws slack in the drill line.

12. Driller distraction while running casing leads to stacking TDS on top of casing string, bent casing joint and/or fouled casing threads.
Consequences of Driller Distraction
Consequences of Driller Distraction
HIERARCHY OF HAZARD CONTROL

Casing Running Tool
Passive

Pipe Delivery System
Passive

Safe Buffer Zones
Passive / Active

Color-coding
Active

Last Line of Defense!

Elimination
MOST EFFECTIVE
Mech Controls & Automation
Guards & Barriers
Alarms & Warnings
Trng & Procedures
LEAST EFFECTIVE

% Effectiveness as Hazard Control

Source: Systems Safety Engineering and Management, Roland & Moriarty, 1990
Technology to Reduce the Risks Casing Running Tool (CRT) & Pipe Delivery Systems
Warning Signal / Procedural Control
(Color-coding for Hydraulic Slip Inserts)

9 5/8 Hydraulic Slips. RED

7 5/8 Hydraulic Slips. YELLOW
Warning Signal / Procedural Control
(Color-coded Gauges to Confirm Csg Size)
ADVANTAGES OF USING CASING RUNNING TOOLS

1. Elimination of conventional hazards
2. Reduces rig floor over-crowding of tools, equipment, and people
3. Reduces risk associated with suspect equipment and/or impaired casing crews
4. Provides ability to rotate, reciprocate and circulate thru the csg string at any height
HAZARDS OF USING CASING RUNNING TOOLS

1. Human Errors ... primarily by Drillers

- disengages CRT at wrong time
- tries to pick-up casing string with SJE
- activation of link-tilt too soon or too late
2. Unregulated hydraulic power supply to link tilt system affecting eqpt speed.

3. Positions of People – Floorman struck by SJE or link tilt assembly

4. Positions of People – Floormen caught between link tilt (as moving object) and CRT body (as fixed object)
5. Hand and finger pinch points associated with CRT maintenance or repair

6. Trapped pressure inside casing due to inadequate communications among parties can force CRT out of casing string.
HAZARDS OF USING CASING RUNNING TOOLS

7. Floormen holding manual back-up of nose cone while Driller rotates CRT with mechanical power at high RPM.
Floorman Struck by 5-ft bar behind ear
HAZARDS OF USING PIPE DELIVERY SYSTEMS

1. Tubulars fall out of trough during tubulars handling operations.

2. Pipe delivery systems used outside of its intended purpose to lift other tools and equipment.
CLOSING THOUGHTS

1. MOTOR VEHICLES are the GREATEST THREAT to our work force.

2. CASING is our most hazardous activity.

3. Leverage the Hierarchy of Hazard Control to eliminate hazards and reduce risks.

4. Greater drilling contractor ownership of the most hazardous activities.