# A Drill Pipe Management Program

Technology is the Key to the Future

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# Why Do You Need A Drill Pipe Management Program?

- Drill Pipe Is Your Single Largest Investment
  - TAKE CARE OF IT
- Increase The Return On Your Investment
- Reduce Costly Failures
- Conserve Capital
- Enhance Your Company Image With Your Customers

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# Drill Pipe Care and Handing Offshore


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# Drill Pipe Tool Joint Identification

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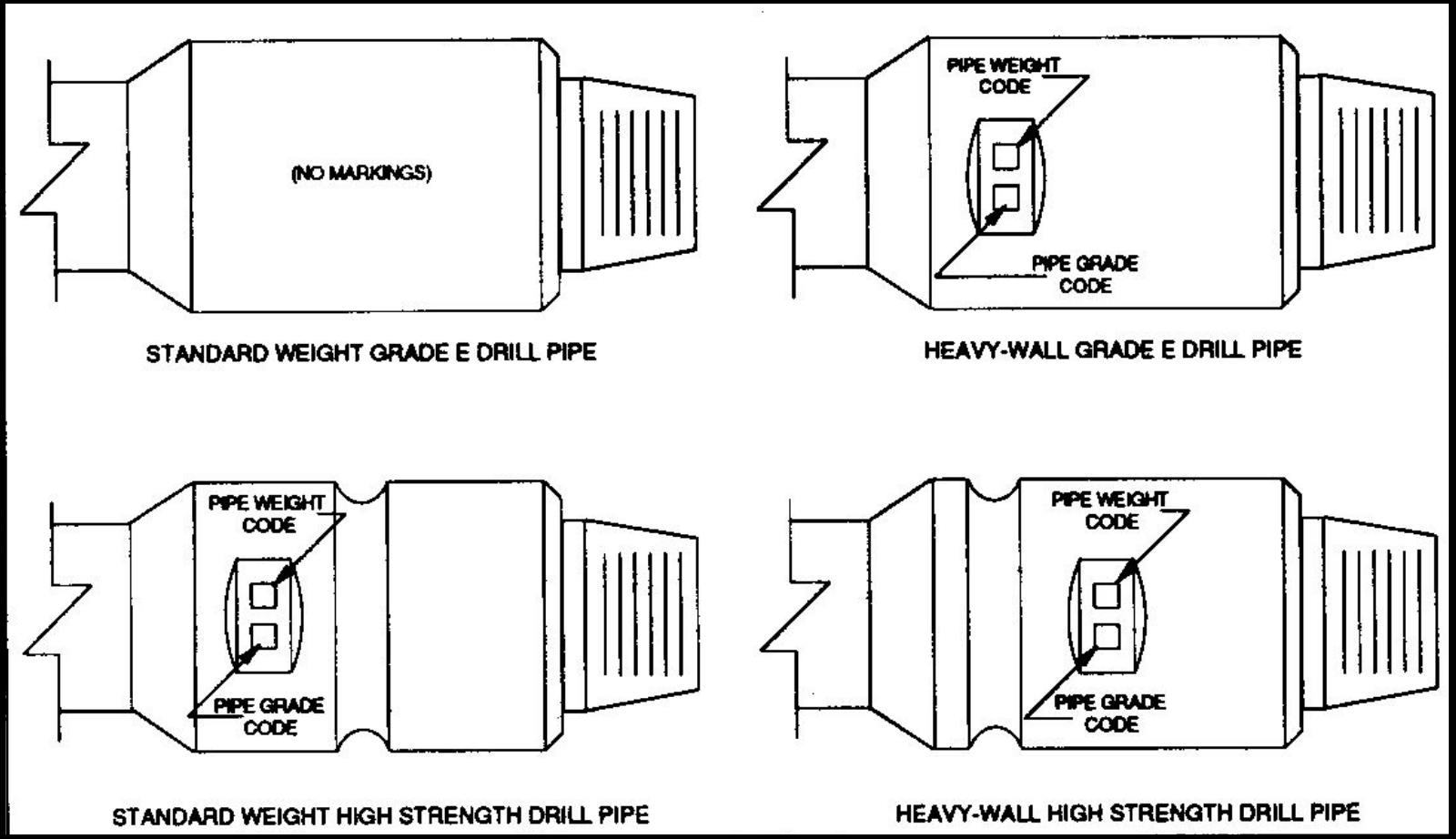
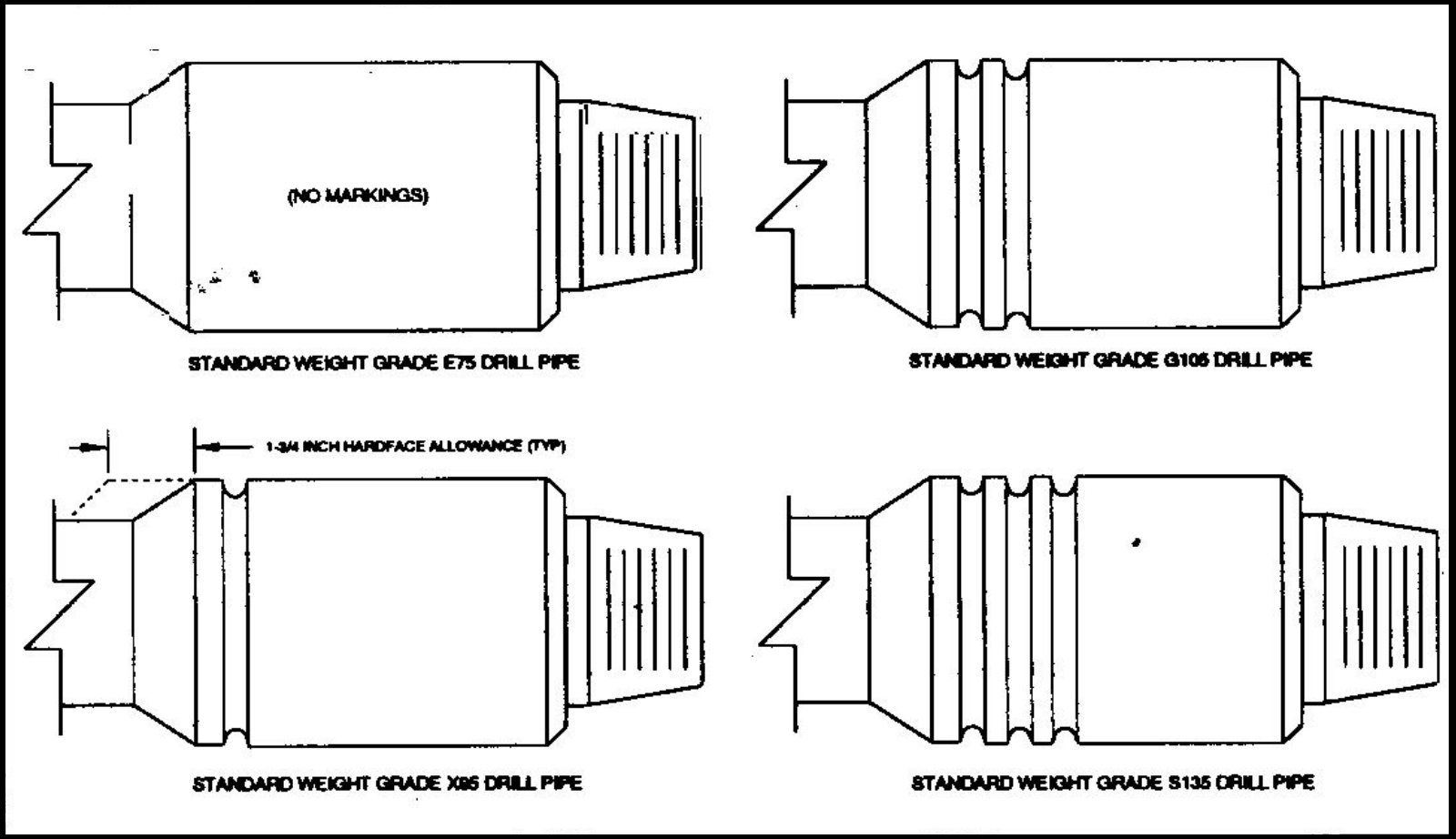
# Old API Marking System For Drill Pipe



# New API Marking System For Standard Wall Drill Pipe

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# Drill Pipe
# Tool Joints

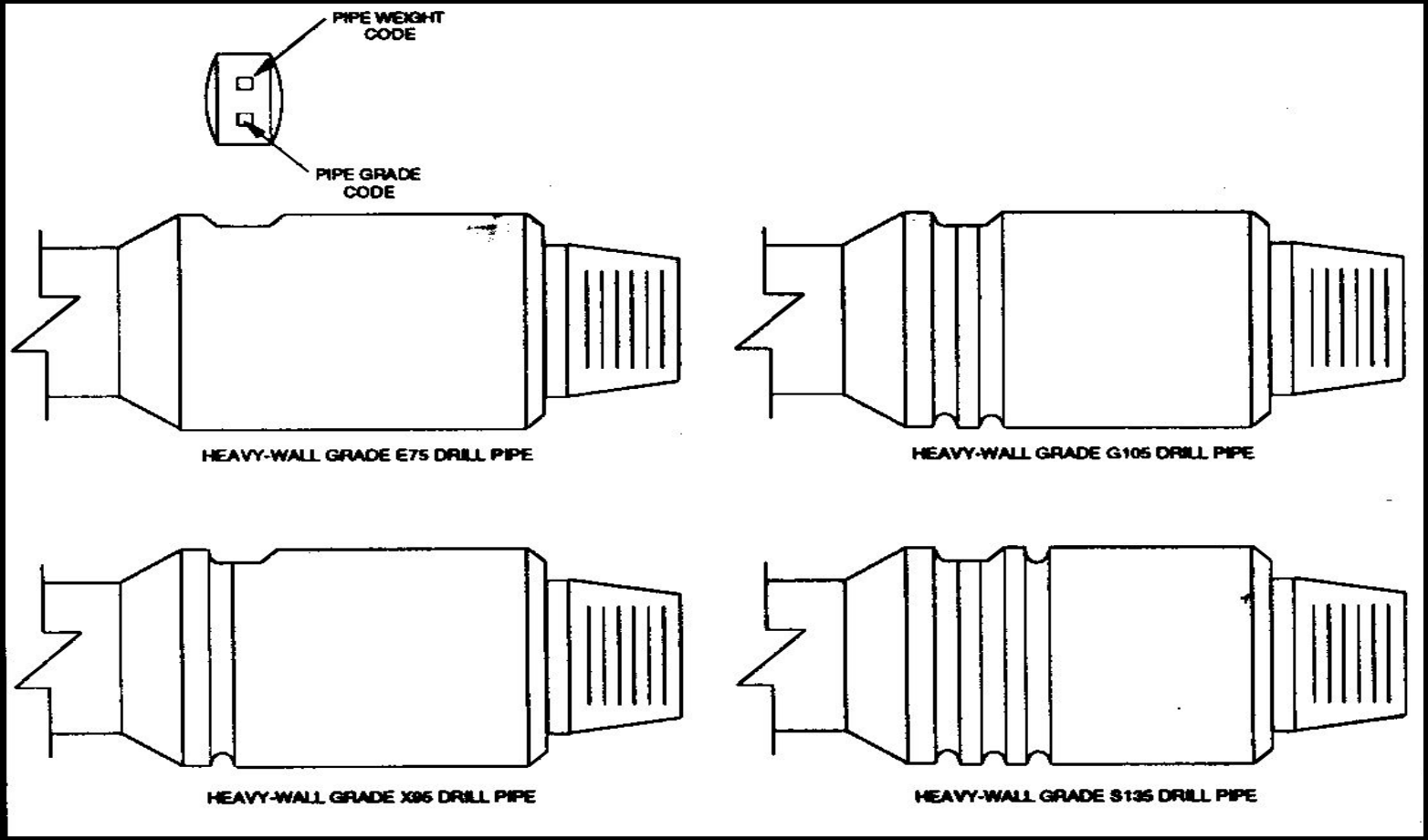
| Tool Joint | Grade | Tool Joint O.D. | Tool Joint I.D. |
|---|---|---|---|
| 5” NC-50 19.50# | E-75 | 6 5/8” | 3 ¾” |
| | X-95 | 6 5/8” | 3 ½” |
| | G-105 | 6 5//8” | 3 ¼” |
| | S-135 | 6 5/8” | 2 ¾” |
| 51/2” FH | E-75 | 7” | 4” |
| 24.70# | X-95 | 7 ¼” | 3 ½” |
| | G-105 | 7 ¼” | 3 ½” |
| | S-135 | 7 ½” | 3” |
| 5 7/8” XT-57 | | | |
| 23.40# | S-135 | 7” | 4 ¼” |

Refer to API RP7G Tables 8-9 for Mechanical Properties of New Tool Joints and Drill Pipe

The number in the drill pipe grade is the tensile yield strength of that grade.
Example: Grade S-135 is 135,000 psi minimum yield strength.

The weight is pounds per foot weight of the drill pipe.
Example: 19.50# is 19.50 pounds per foot.

# New API Marking System For Heavy Wall Drill Pipe

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# Tool Joint Identification Of Heavy Wall Drill Pipe

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# Weight and Grade Codes

| Grade | Grade Code |
|---|---|
| E – 75 | E |
| X – 95 | X |
| G – 105 | G |
| S – 135 | S |

| OD (in) | Nominal Weight (lb/ft) | Weight Code |
|---|---|---|
| 2 3/8 | 4.85 | 1 |
| | 6.65 (standard) | 2 |
| 2 7/8 | 6.85 | 1 |
| | 10.40 (standard) | 2 |
| 3 ½ | 9.50 | 1 |
| | 13.30 (standard) | 2 |
| | 15.50 | 3 |
| 4 | 11.85 | 1 |
| | 14.00 (standard) | 2 |
| | 15.70 | 3 |
| 4 ½ | 13.75 | 1 |
| | 16.60 (standard) | 2 |
| | 20.00 | 3 |
| | 22.82 | 4 |

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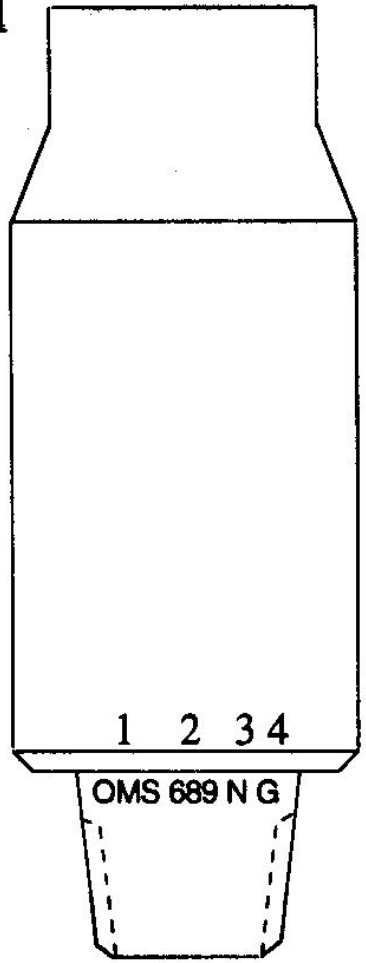
# API Pin Neck Marking System

| Mill/Processor | Symbol |
|---|---|
| Algoma | X |
| British Steel | B |
| Dalmine | D |
| Grant/TFW | TFW |
| Kawasaki | H |
| Nippon | I |
| NKK | K |
| Mannesmann | M |
| Omsco | OMS |
| Reynolds Aluminum | RA |
| Prideco | PI |
| Sumitomo | S |
| Siderca | SD |
| Tamsa | T |
| US Steel | N |
| Vallourec | V |




Notes:

1 Tool Joint Mfg.
2 Date of tool joining
3 Pipe Mfg
4 Pipe grade

Example: Omsco tool joint joined June, 1989 on US Steel grade G pipe.

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# Tool Joint Pin Neck Marking


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# Tool Joint Makeup and Breakout Procedures
## New and Re-cut Connections

- Check torque gauge and make sure it is working properly
  - Don't guess!
- Clean and dry each connection.
- Dope threads ***and*** sealing shoulders with a good quality, clean, tool joint thread compound.
- Stab connection and make up s-l-o-w-l-y.
- Connection makeup is typically to 80% of the manufacturers torque.
  - Don't guess, look it up!
- Breakout and spin out s-l-o-w-l-y.
- Wipe off connections and inspect threads and shoulders for damage.
- Re-dope threads ***and*** sealing shoulders.
- Stab connection and make up s-l-o-w-l-y.
- Connection makeup is typically to 90% of the manufacturers torque.
  - Don't guess, look it up!

# Recommended Thread Protectors

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# Be Consistent

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# Leave Thread Protectors on when Picking Up or Laying Down

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# Remove Box Thread Protector and Insert Rabbit

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# Be Sure of that Tool Joint Compound


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# Keep Contaminants Out Of Tool Joint Compound

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# *This is Not Tool Joint Compound*
# *It is Grease for Slips*

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# Pipe Handler
# Lifts and Positions Joint

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# Remove Pin End Protector

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# Use a Neoprene Rabbit
# Not Steel

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# Wipe Old Tool Joint Compound

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# Inspect Threads and Sealing Shoulder

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# Improper Application of Tool Joint Compound

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# Proper Application of Tool Joint Compound

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# *This is What You Don't Want*
# *Dry Connection*

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# Clean Drill Pipe ID

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# Internal Corrosion Pitting

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# Clean Drill Pipe OD with a Wiper

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# External Corrosion Pitting

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# Proper Racking of Drill Pipe in Stands

# Must Use Protectors While in Stands

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# Proper Stabbing is Critical

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# Improper Stabbing

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# *This Is What You DON'T Want*

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# Stabbing Guide

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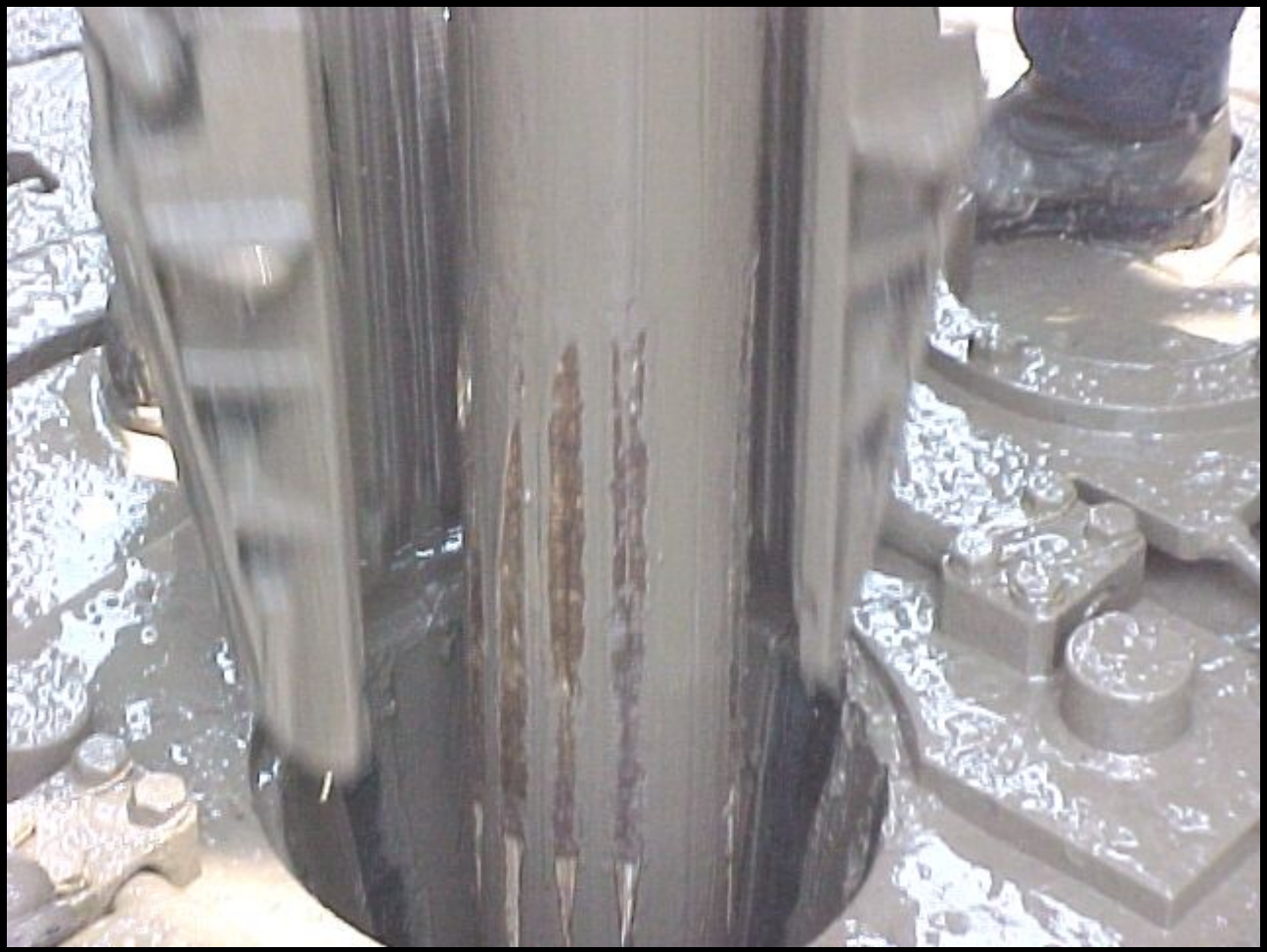
# Improper Slip Installation



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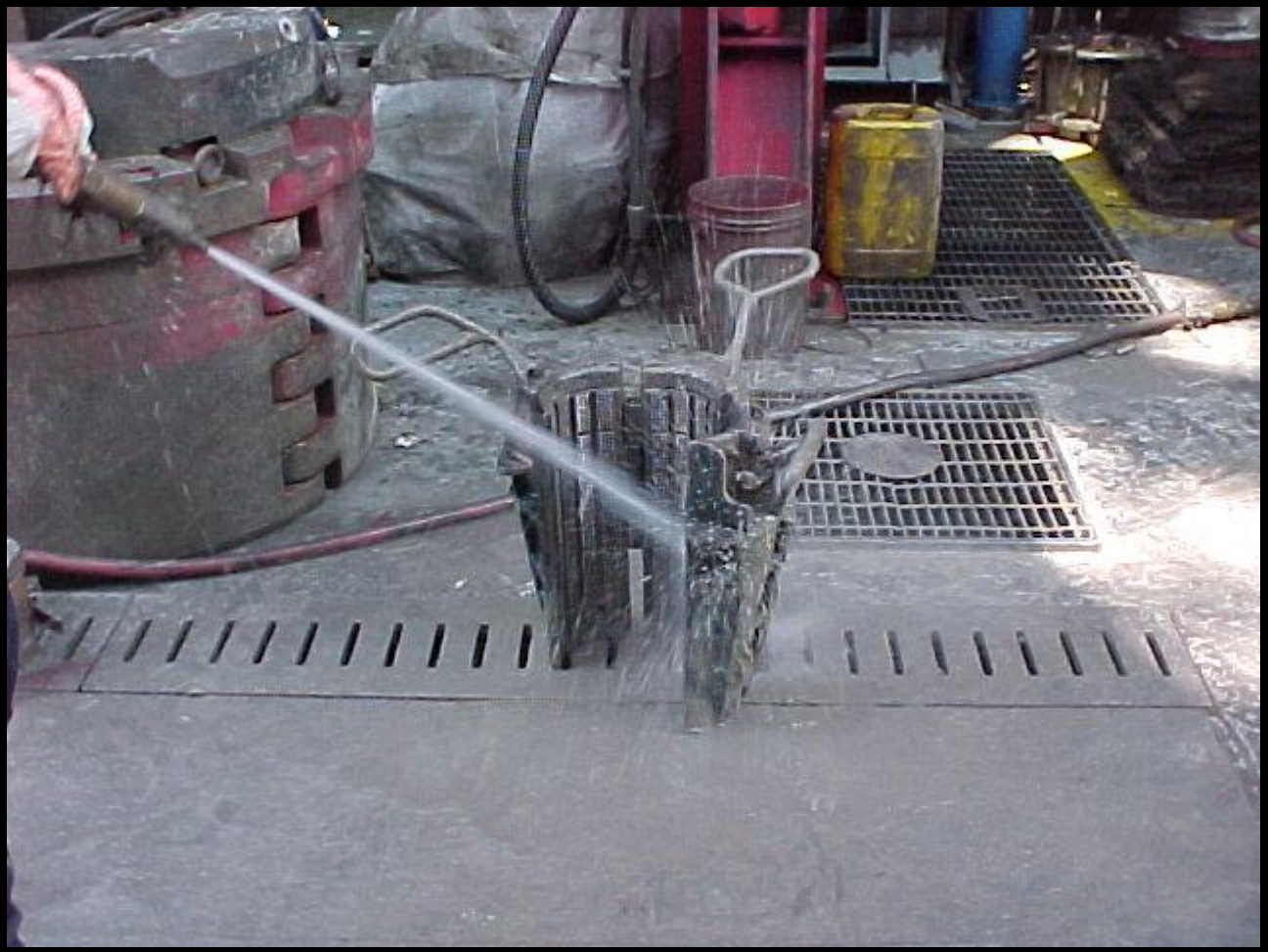
# Cleaning Slips



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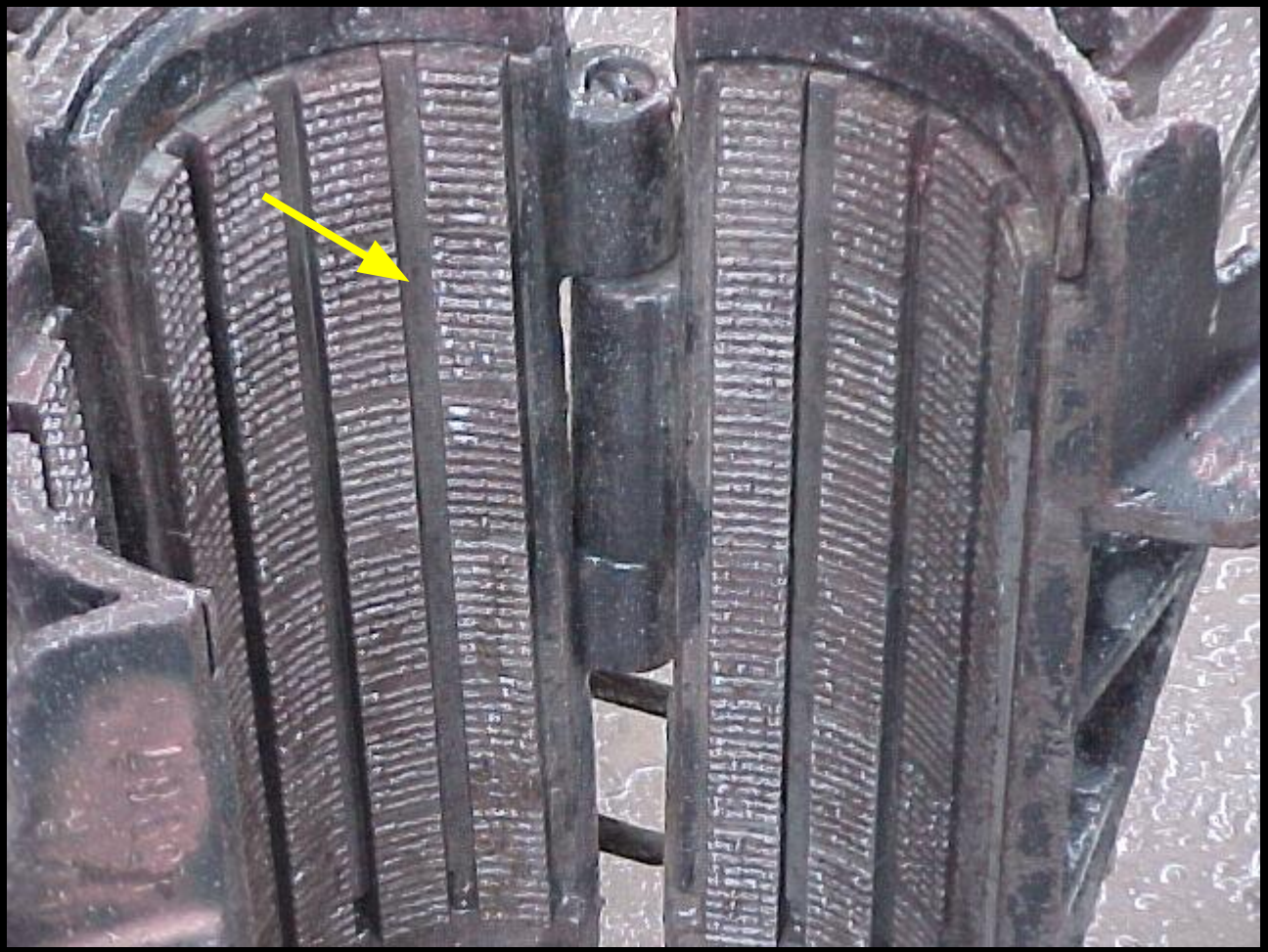
# Slip Maintenance



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# Slip Area Damage

# Slip Cuts

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# Crack in Slip Cuts

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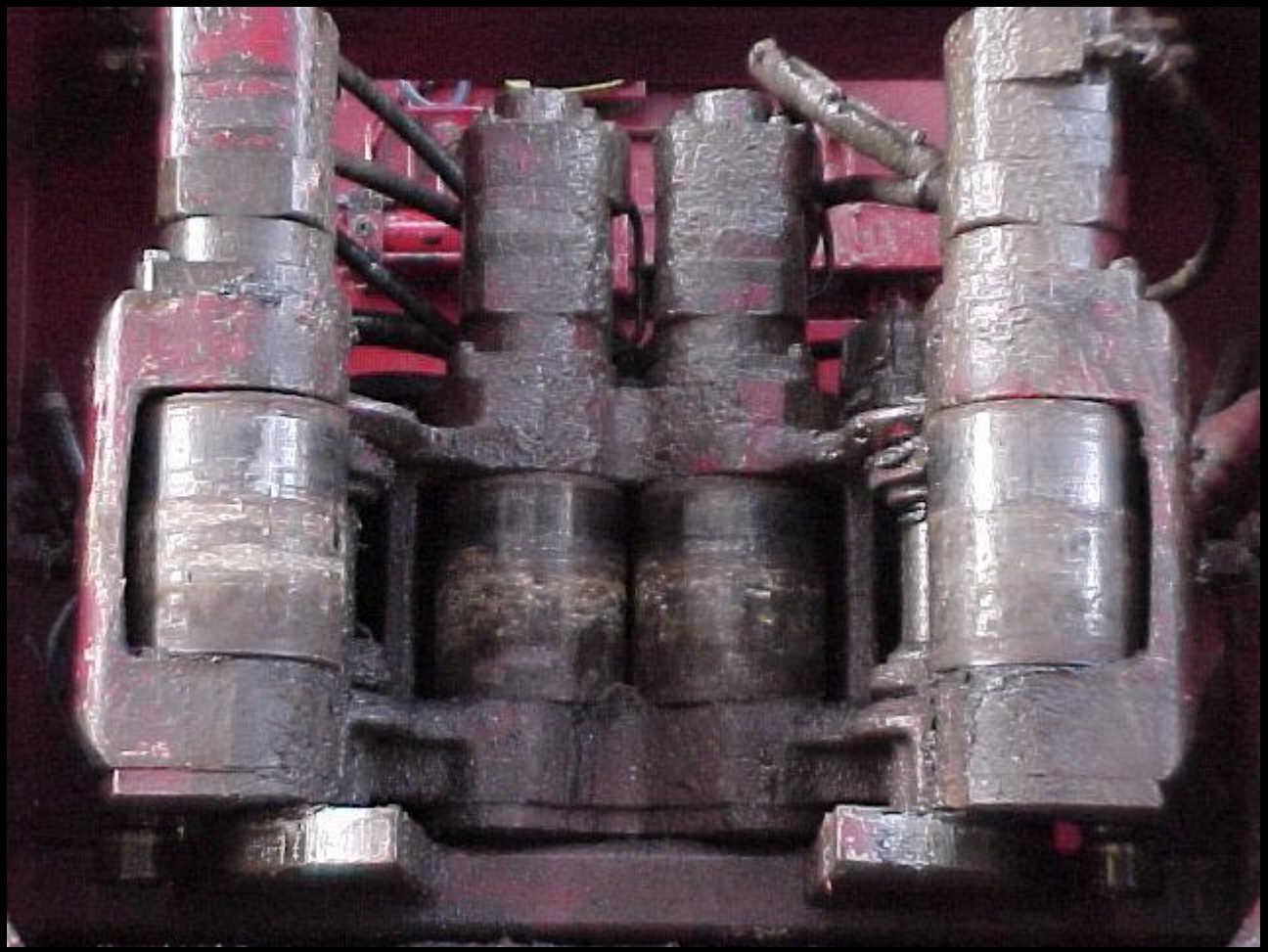
# *Use a Spinner for Initial Make-up*



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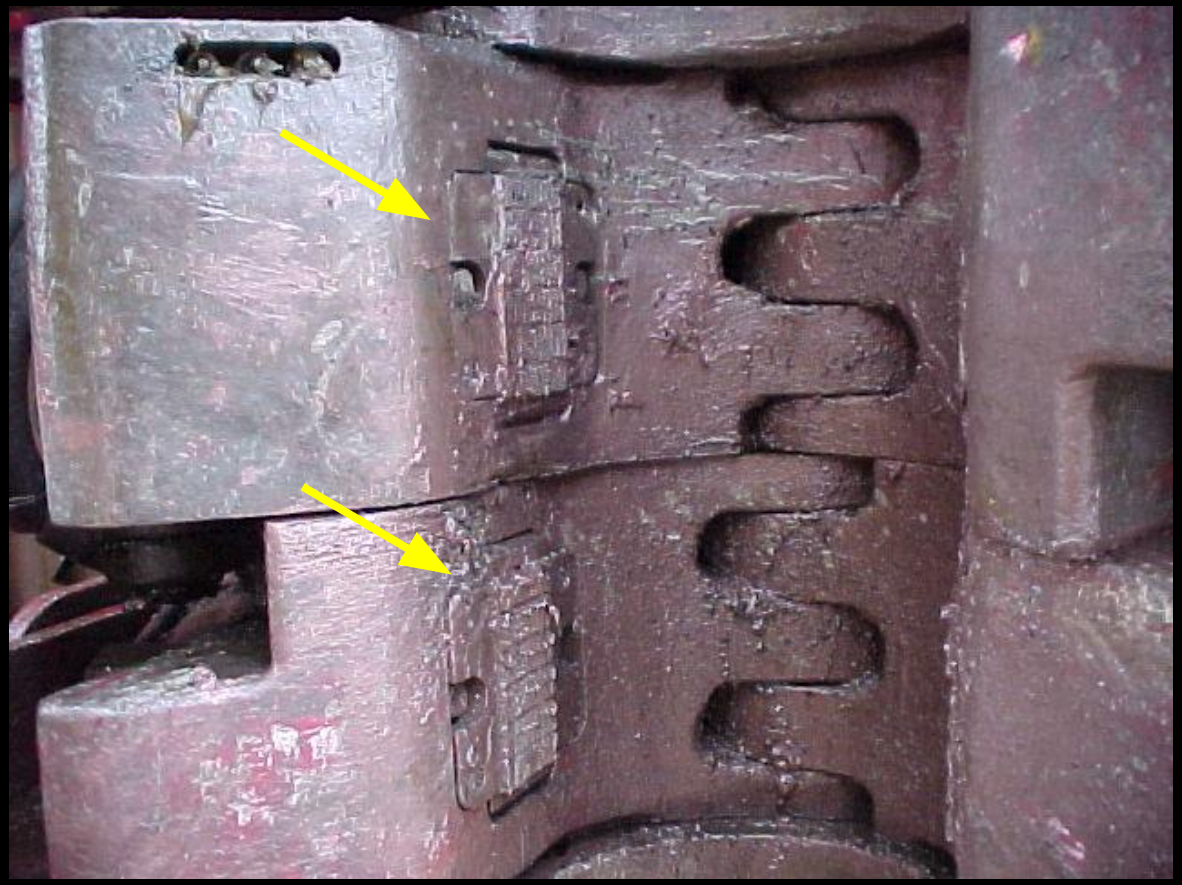
# Tong Die Maintenance



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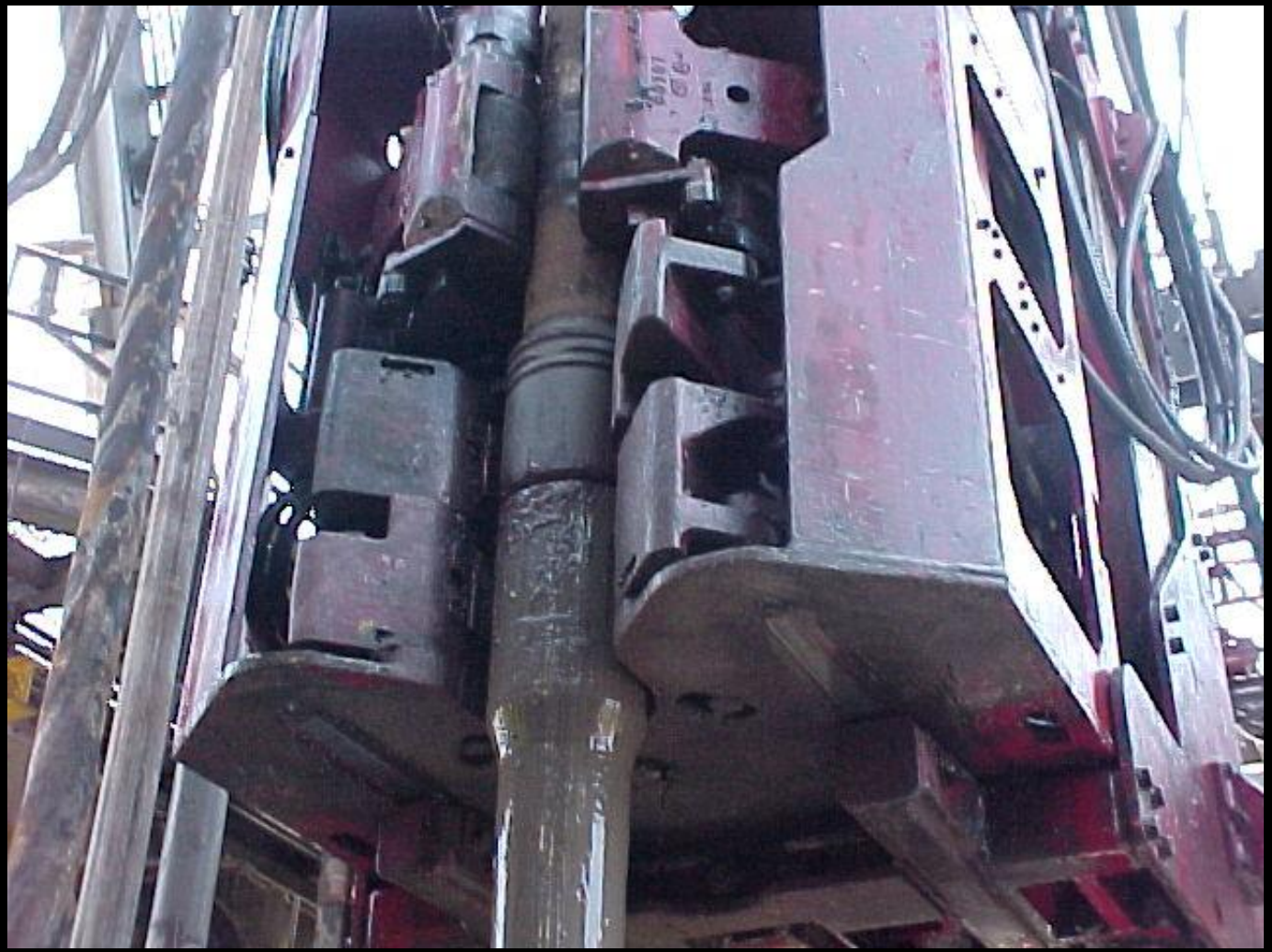
# Proper Position
# Iron Roughneck



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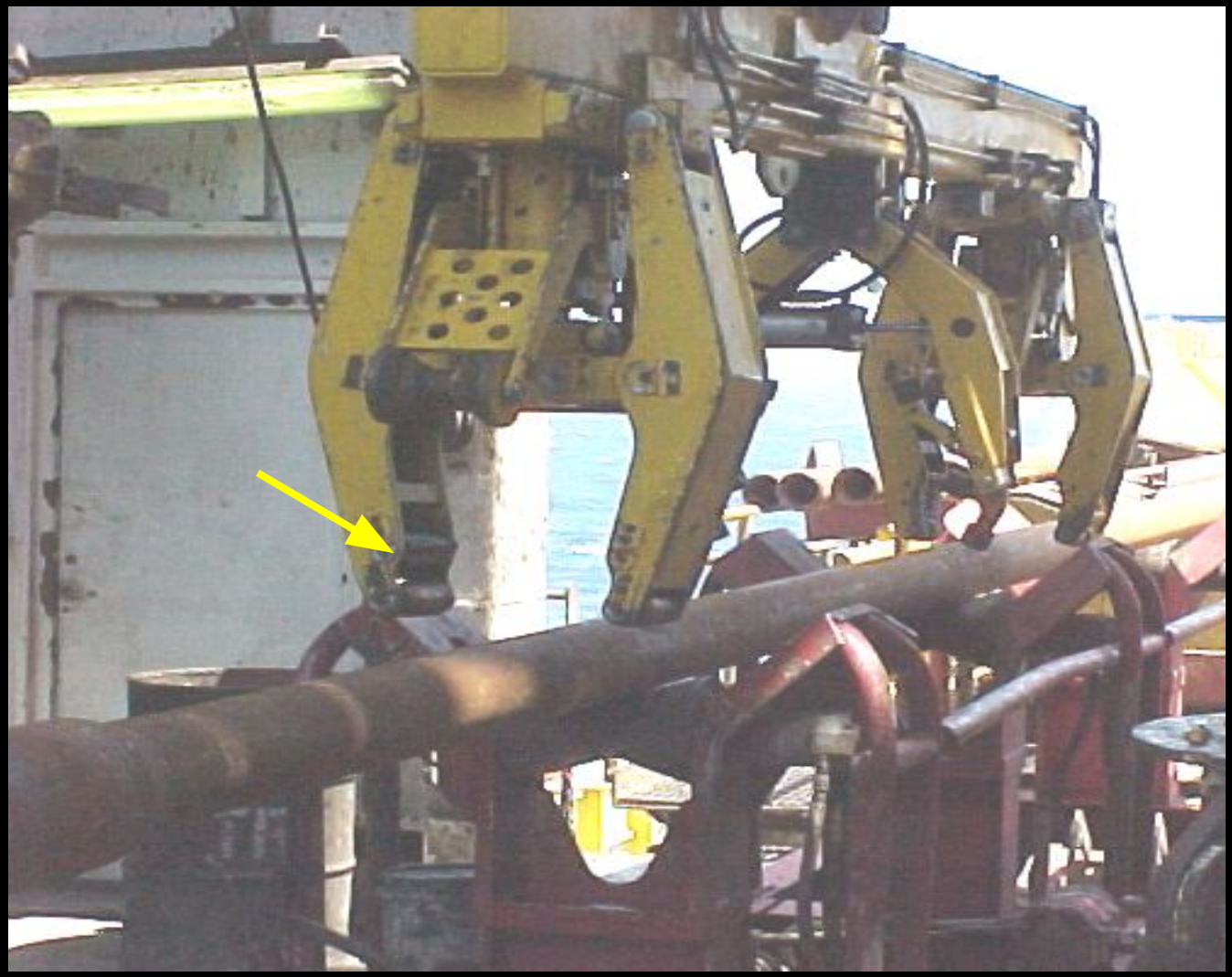
# Pipe Handling System - Roller Maintenance



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# Pipe Handling System - Die Maintenance

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# Pipe Handling System - Worn Roller

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# Pipe Conveyor System - Maintain Conveyor

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# Maintain Pipe Handling Equipment

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# Inspect Hooks Periodically

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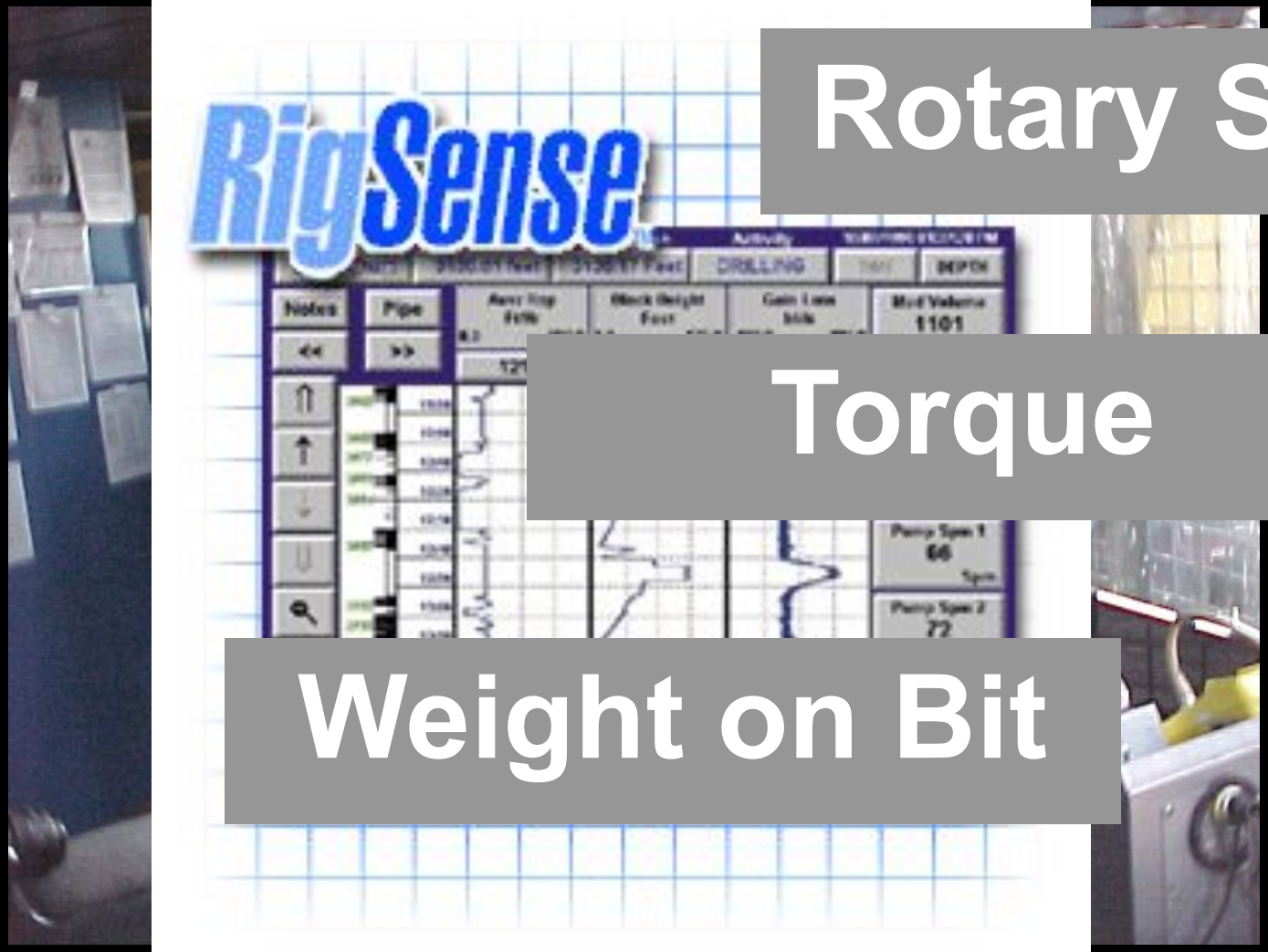
# Monitor Your Drilling Controls




Rotary Speed

Torque

Weight on Bit

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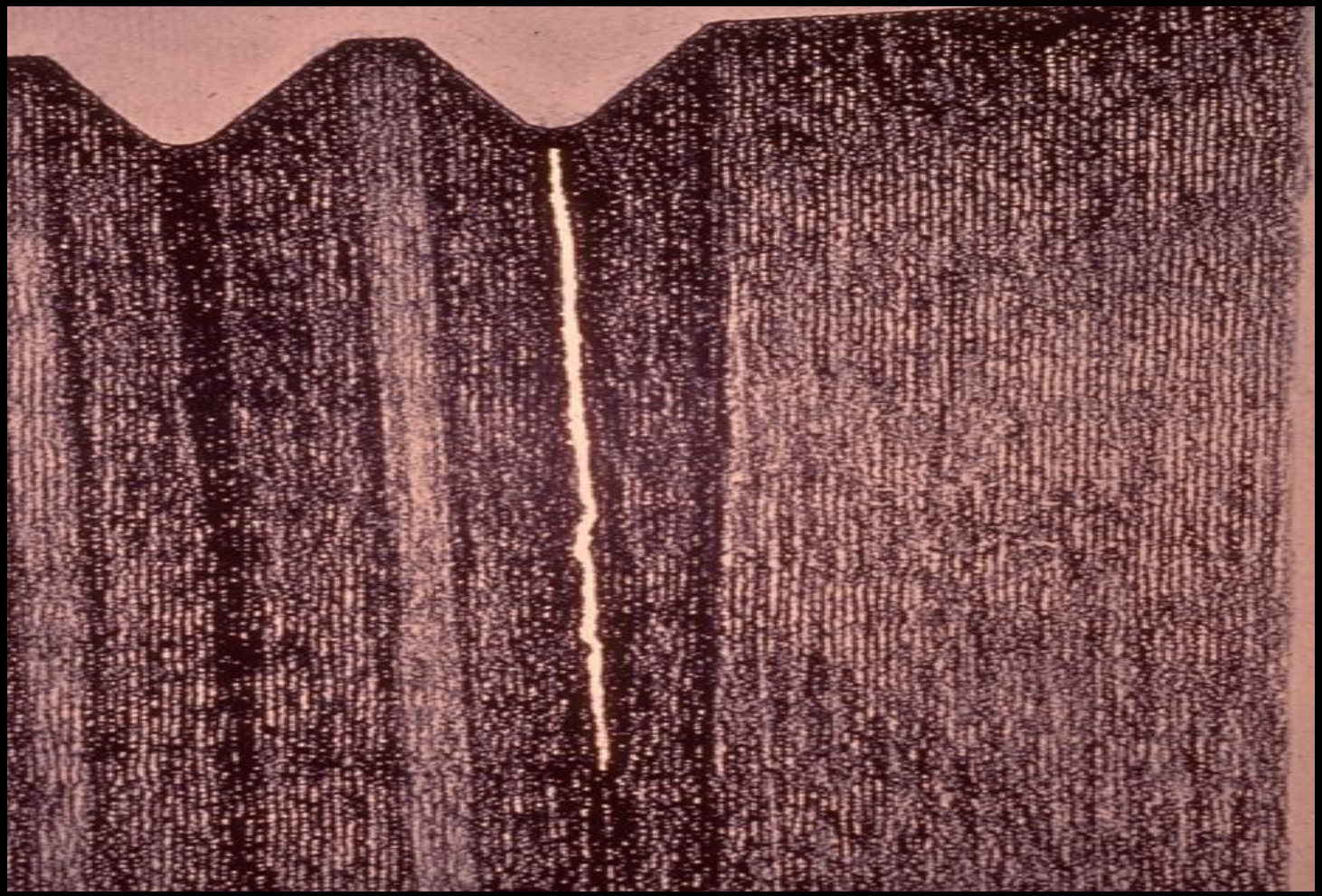
# An Effect of Over Torque



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# Proper Storage of Drill Pipe

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# Improper Storage of Drill Pipe

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# Proper Storage of Subs

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# Lifting Drill Pipe With Slings

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# Use Spreader Bar With Slings

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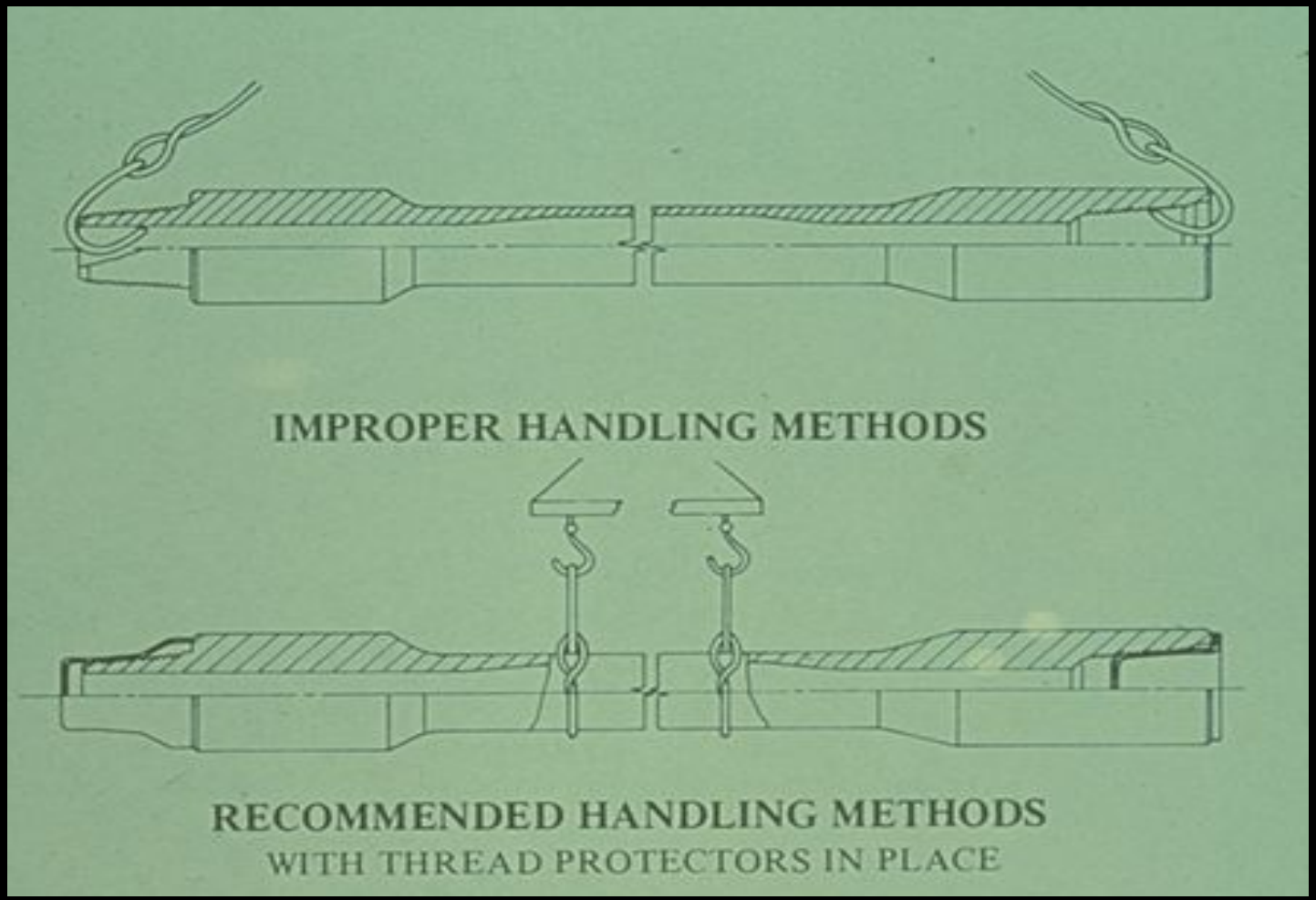
# Handle Drill Pipe With Slings
# NEVER Use Hooks Or Rods

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# Tool Joint OD Wear

| | | New | Down Grade | Difference |
|---|---|---|---|---|
| 5 ½ | S | 24.70 # | 7 ½ | 7 1/32 | 15/32 |
| 5 7/8 | S | 23.40 # | 7 | 6 15/32 | 17/32 |
| 6 5/8 | S | 25.20 # | 8 ½ | 7 29/32 | 19/32 |

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# Check Your Hardband Condition

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# Used Drill Pipe Hardband Condition Report

Date: _____ Tuboscope Inspector _____

Rig No.: _____

Rig Location: _____ Oil Company: _____

Description Of Drill Pipe:

Size: 5 Grade: X-95 Weight: 19.50 Connection: NC 50

Hardband Condition: Drill Pipe

No. of joints requiring hardbanding:____ Average box tool joint OD: _____

No. of joints requiring tool joint rebuild: _____

Caliper Settings For Hardbanding

3 ½", 13.30 & 15.50#, NC-38 connections – 4 13/16" **

E-75, 13.30# - 4 9/16" **

4 ½", 16.60 & 20.00#, NC-46 connections – 6 1/16" ** – ALL

5", 19.50 & 25.60#, NC-50 connections – 6 7/16" ** – ALL

** Caliper settings were based on new tool joint OD less 3/16". Field hardband units typically deposit 1/8" to 3/16" of hardband material, cumulatively, on the tool joint.. Exceeding new tool joint OD can result in fishing problems and elevator damage.

Tong Space Minimums:

Box Tool Joint – 9-1/2" (includes 3" hardband allowance) Drill Collars require Hard banding – Yes No

Pin Tool Joint – 6-1/2" If yes, how many and what size

No. of joints with short boxes:

No. of joints with short pins: HWDP require Hard banding – Yes No

Average box tool joint tong space: _____

Average pin tool joint tong space: _____

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# Check Condition
# Shoulders And Bevels

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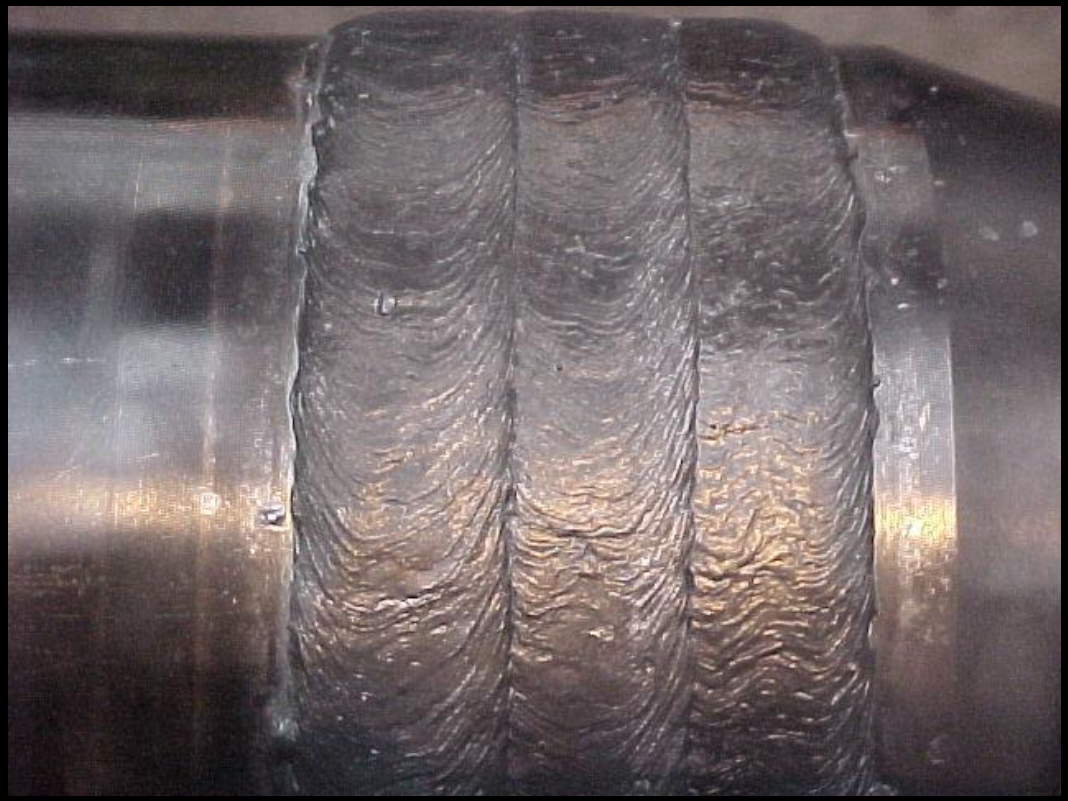
# Drill Pipe Hardband

## TCS 8000 – Box End

Chrome Alloy Hardband



- No Cracking
- No Spalling
- Casing Friendly
- Can Be Reapplied
- Hardness 50 – 54 HRC

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# Check Straightness Of Drill Pipe

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# NEVER Use Steel Rods Or Hooks To Move Drill Pipe

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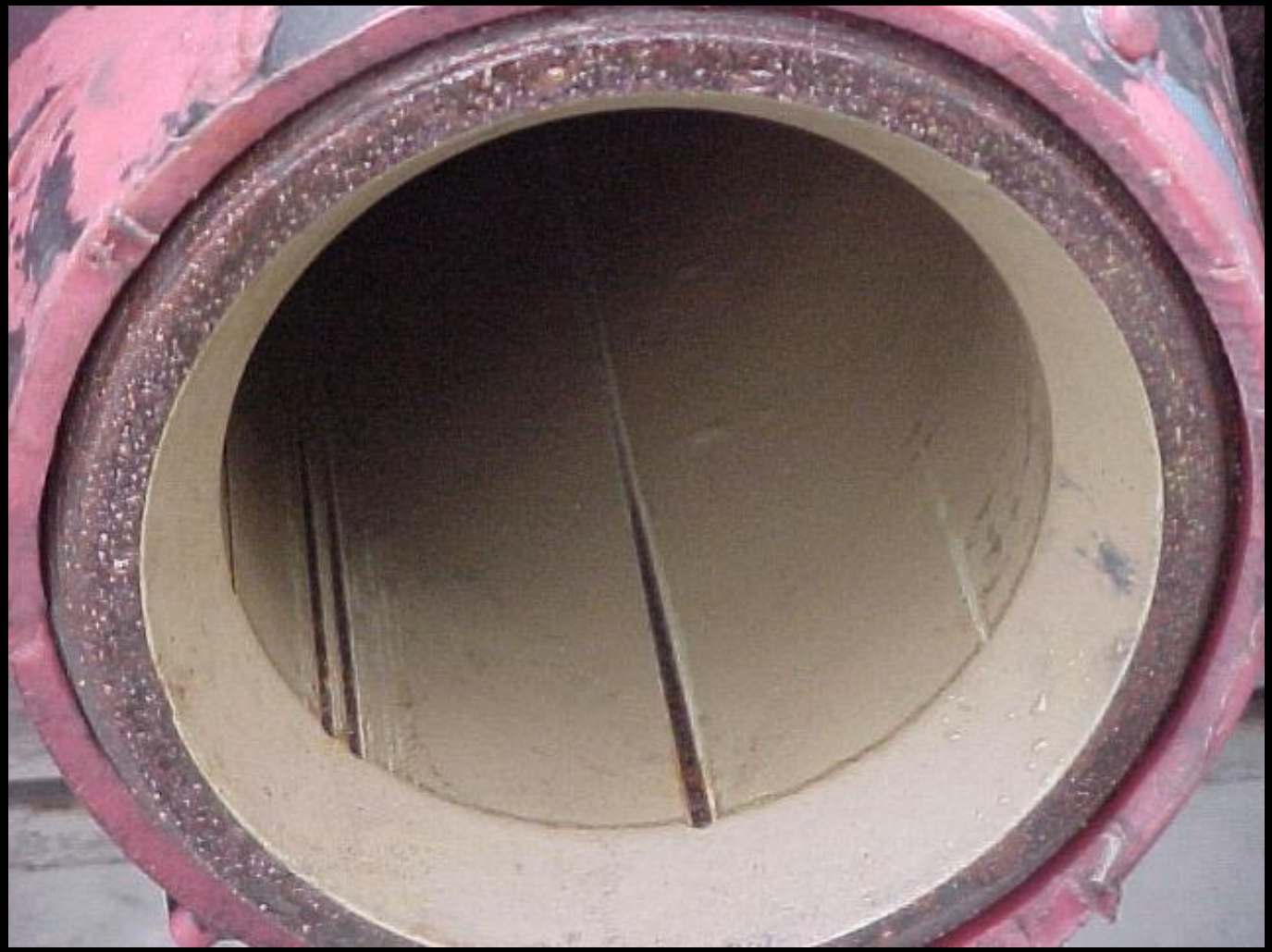
# Inspect Condition Of Internal Coating



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# How To Minimize Corrosion In The Drill Stem

- Control the drilling fluid pH. A pH of 9.5 or higher will deter the corrosion of steel in water-base systems containing dissolved $O_2$
- Use proper inhibitors/oxygen scavengers particularly with low pH, low solids drilling fluids.
- Use plastic coated pipe and a proven re-coating program.
- Use de-gassers/de-sanders to remove dissolved gases and abrasives.
- Maintain tight pump connections and reduce oxygen intake.
- Minimize stress concentrators such as slip/tong marks, gouges, notches, etc.

# How To Minimize Sulfide Stress Cracking In The Drill Stem

- When practical, maintain a pH of 10 or higher.
- Chemically treat before encountering $H_2S$.
- Use the lowest grade drill pipe that will withstand the required drilling conditions.
- Reduce stresses by using thicker walled components.
- Minimize stress concentrators.
- After $H_2S$ exposure, use care in pipe handling. Avoid sudden shocks and high loads.
- Use oil-based mud to create an oil-wet metal. Agents that cause corrosion in water (dissolved salts, dissolved gases, and acids) do not damage oil-wet metal.

# API/IADC Drill Pipe Failure Study

NUMBER OF FAILURES REPORTED ……1,801
JANUARY 1, 1988 THROUGH SEPTEMBER 1, 1990

NUMBER OF REPORTING CONTRACTORS …….. 16

NUMBER OF REPORTING OIL COMPANIES …….. 4

NUMBER OF DRILLING RIGS INVOLVED ……. 200
(ESTIMATED)

PERCENT OF FAILURES WITHIN 10”
OF INTERNAL UPSET RUNOUT …… 85%

FAILURES DIVIDED - PIN/BOX …… 65% BOX - 35% PIN

60% OD

40% ID

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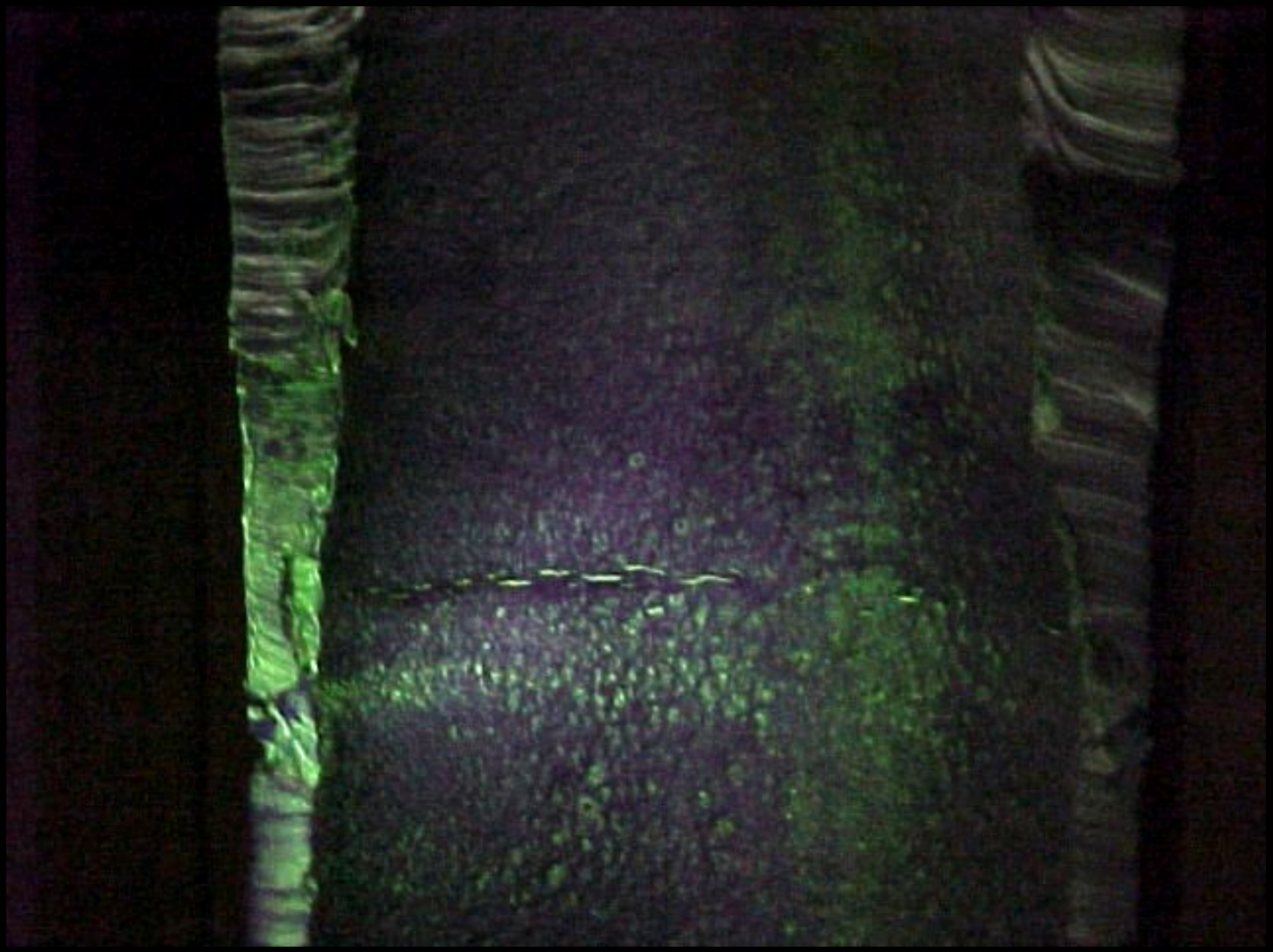
# I.D. Fatigue Cracks
# Upset Run-Out Zone



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# Washout - Box

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# Washout - Pin

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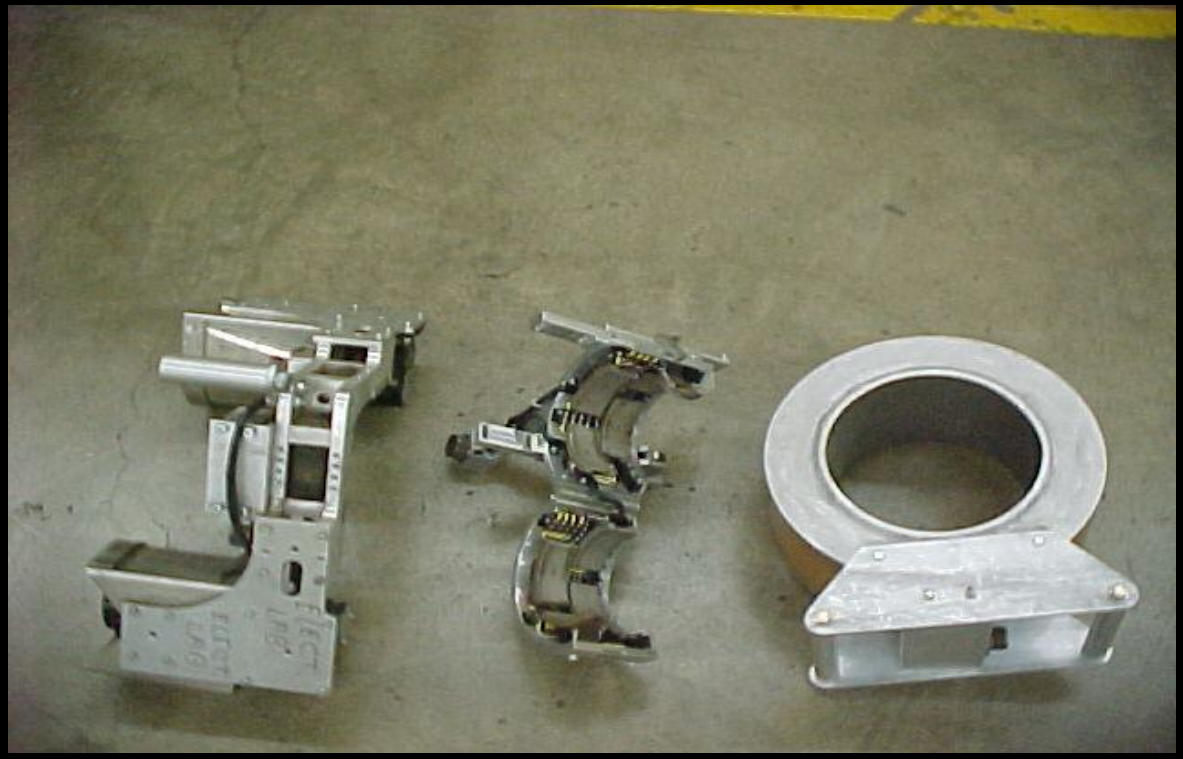
# Electromagnetic Inspection

- Evaluation Of ***TUBE BODY*** For Imperfections
- Detects - ID/OD ***TUBE BODY*** Fatigue Cracking
- Detects - ID/OD ***TUBE BODY*** Corrosion Pitting
- Detects - ***TUBE BODY*** Wall Thickness Changes



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# Ultrasonic
# End Area Inspection

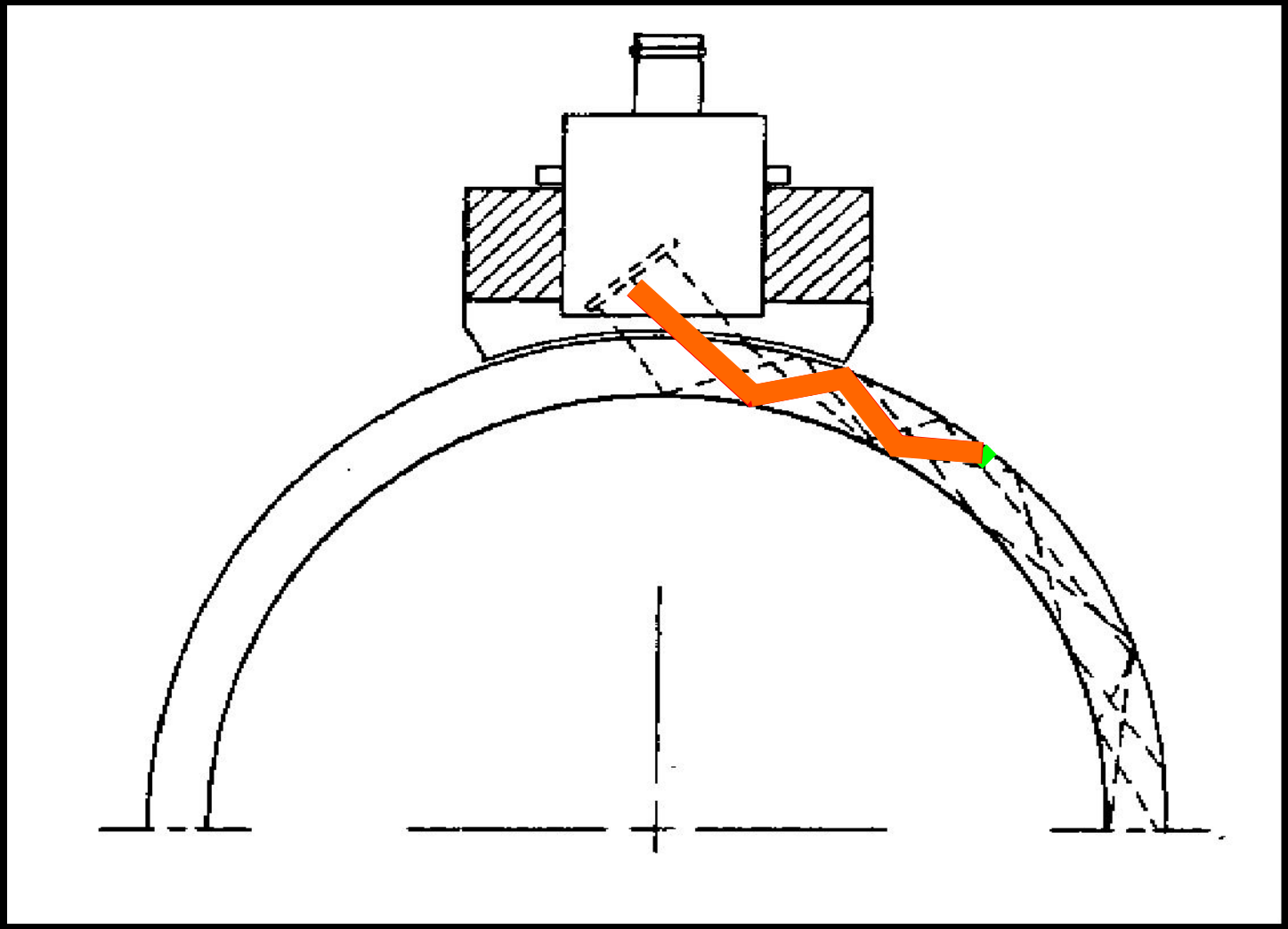
Shear Wave

- Detection Of Fatigue Cracks In ***Upset Run-out***

Compression Wave

- Detection Of Corrosion Pitting In ***Upset Run-out***
- Detection Of Wall Reduction In ***Upset Run-out***

# Shear Wave Ultrasonic



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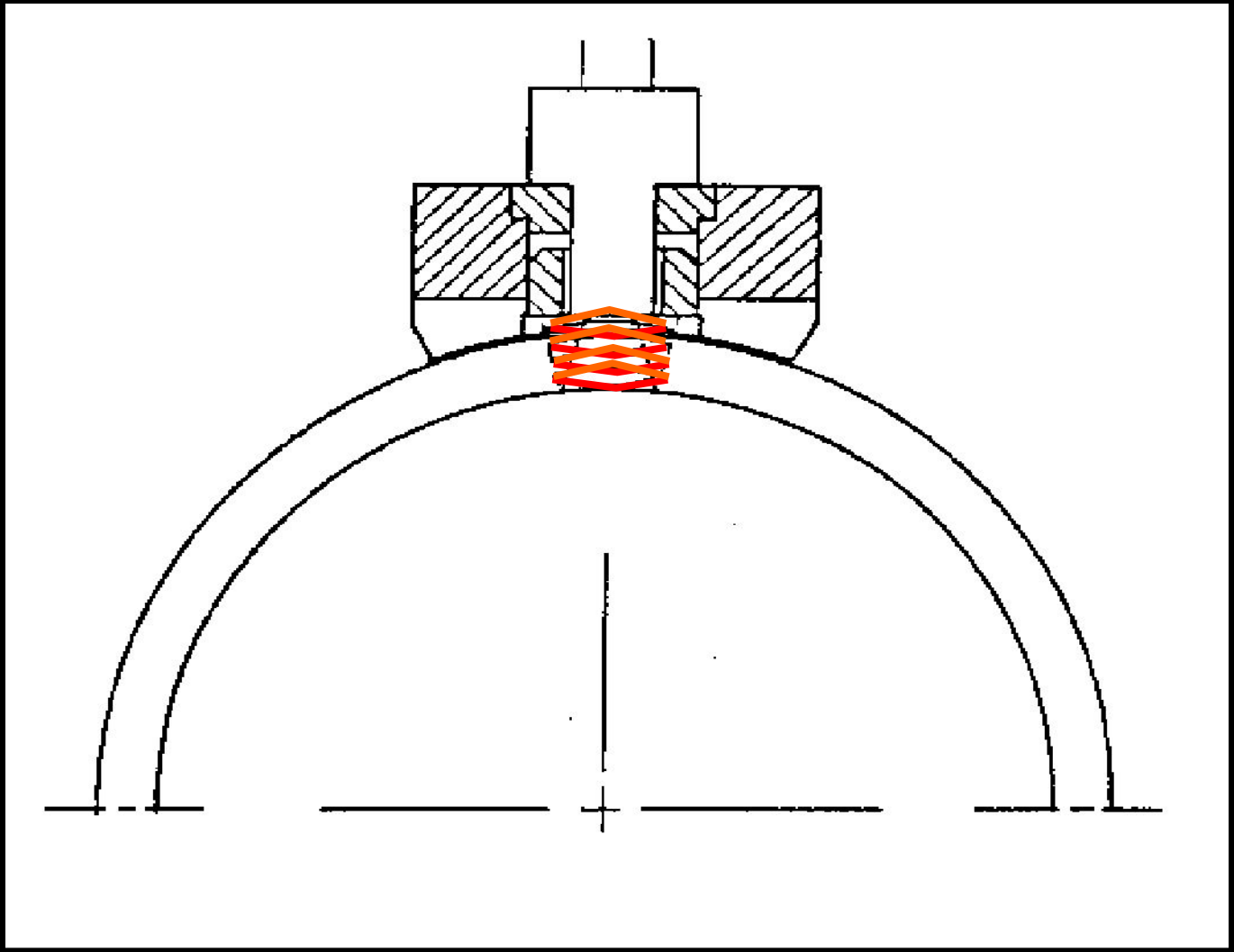
# Compression Wave Ultrasonic



# Benefits Of Ultrasonic End Area Inspection

- Detects Minute O.D./I.D. Fatigue Cracks ***Throughout The Upset Run-out Zone***
- Detects Corrosion Pitting ***Throughout The Upset Run-out Zone***
- Detects Wall Thickness Reduction ***Throughout The Upset Run-out Zone***
- Reduces Used Drill Pipe Inspection Cost
- Capable Of Inspecting Heavy-Wall Drill Pipe

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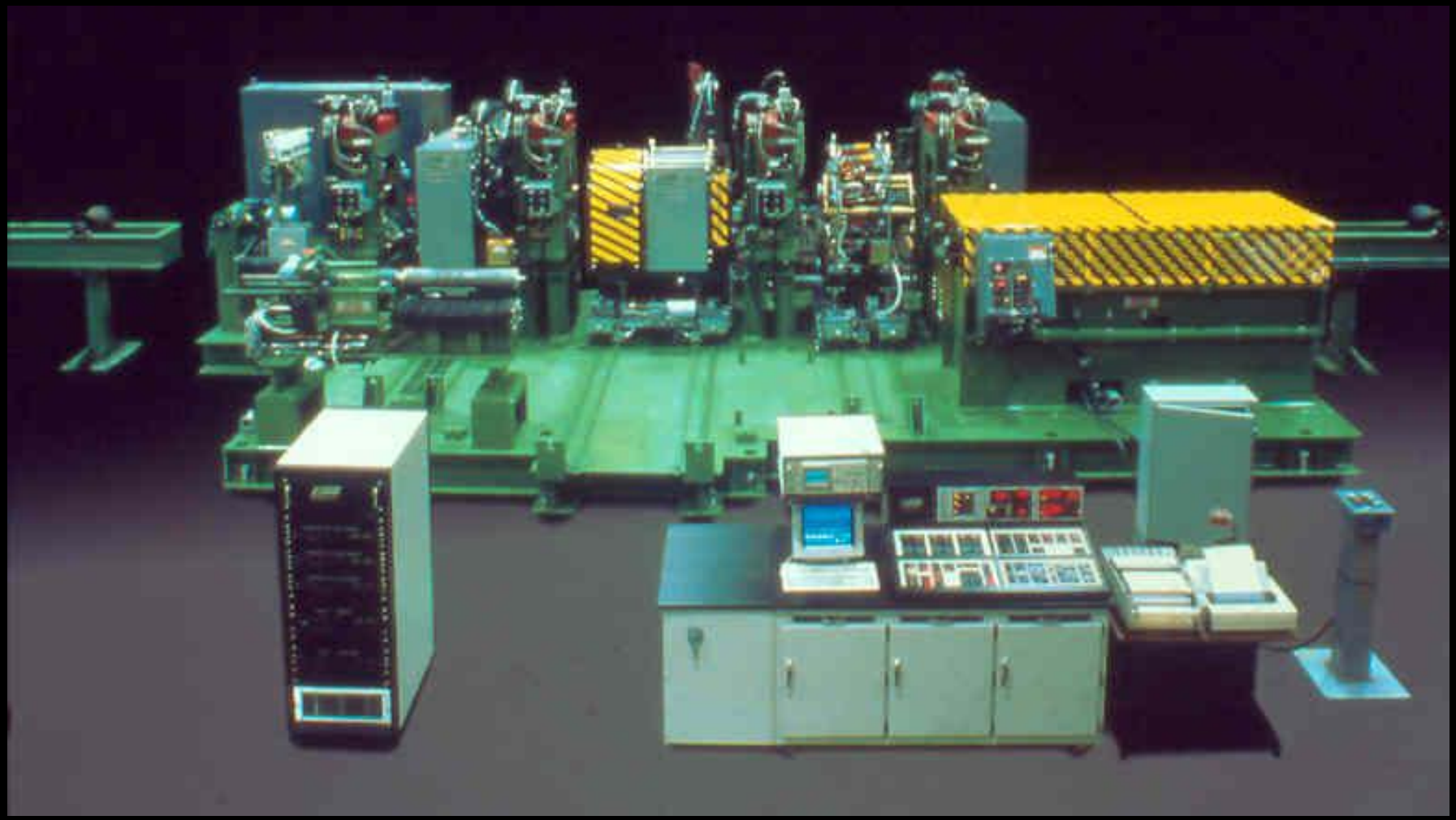
## New Non-Tool Jointed Drill Pipe



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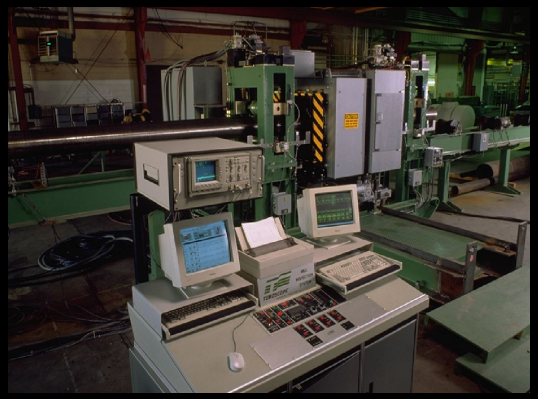




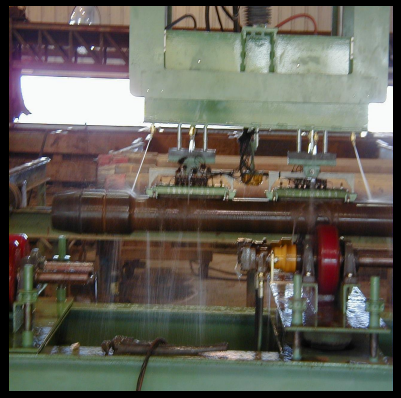

# Your Drill Pipe Management Company

# Thank You

Tuboscope would like to express special thanks to both Conoco Inc. and Transocean Offshore Deepwater Drilling Inc. for providing access to the Deepwater Pathfinder Drill Ship.



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# Tuboscope
# Drill String Services


# Thank You