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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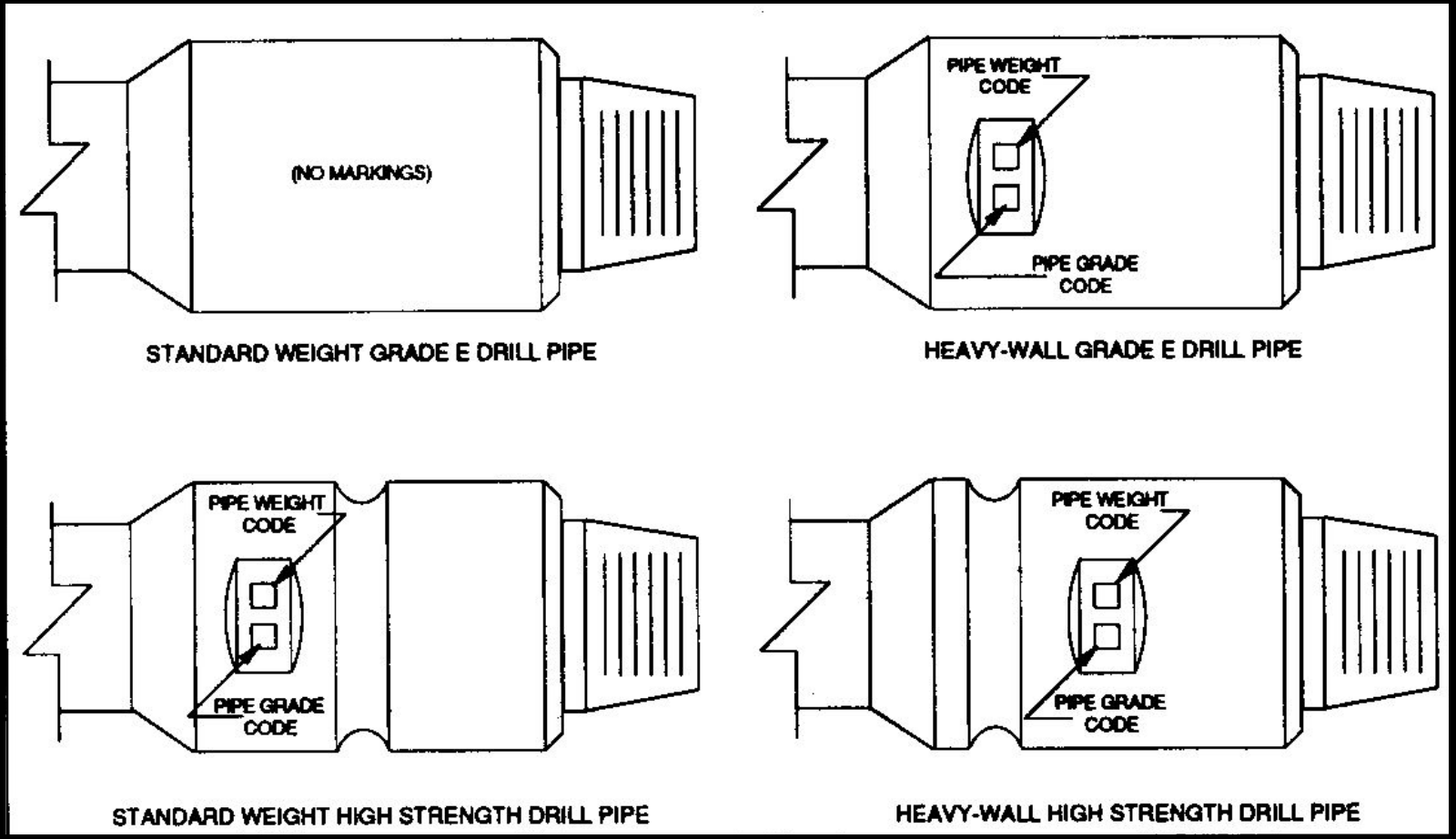
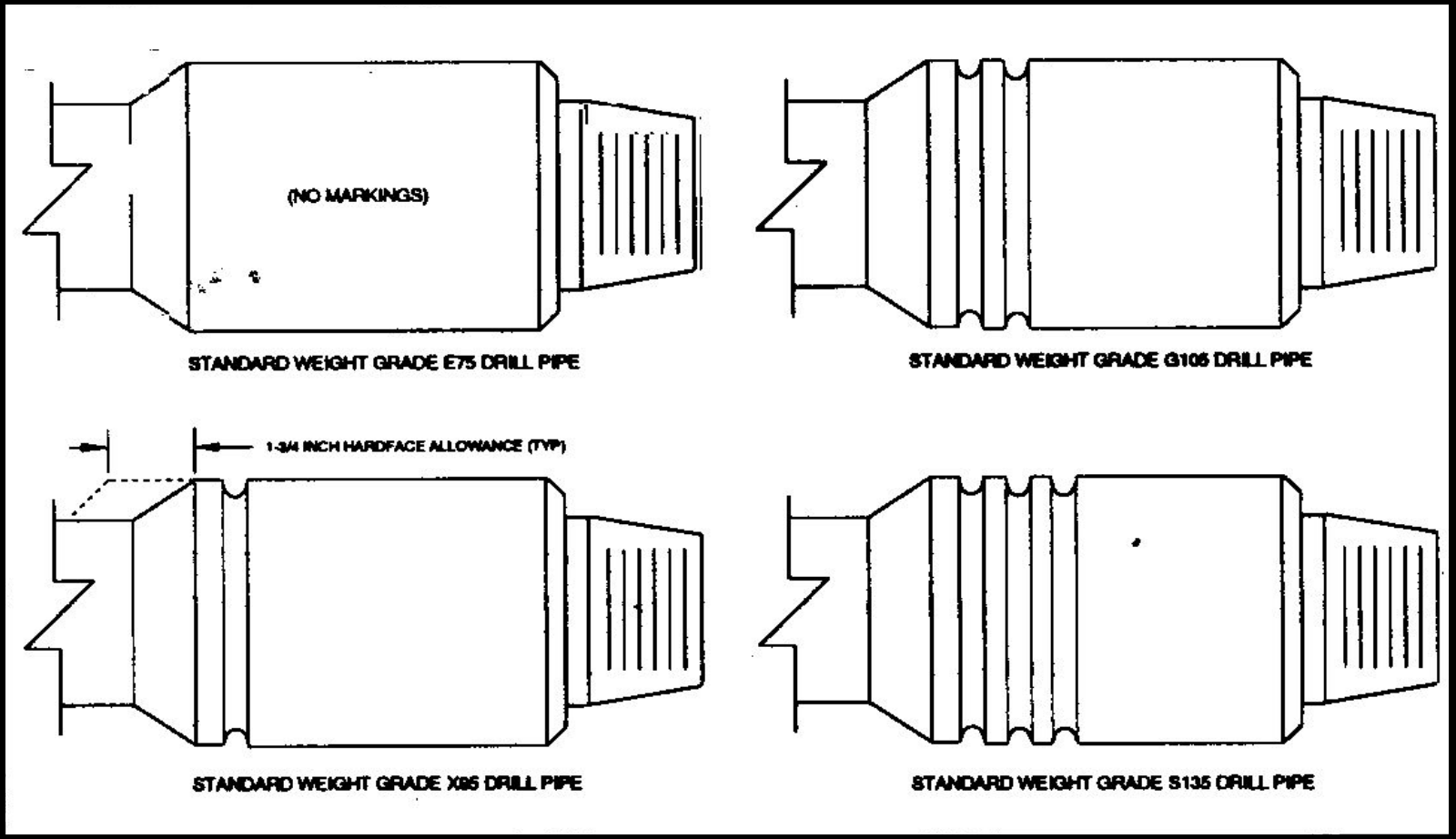
Old API Marking System For Drill Pipe



New API Marking System For Standard Wall Drill Pipe



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Drill Pipe
Tool Joints

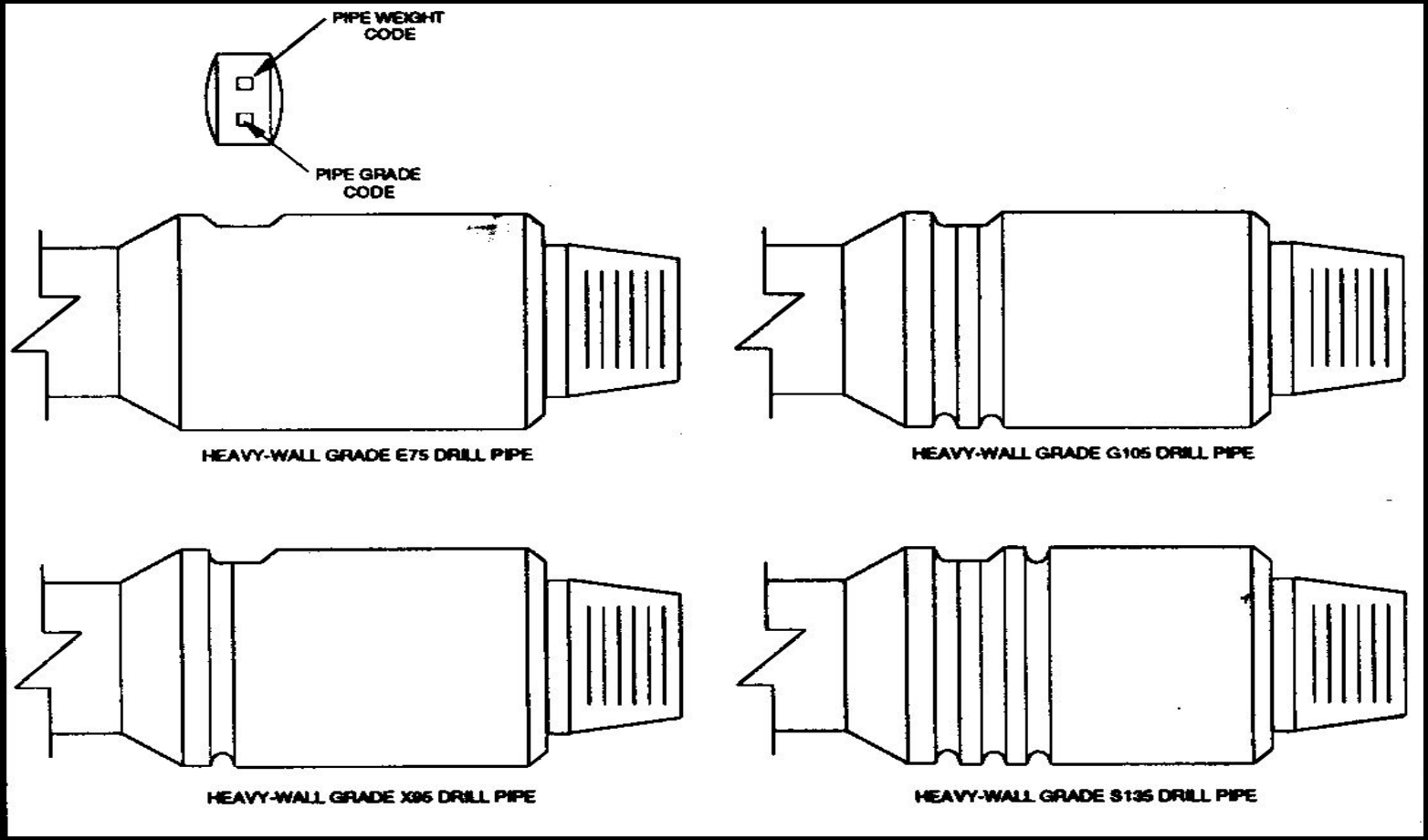
Tool Joint	Grade	Tool Joint O.D.	Tool Joint I.D.
5” NC-50 19.50#	E-75	6 5/8”	3 ¾”
	X-95	6 5/8”	3 ½”
	G-105	6 5//8”	3 ¼”
	S-135	6 5/8”	2 ¾”
51/2” FH	E-75	7”	4”
24.70#	X-95	7 ¼”	3 ½”
	G-105	7 ¼”	3 ½”
	S-135	7 ½”	3”
5 7/8” XT-57			
23.40#	S-135	7”	4 ¼”

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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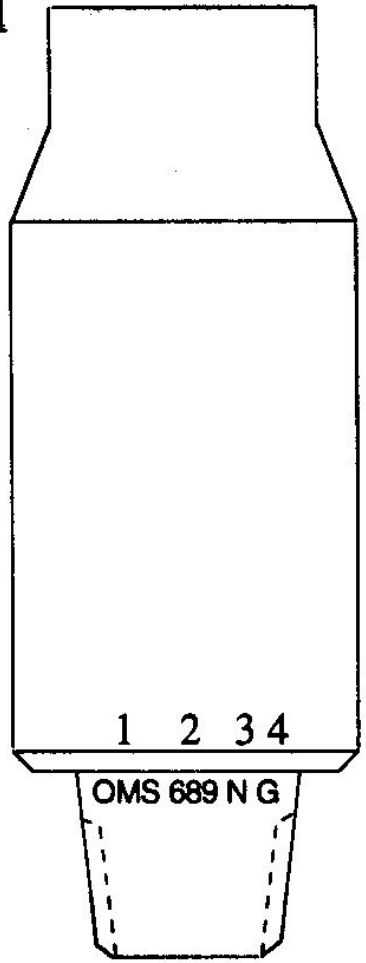
API Pin Neck Marking System

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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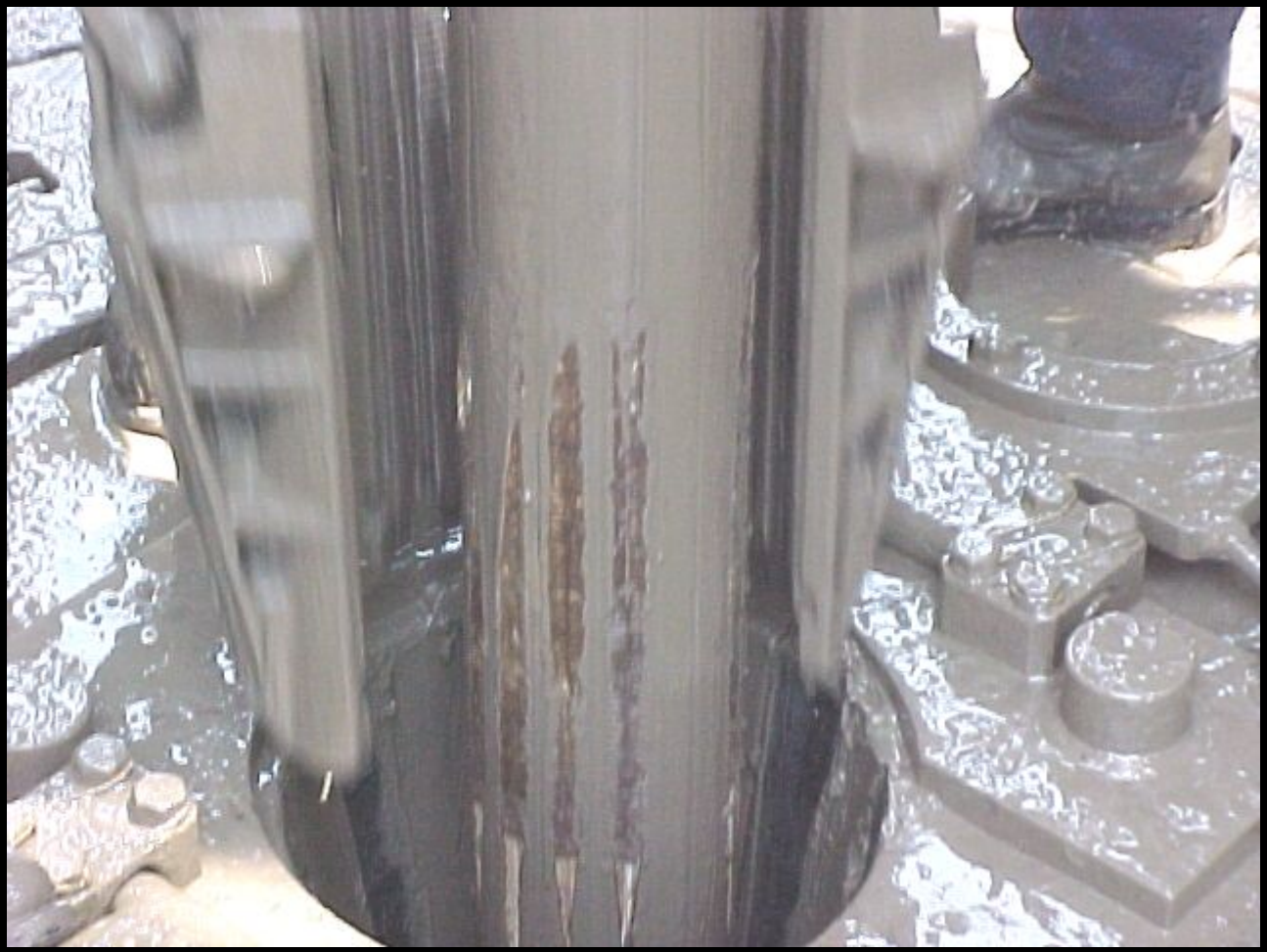
Improper Slip Installation



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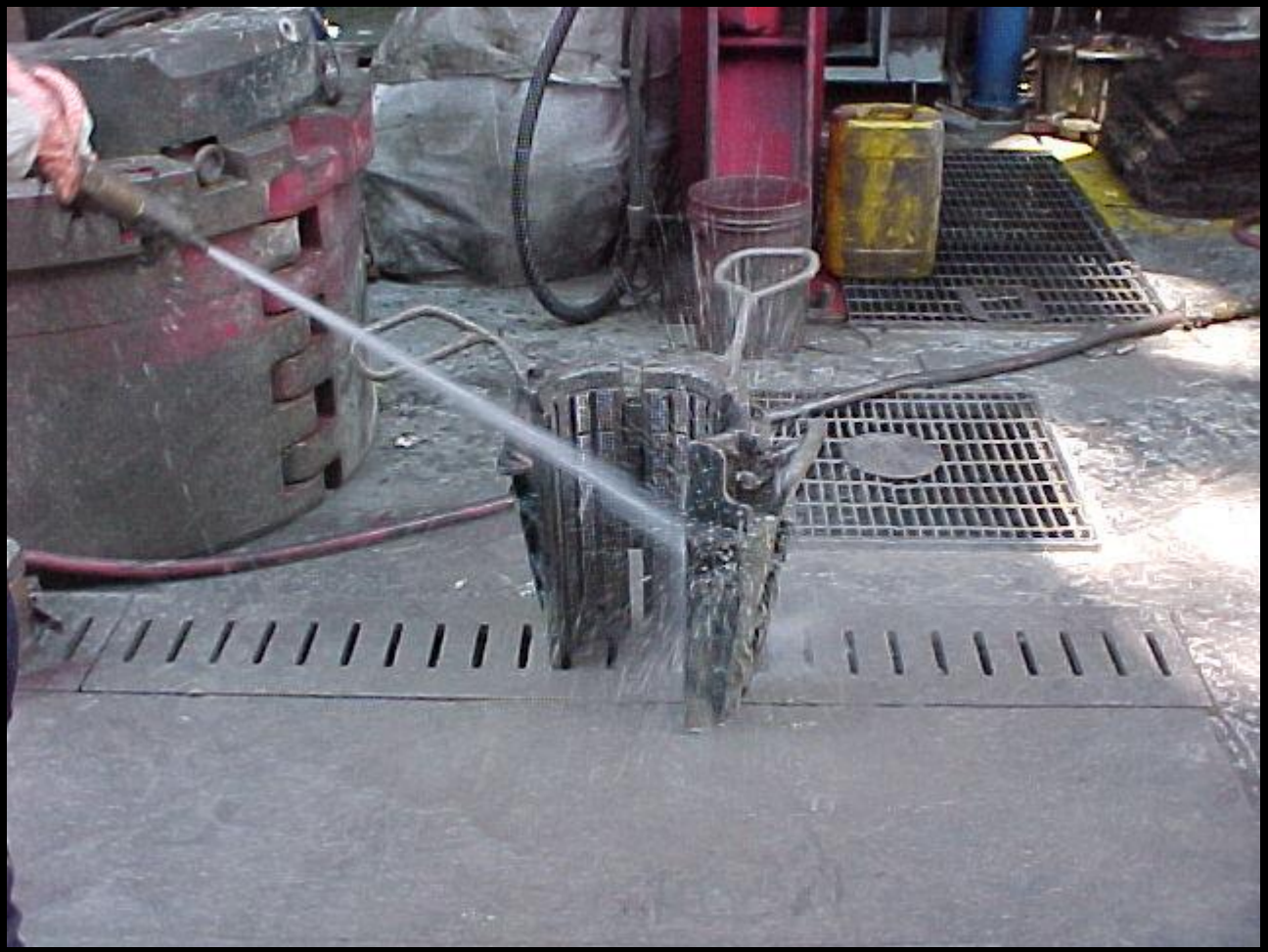
Cleaning Slips



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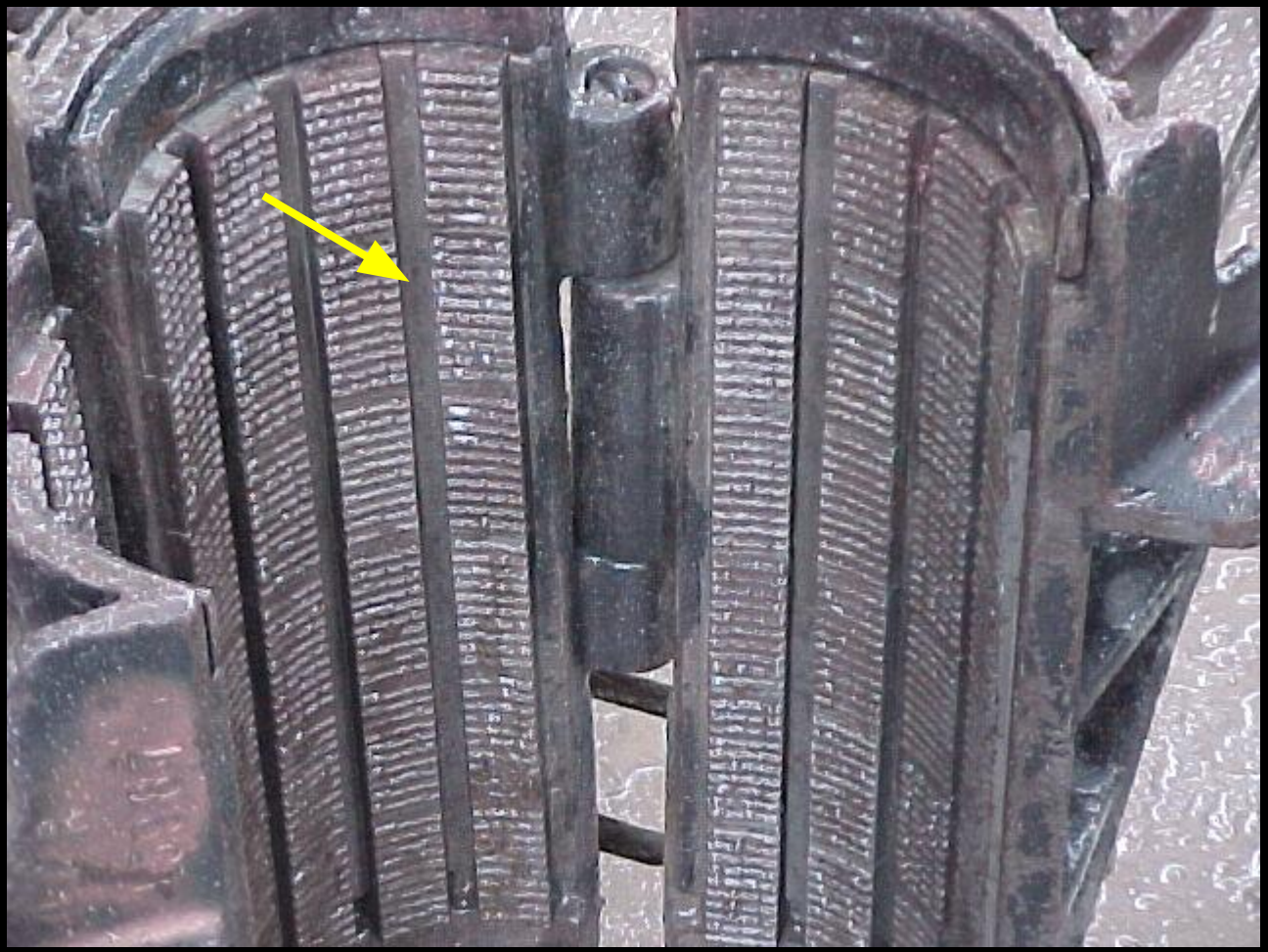
Slip Maintenance



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Slip Area Damage

Slip Cuts

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Crack in Slip Cuts

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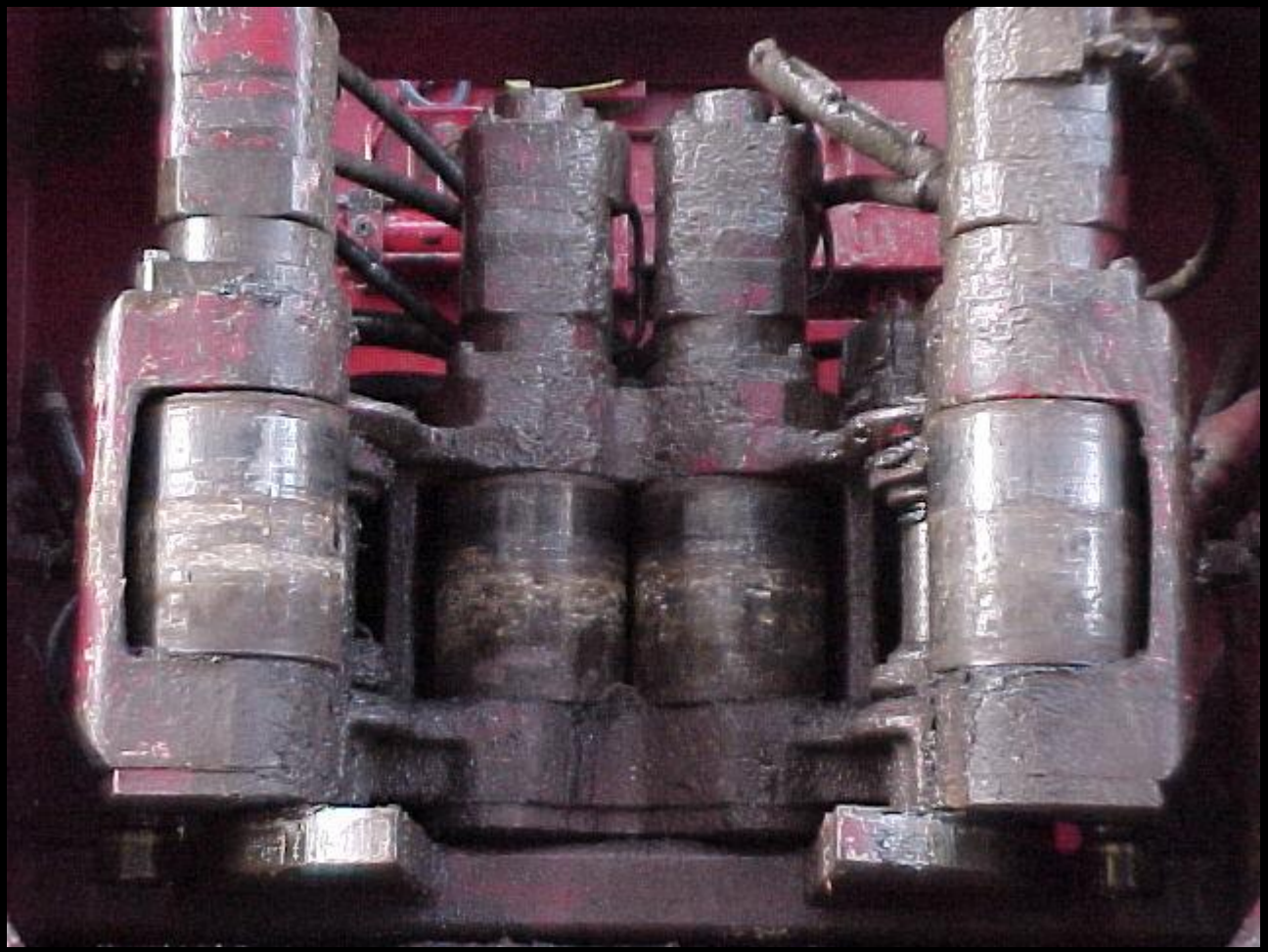
Use a Spinner for Initial Make-up



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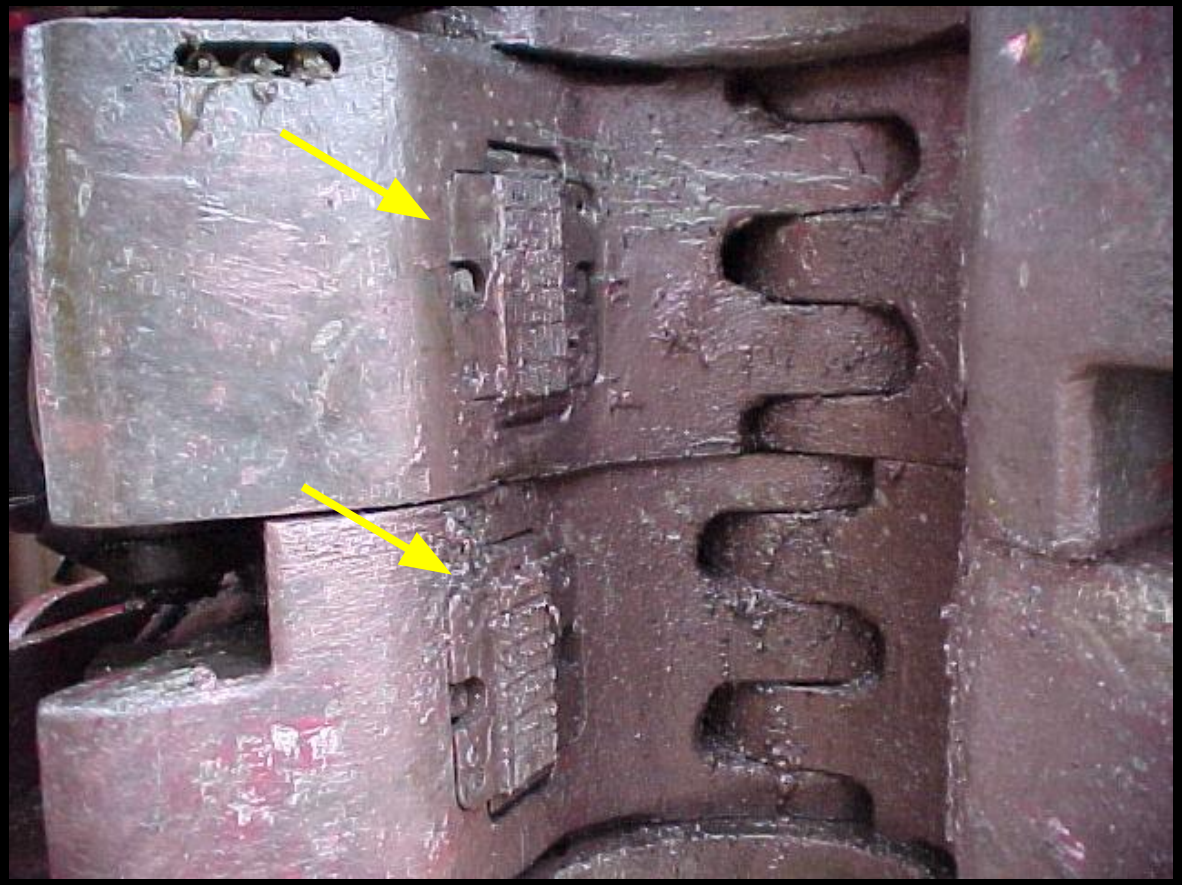
Tong Die Maintenance



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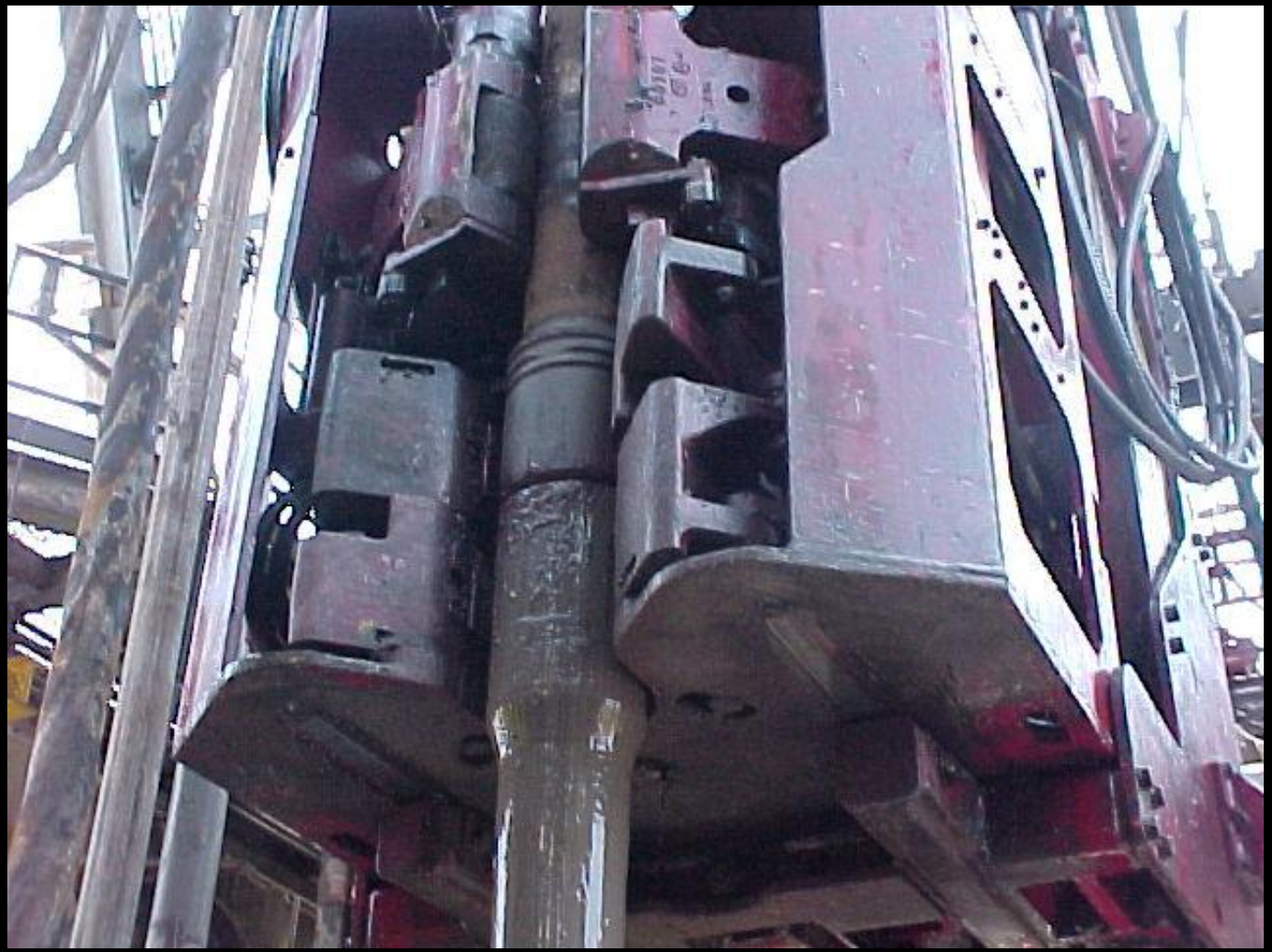
Proper Position
Iron Roughneck



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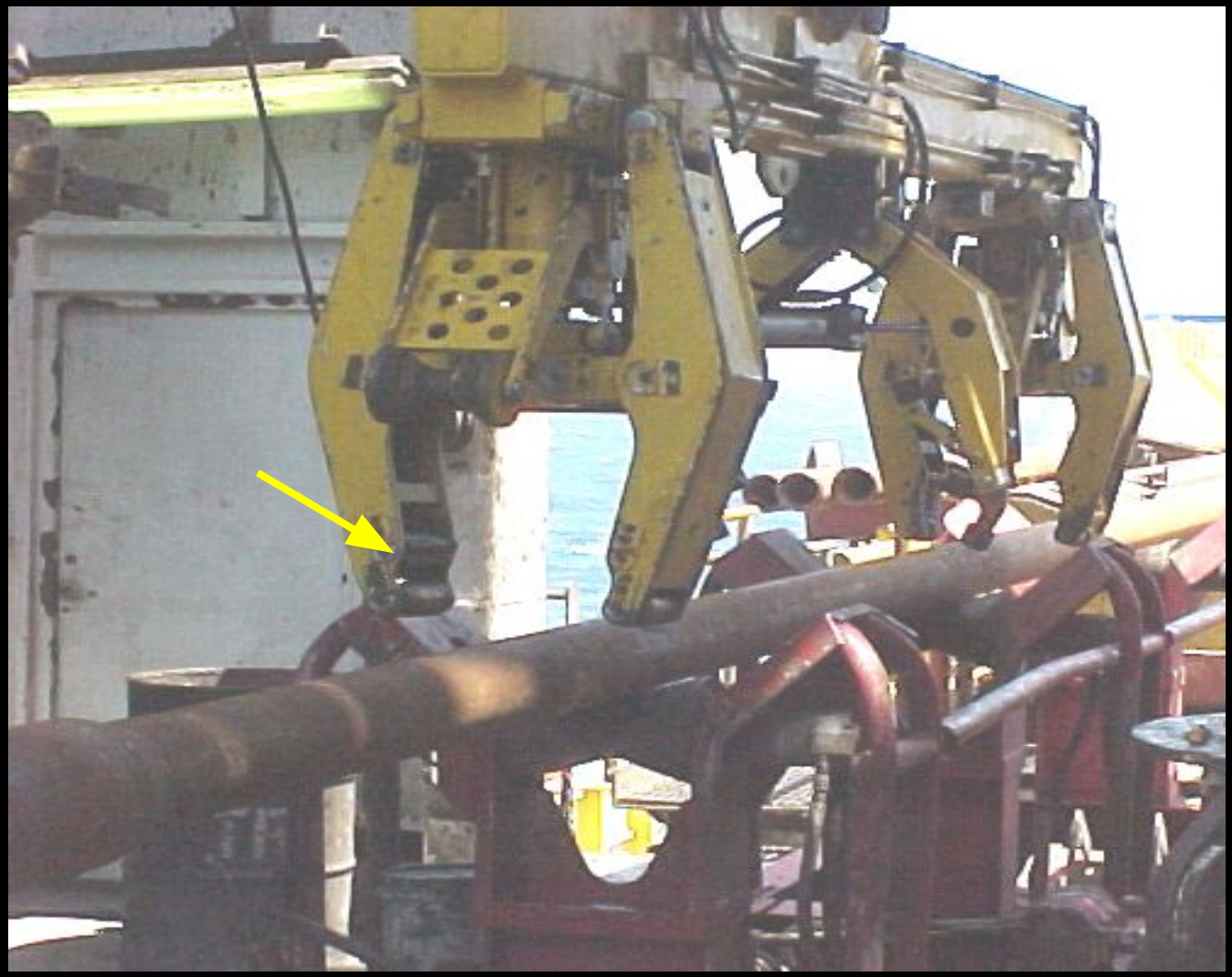
Pipe Handling System - Roller Maintenance



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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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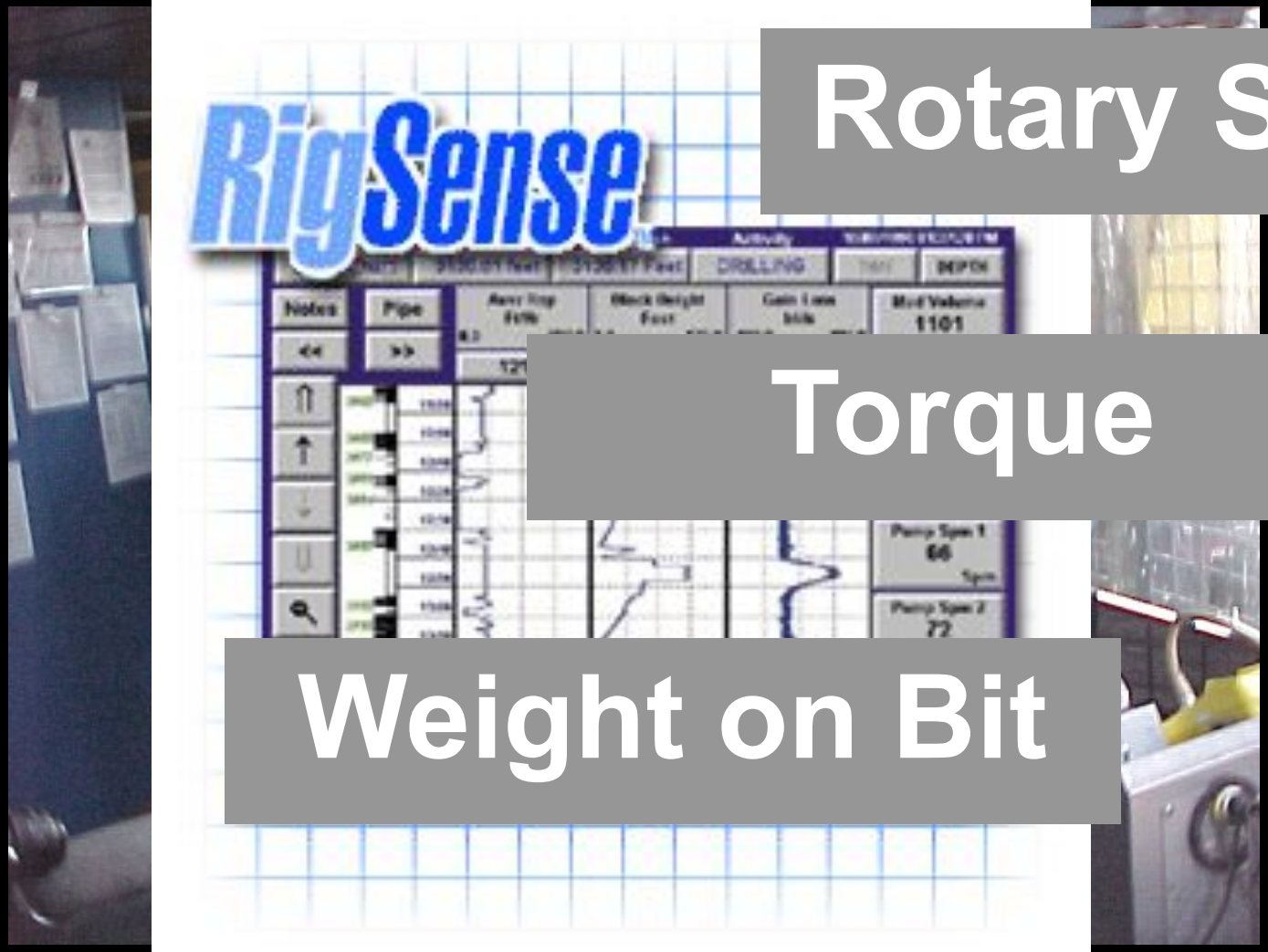
Monitor Your Drilling Controls



Rotary Speed

Torque

Weight on Bit

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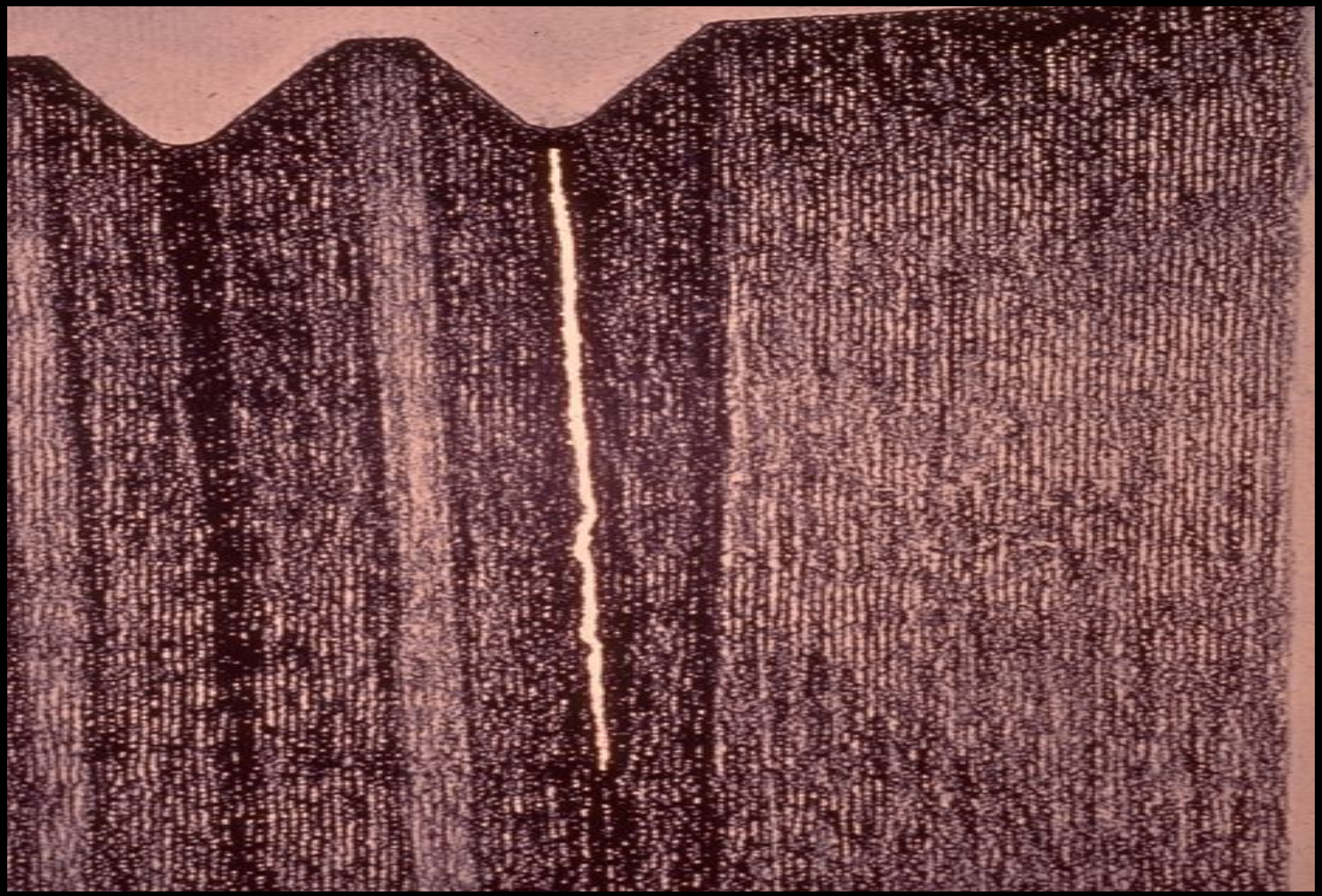
An Effect of Over Torque



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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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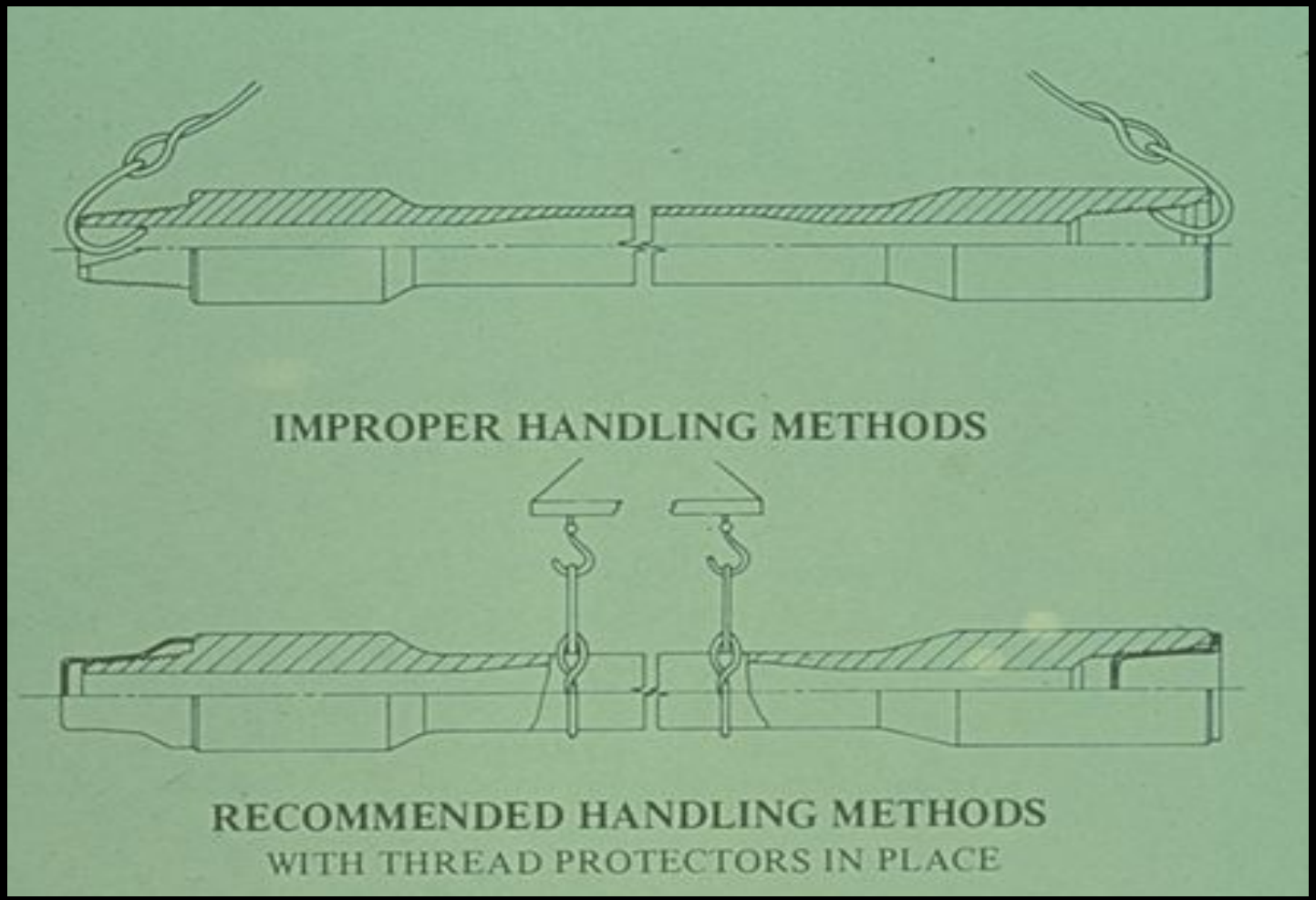
Handle Drill Pipe With Slings
NEVER Use Hooks Or Rods



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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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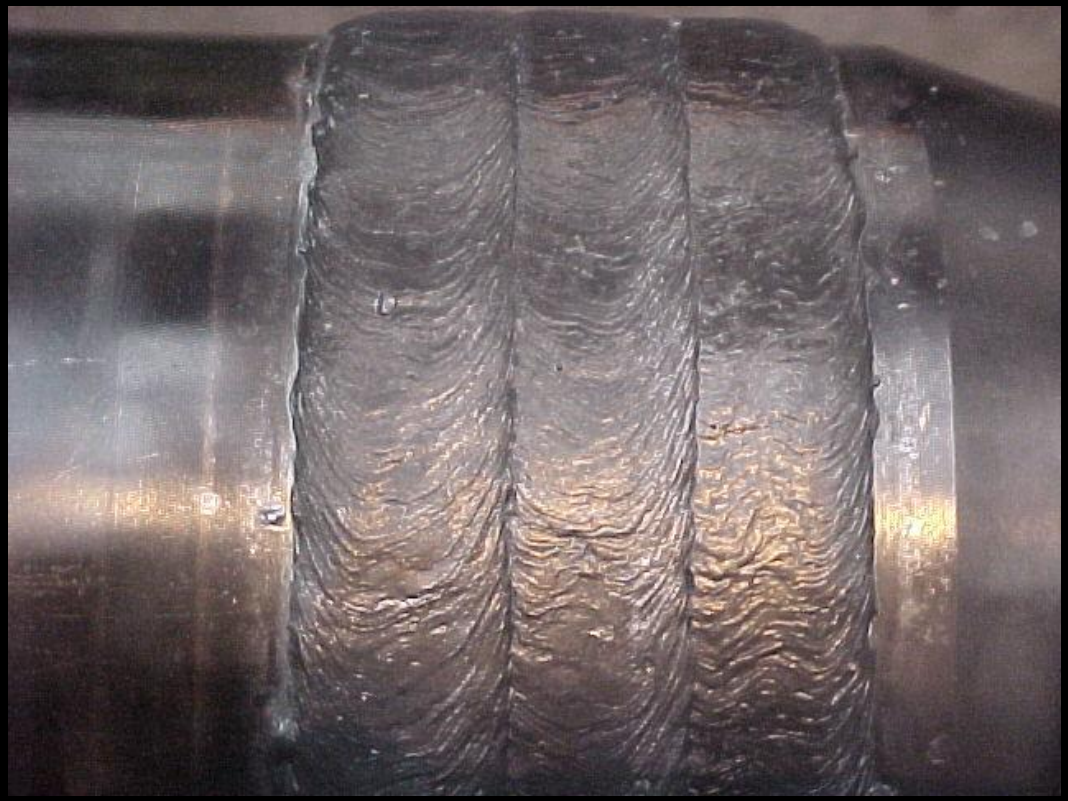
Drill Pipe Hardband

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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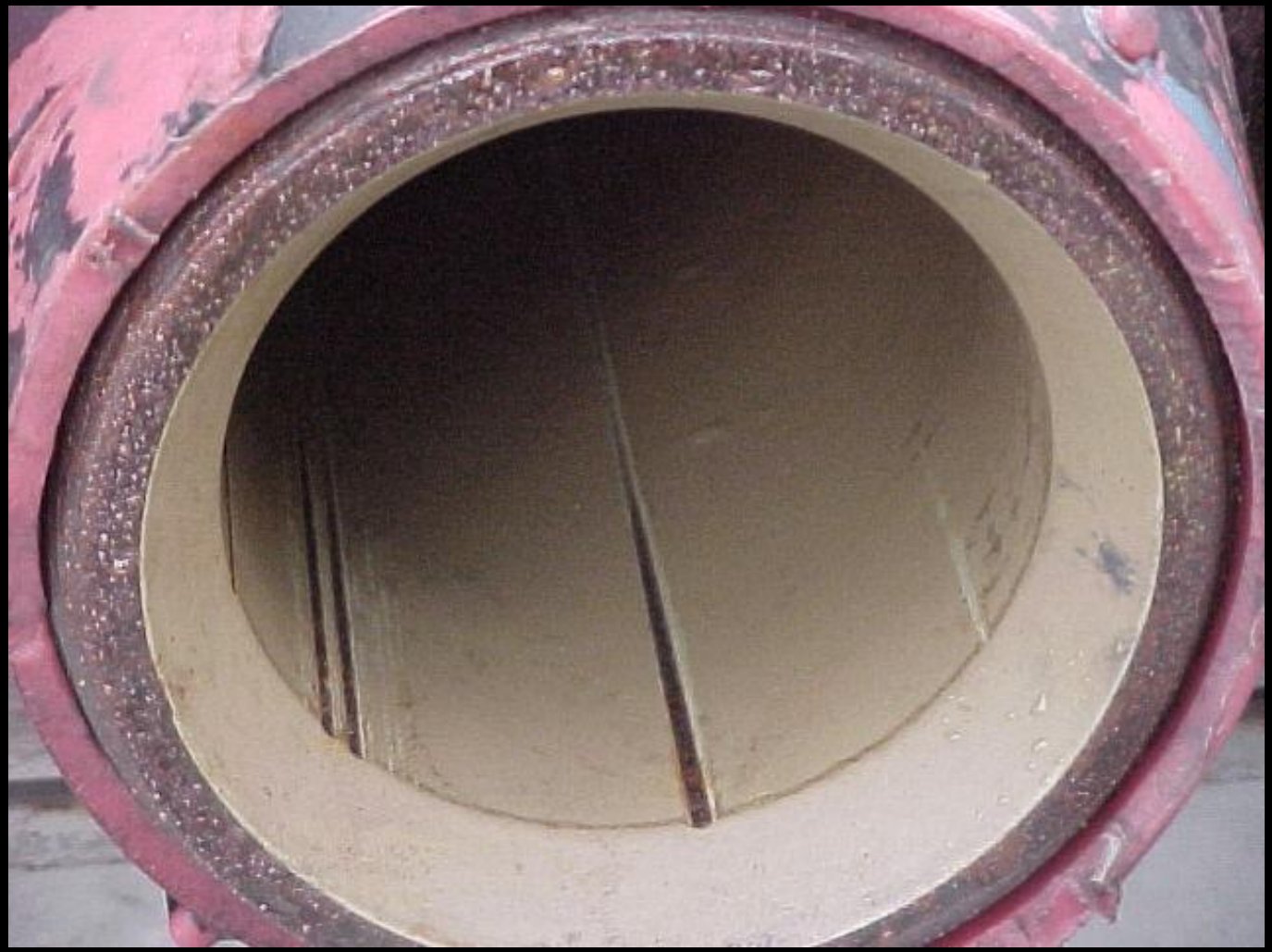
Inspect Condition Of Internal Coating



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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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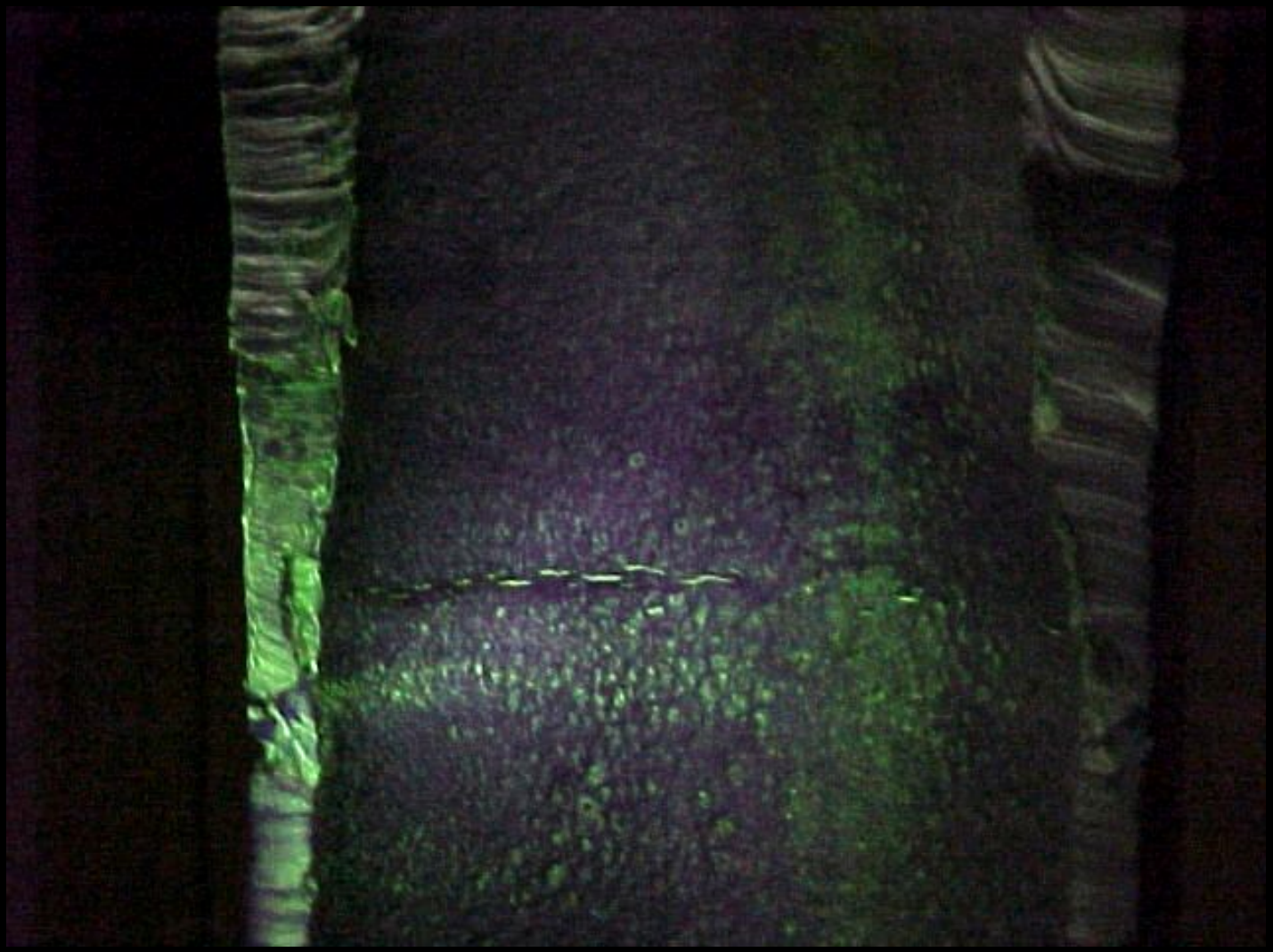
I.D. Fatigue Cracks
Upset Run-Out Zone



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Washout - Box

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Washout - Pin

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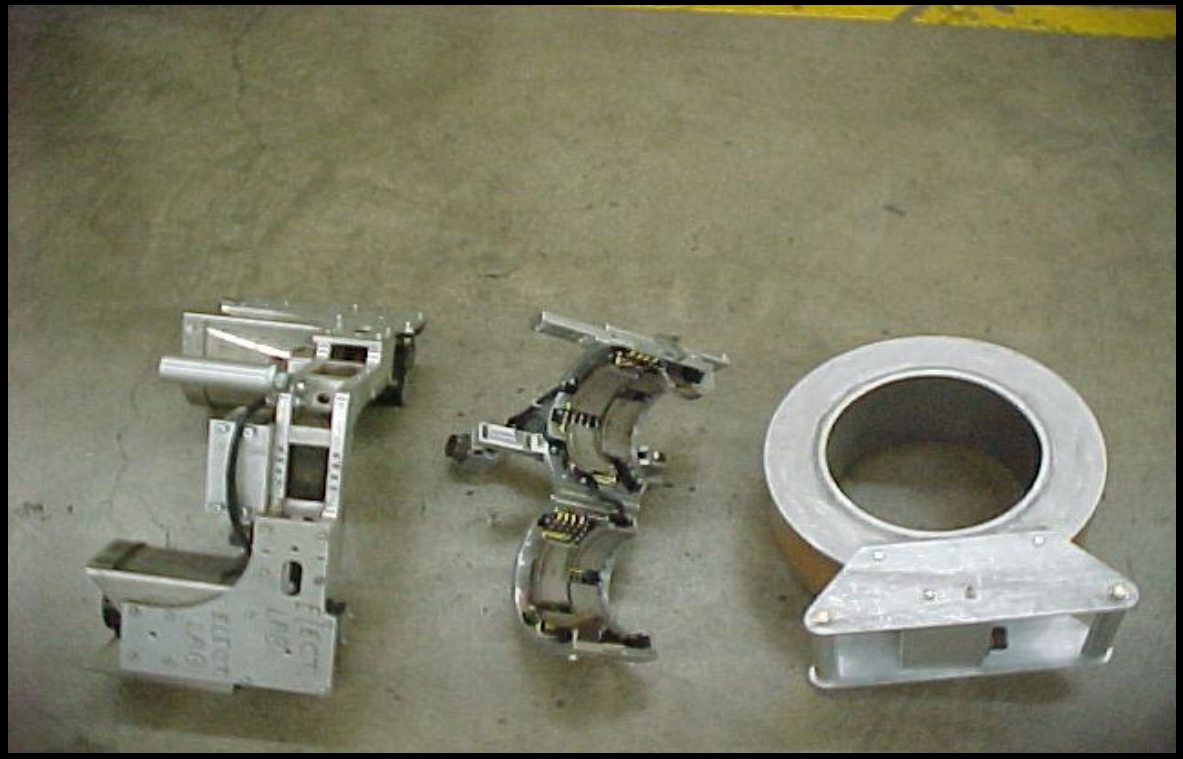
Electromagnetic Inspection

- 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

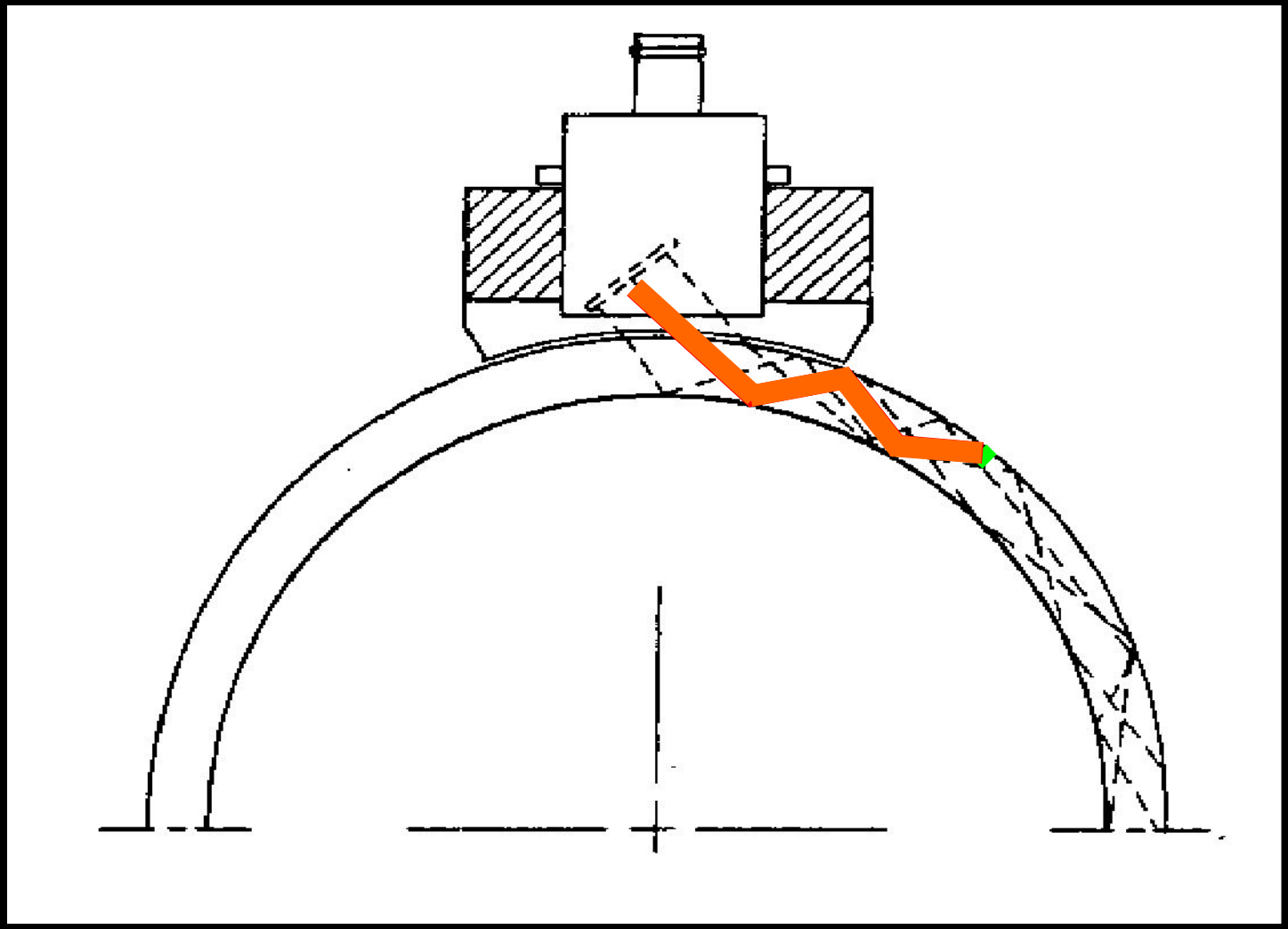
Shear Wave

- 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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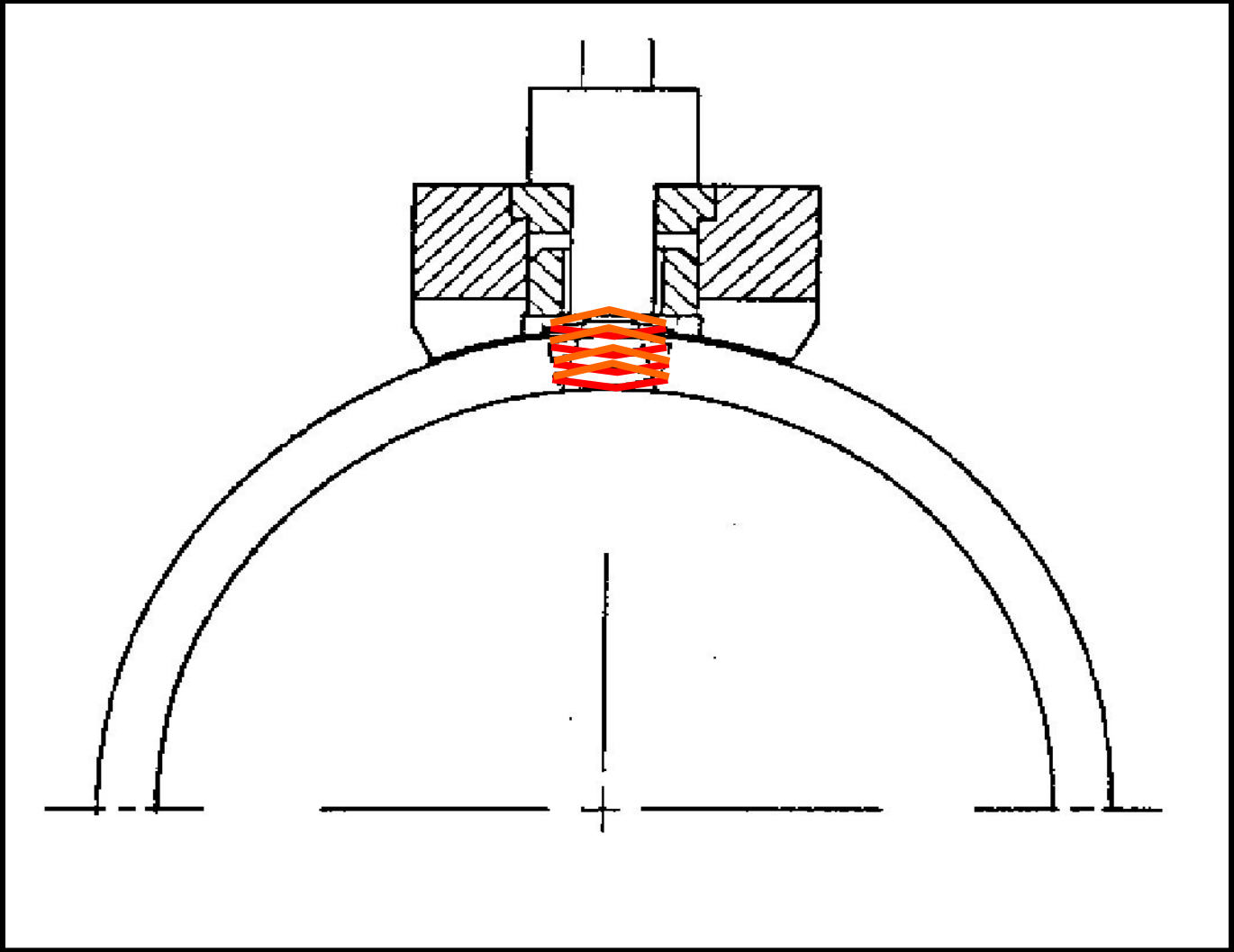
Compression Wave Ultrasonic



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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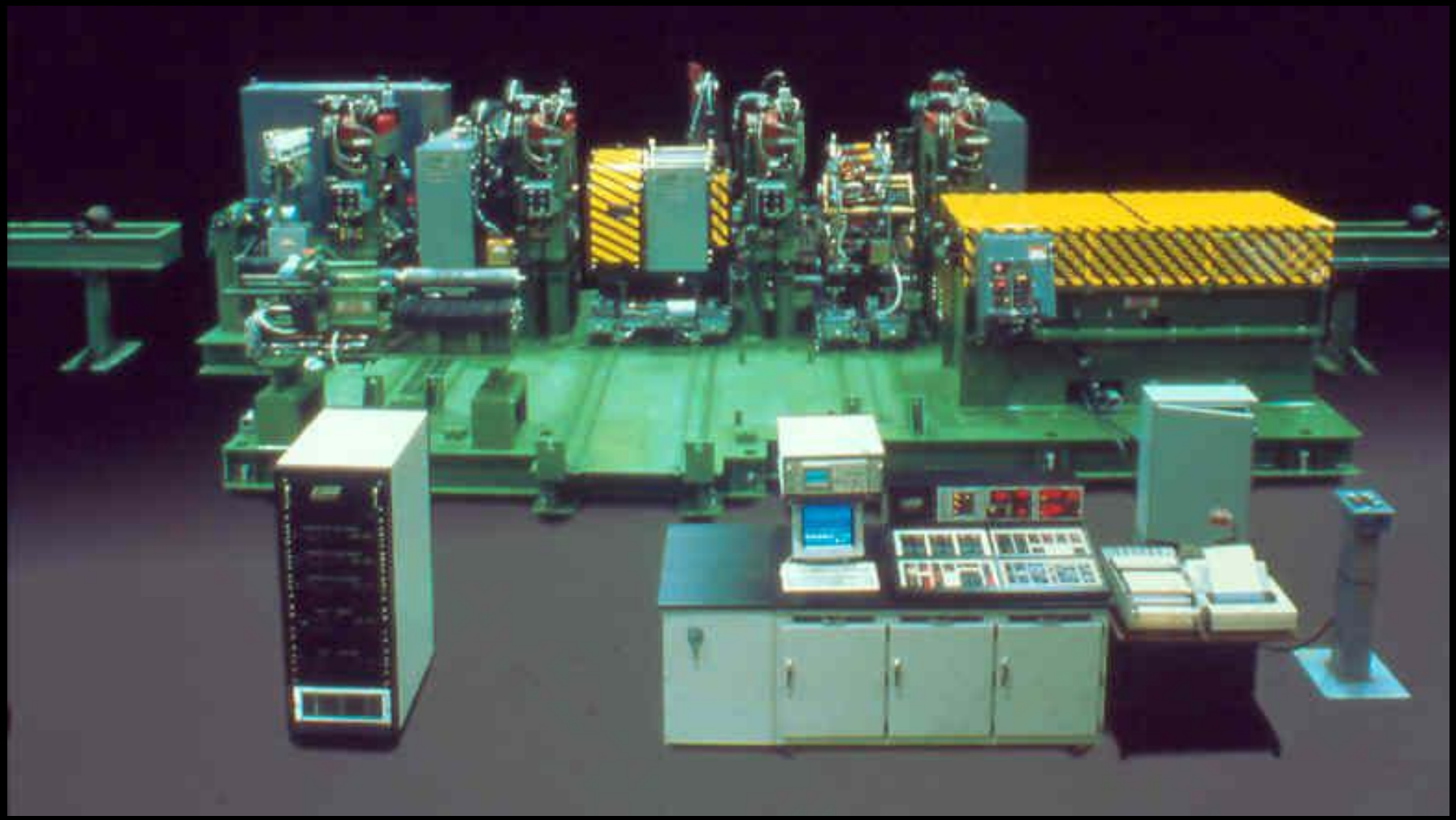
Truscope® AS

New Non-Tool Jointed Drill Pipe



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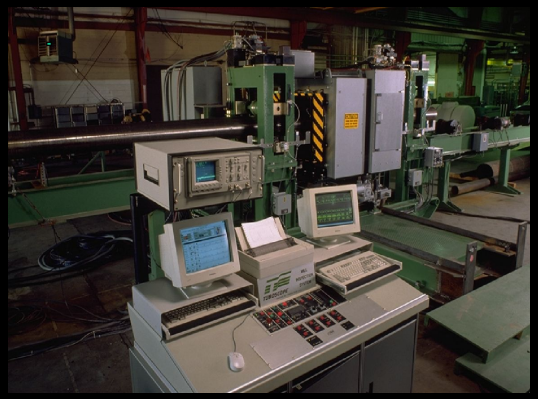




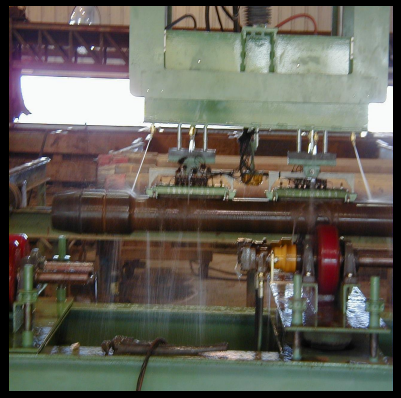

Your Drill Pipe Management Company

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