

Sucker Rod Failure Locations and Inspection Zones

Field inspection map for rod body, forged ends, threaded connections and couplings

Sucker Rod Structure and Common Failure Locations

01 Rod Body

- fatigue crack
- corrosion pits
- rod-to-tubing wear

02 Upset Transition

- local cracking
- surface discontinuity
- transition-area stress concentration

03 Shoulder / Wrench Area

- shoulder damage
- impact marks
- make-up related surface damage

04 Pin Thread

- thread wear
- galling
- corrosion
- deformation

05 Coupling

- coupling OD wear
- internal thread damage
- eccentric wear
- cracking



01 Rod Body



02 Upset Transition



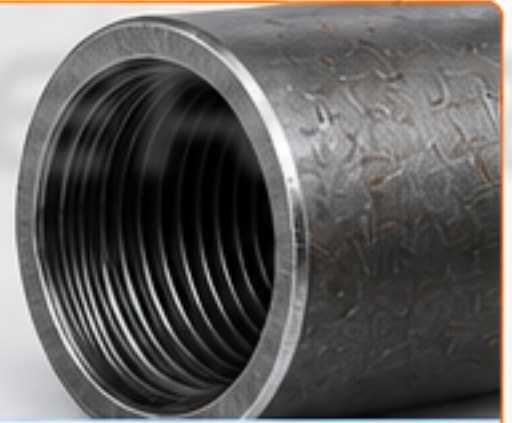
03 Shoulder / Wrench Area



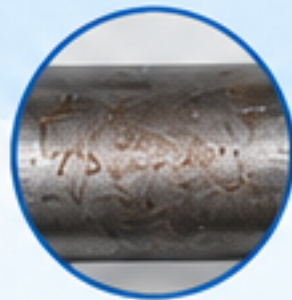
04 Pin Thread



05 Coupling

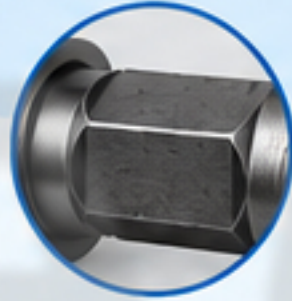


Inspection Zone Panel



Rod Body

Surface condition, straightness, local wear and crack indication.



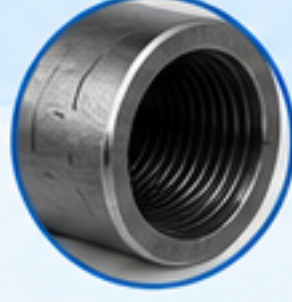
Rod End

Forged transition, wrench flats and shoulder condition.



Pin Connection

Thread form, damage, galling and corrosion.



Coupling

Internal thread, outside diameter wear and contact pattern.



Failure location is an important diagnostic clue, but the damaged area should be evaluated together with load history, well deviation, corrosion condition and adjacent rod-string components.

Inspection Workflow (Page 1)



Failure Appearance and Diagnostic Direction

Field diagnosis matrix for common observed damage patterns and next inspection steps

Observed Condition	Typical Location	Possible Failure Mechanism	What to Check Next
01  Transverse / Progressive Rod-Body Crack	Rod body or transition area	Repeated cyclic loading / fatigue	- Load history - rod diameter and grade - nearby rods - repeated failure depth
02  Crack Starting from Corrosion Pit	Rod body surface	Corrosion-assisted fatigue	- Produced fluid condition - pitting distribution - corrosion protection - adjacent rod surfaces
03  Localized One-Side Wear	Rod body or coupling OD	Rod-to-tubing contact	- Well deviation - tubing ID - rod guides - coupling clearance
04  Damaged / Deformed Threads	Pin or coupling	Connection wear, damaged thread engagement or improper make-up condition	- Mating thread - shoulder contact - coupling condition - repeated connection failures
05  Shoulder Damage	Rod end	Connection make-up or alignment issue	- Mating shoulder - thread condition - rod-end alignment - coupling condition
06  Coupling OD Wear	Outer coupling surface	Tubing contact / insufficient operating clearance	- Tubing ID - well deviation - guide placement - wear pattern around circumference



Diagnostic Rule

Do not assign a failure cause from appearance alone. Compare the damage location, fracture pattern, operating history and surrounding rod-string condition before reaching a field diagnosis.

Inspection Workflow (Page 2)

Observe Appearance

Identify Typical Location

Compare with Likely Mechanism

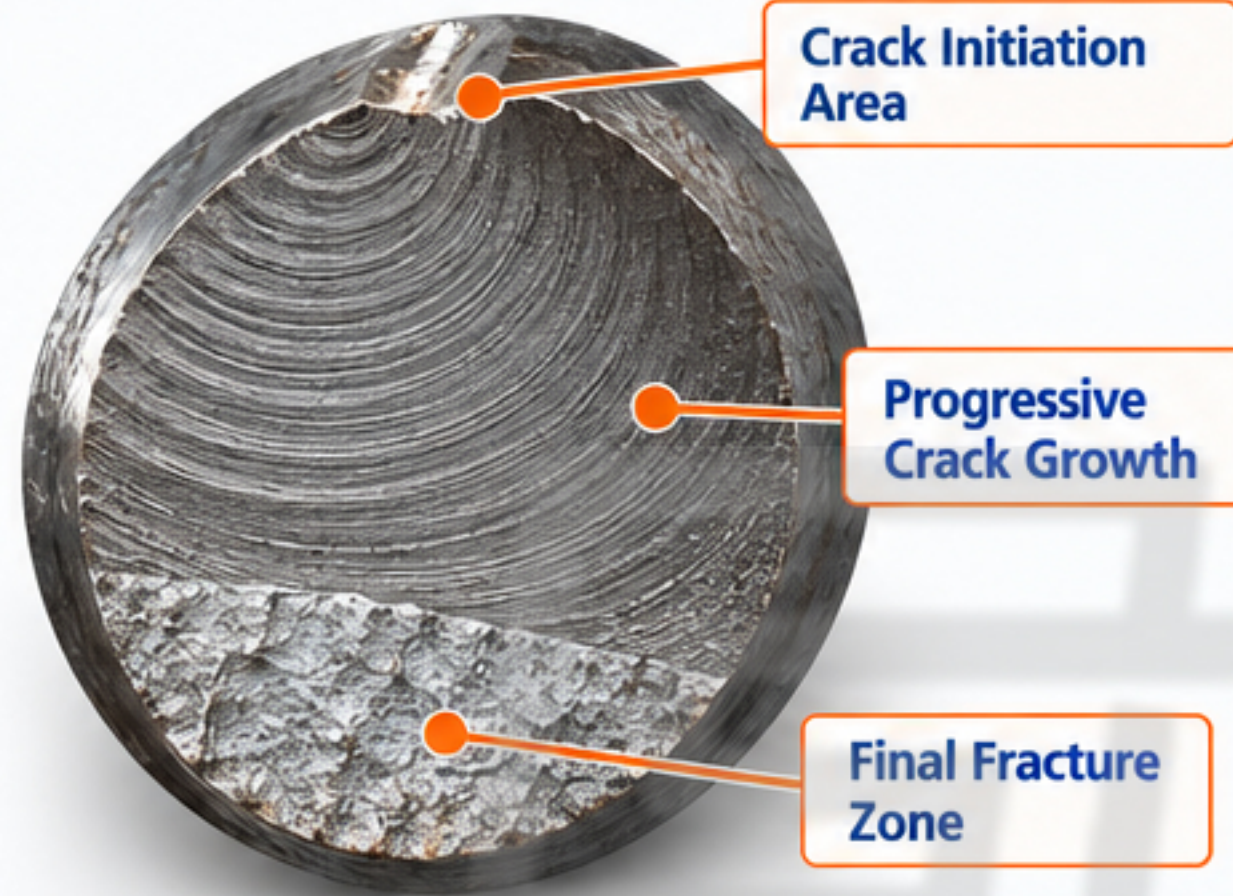
Check Next Inspection Item

Confirm Field Diagnosis

Fracture Pattern Screening

Field comparison of fatigue, overload and corrosion-assisted fracture indications

Fatigue



Typical features

- Often begins from a localized surface or geometric stress raiser
- Crack grows through repeated load cycles
- Final separation occurs after remaining section becomes insufficient

Overload



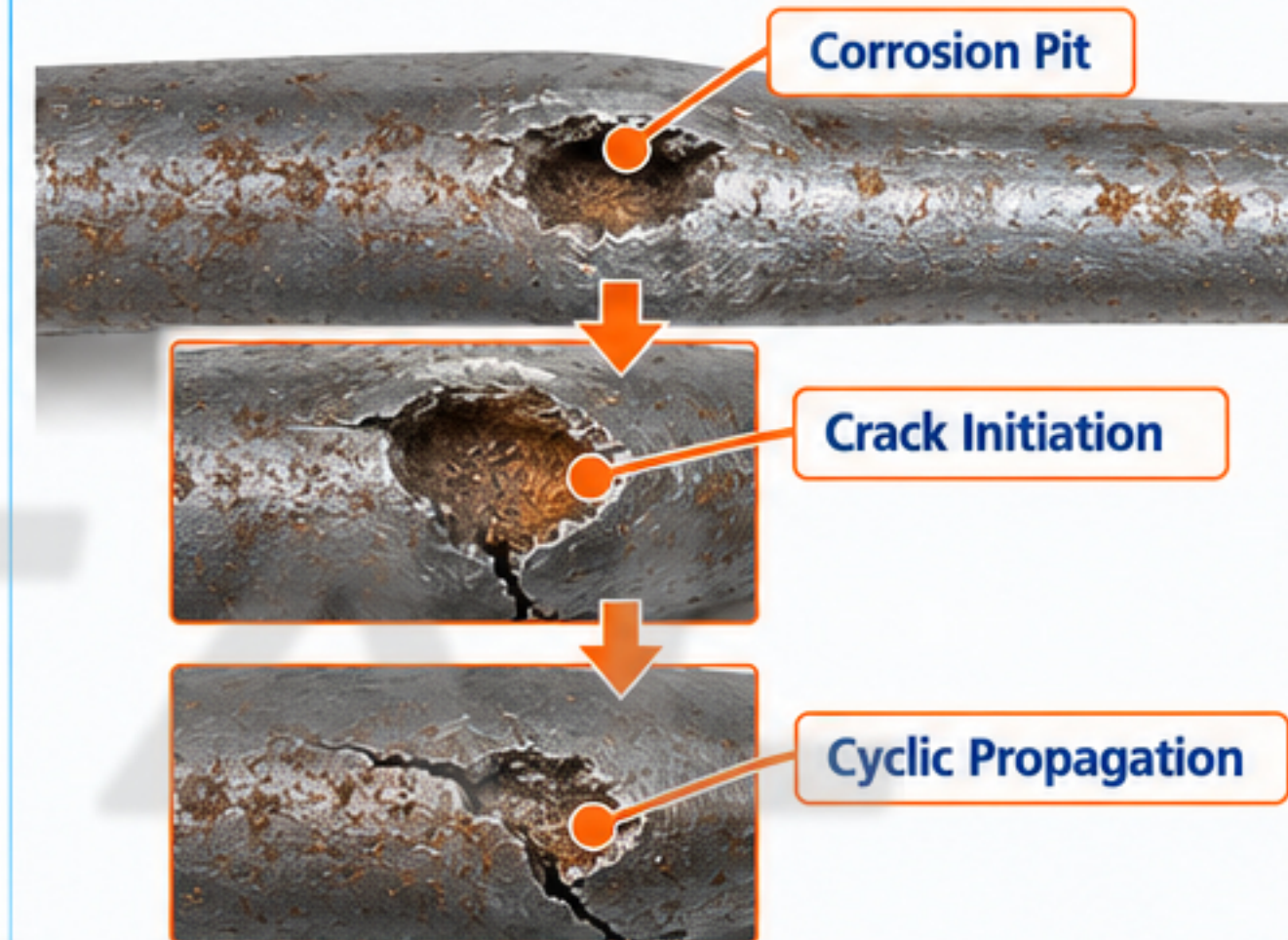
Typical appearance

- large final fracture region
- possible gross deformation depending on material and loading
- little evidence of progressive crack propagation

Check

- abnormal load event
- stuck pump or mechanical obstruction
- unexpected tensile demand
- remaining rod-string condition

Corrosion-Assisted Failure



Typical features

- corrosion can create local initiation sites
- cyclic stress can accelerate crack growth
- surface condition around the fracture is important evidence



Field Screening ≠ Laboratory Confirmation

Visual fracture screening can guide the next inspection step, but uncertain or repeated failures may require detailed fractographic, metallurgical or material evaluation.

Fracture Screening Workflow (Page 3)

Observe Fracture Pattern

Compare General Indications

Check Service Condition

Review Load / Corrosion Clues

Decide Next Inspection Step

Corrosion and Rod-to-Tubing Wear Assessment

Field screening for corrosion patterns, localized pitting and rod-to-tubing contact wear

Corrosion Pattern Comparison

01 General Surface Corrosion



- extent of surface loss
- distribution along rod
- produced-fluid condition

02 Localized Pitting



- pit depth and concentration
- crack indication
- repeated damage at similar depth

03 Corrosion + Cyclic Cracking

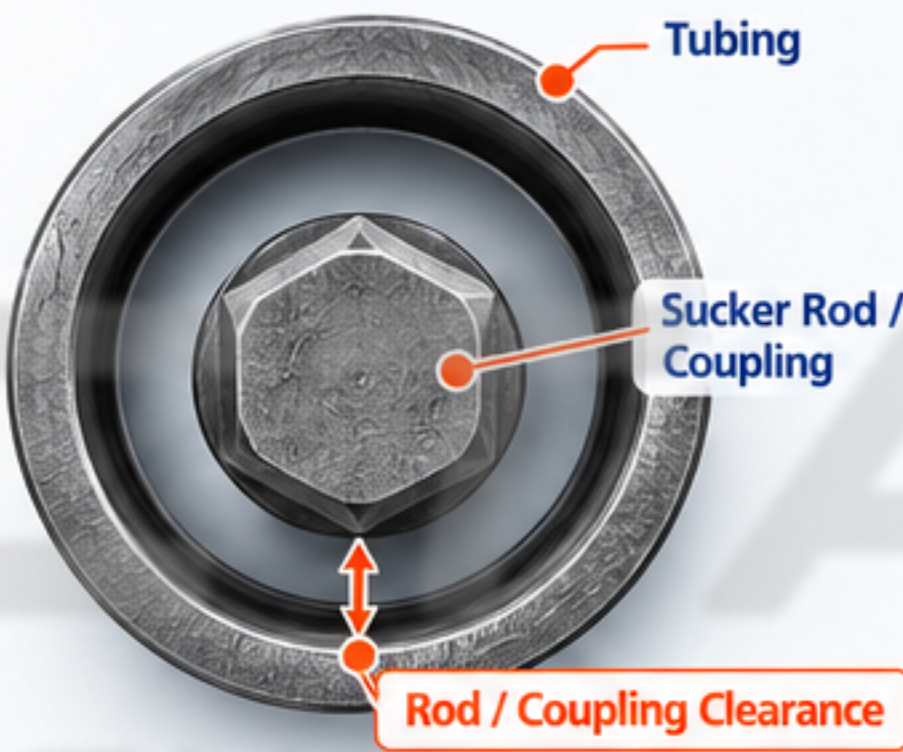


- corrosion location
- cyclic load demand
- grade/material suitability
- adjacent rod condition

Rod / Tubing Contact Mechanism

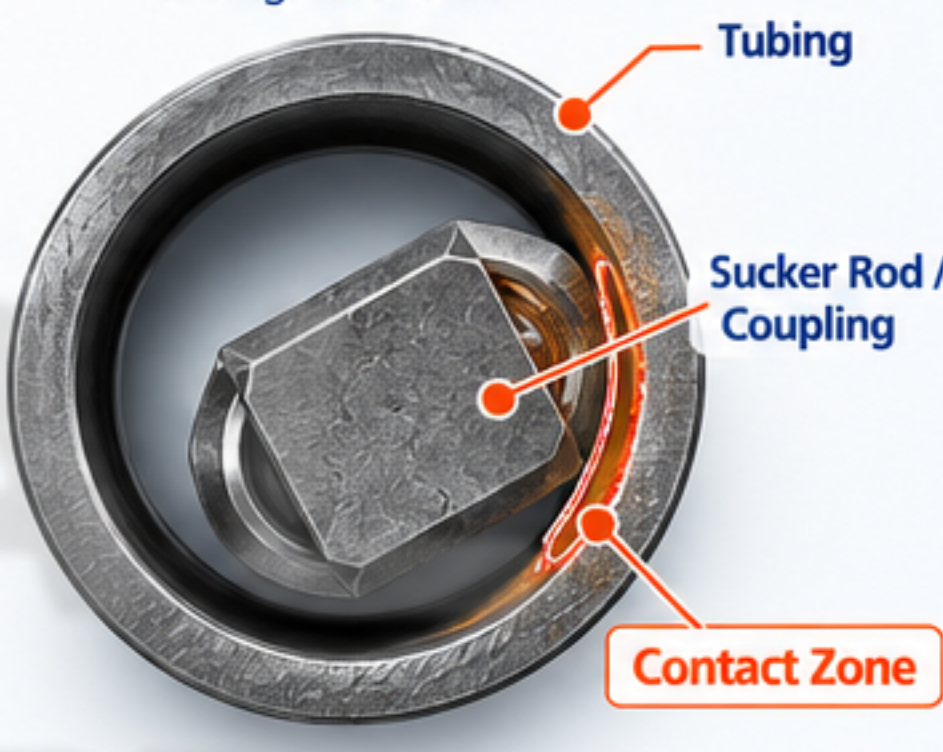
01 Adequate Clearance

Rod string centered inside tubing, with clear annular gap.



02 Deviated Contact

Well deviation causes the rod or coupling to lean and contact the tubing inner wall.



Wear should be evaluated by location and pattern. Repeated one-side wear at similar well depths usually requires checking well deviation, coupling clearance and rod-guide arrangement rather than replacing the damaged rod alone.

Inspection Workflow (Page 4)

Identify Corrosion Pattern

Check Pitting or Wear Location

Review Tubing Contact Evidence

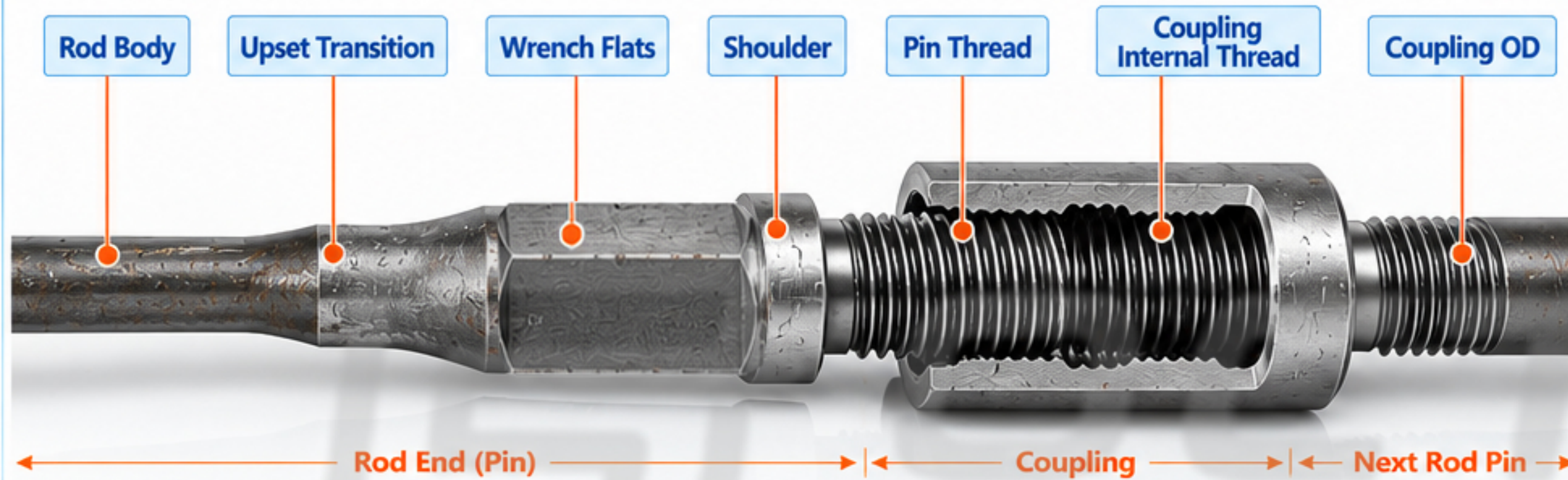
Evaluate Deviation & Clearance

Define Corrective Action

Sucker Rod Connection Inspection Checklist

Inspection points for pin, shoulder, coupling and rod-end components

Sucker Rod Connection Structure and Inspection Points



Rod Body	Upset Transition	Wrench Flats	Shoulder	Pin Thread	Coupling
- fatigue crack - corrosion pits - rod-to-tubing wear	- local cracking - surface discontinuity - transition-area stress concentration	- impact marks - surface damage - make-up related damage	- shoulder damage - impact marks - contact condition	- thread wear - galling - corrosion - deformation	- coupling OD wear - internal thread damage - eccentric wear - cracking

Inspection Checklist

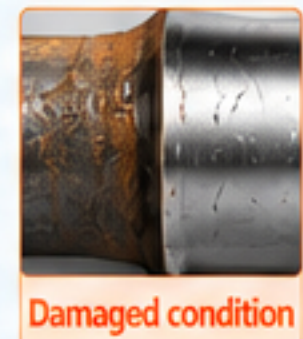
01 Pin Inspection

- thread deformation
- galling
- corrosion
- damaged thread crest/flank
- localized cracking



02 Shoulder and Rod-End Inspection

- shoulder contact condition
- impact damage
- wrench-flat damage
- upset-transition cracking
- alignment / bending indication



03 Coupling Inspection

- internal thread condition
- outside diameter wear
- eccentric wear
- corrosion
- cracking
- compatibility with mating rod pin



Connection Failure Pattern

Repeated pin/thread failures at the same location

Do not inspect the failed pin alone

Check mating coupling + make-up condition

Check alignment + string load

Check tubing contact + overall operating condition

Key Takeaway (Page 5)

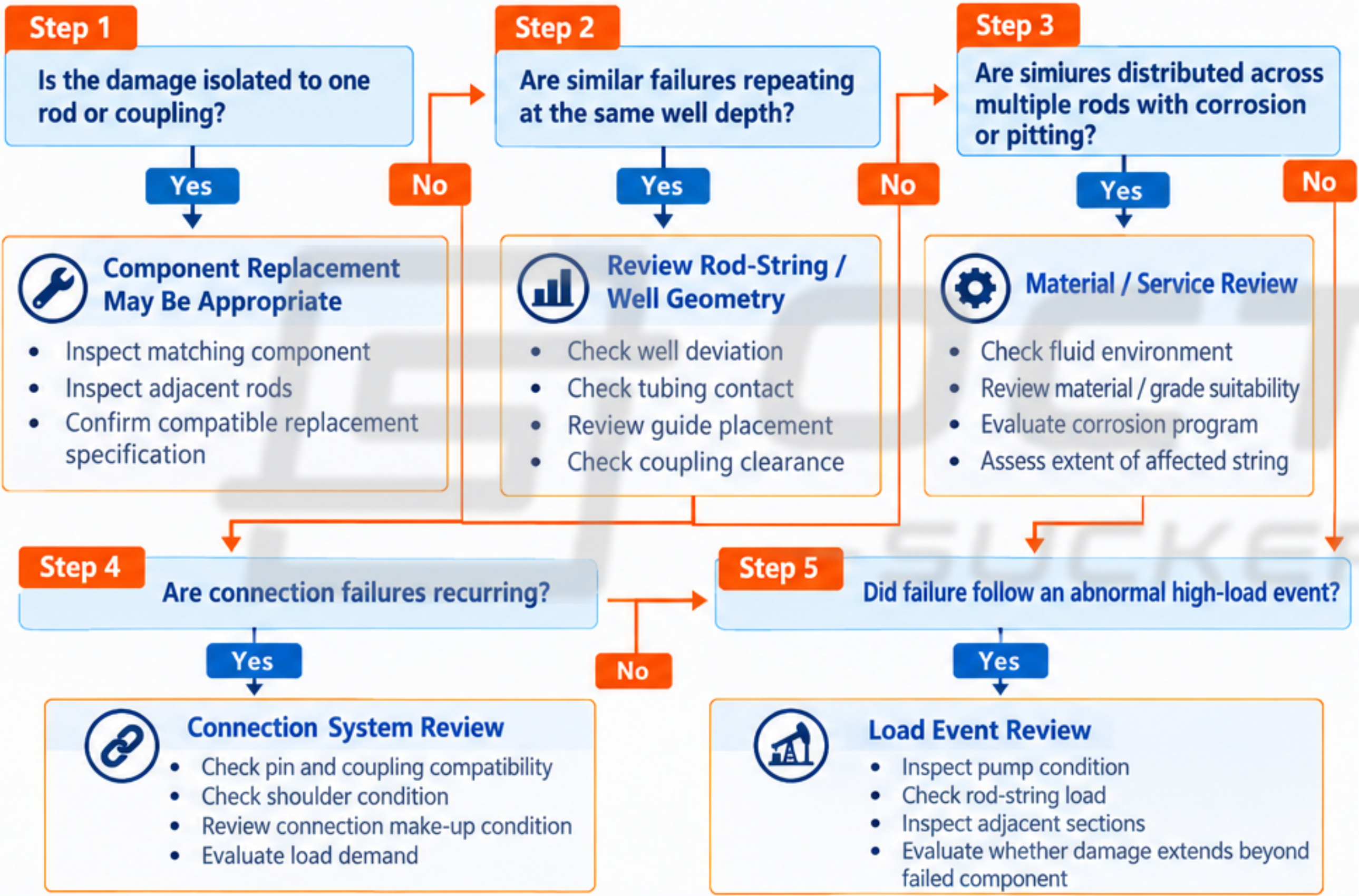


Connection damage should be evaluated together with the mating component, make-up condition, alignment, string load and tubing contact, rather than the failed rod alone.

Replace the Rod or Review the Whole String?

Field decision flow for component replacement or full rod-string review

Decision Tree for Field Disposition



Key Inspection Areas



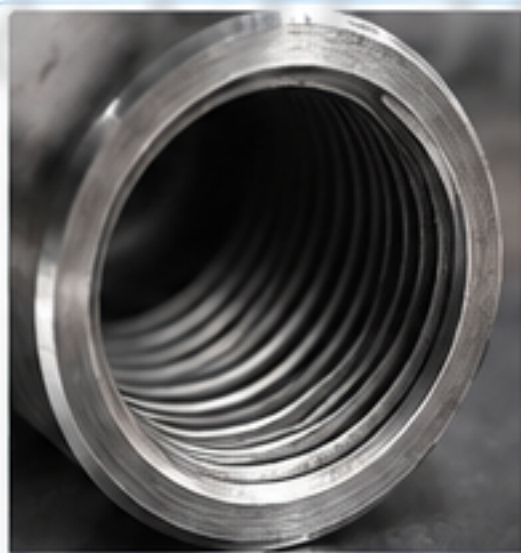
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03 Coupling Inspection

- internal thread condition
- outside diameter wear
- eccentric wear
- corrosion
- cracking
- compatibility with mating rod pin



Replace a failed sucker rod restores the component; identifying the condition that caused repeated failure protects the complete rod string.

Field Disposition (Page 6)

Isolated damage

Replace component

Repeated failures / system condition

Review whole rod string

Confirm root cause

Implement corrective action