Maintenance and use of ctu retrievable packer

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work content

- **Overview**
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- **Tool maintenance process**
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Overview

- **Introduction of Thru-Tubing Retrievable Packer**

Through the tubing packer, the tubing packer can pass through the tubing with a smaller inner diameter and pump pressure to expand and set up its own rubber, thereby achieving a temporary sealing of the target well and the target horizon. Block the blockage and then pump the liquid through the packer to the bottom of the silo. The packer can be housed inside a conventional tubing and within a larger casing below the tubing, and is typically used in routine workover operations

preparation

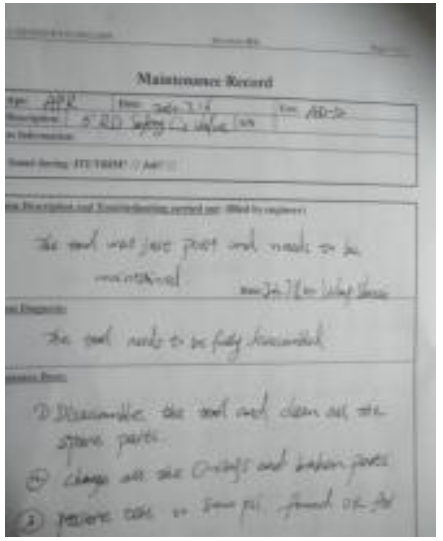
- 2-1 Required documents
- 2-1-1 Pre-Work Safety Record Sheet, See QHSE System Document,
- 2-1-2 Make a Tool Status label

preparation

- 2-2 Inspection Tool log sheet
- Check the operation log table and run the record table to record the operation of the tool in detail, it can be used as a tool to maintain and solve specific problems, Review tool operation records before maintenance
- Note: a) The tool must be maintained after use
- b) Always check maintenance records before use

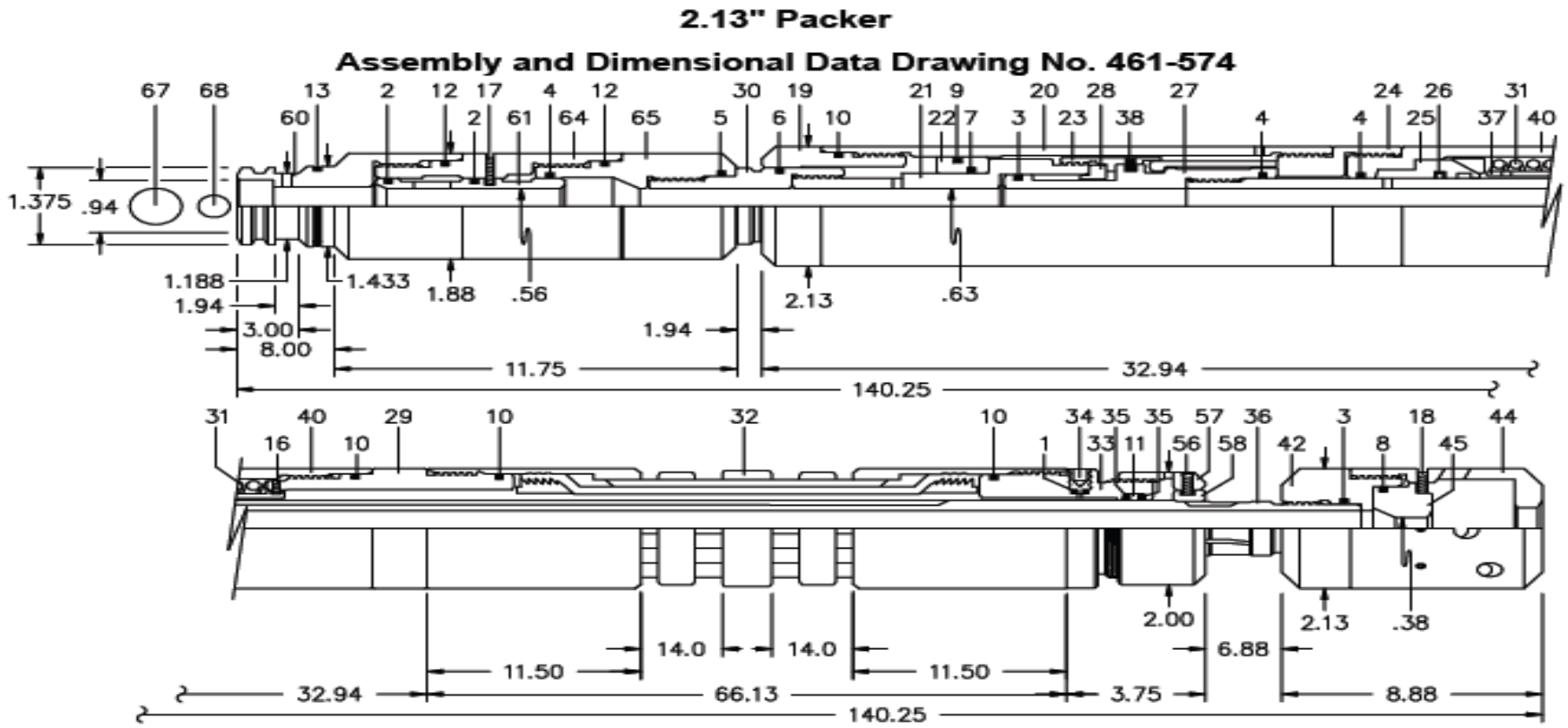
preparation

- 2-3 Preparation tool maintenance records
- After the maintenance of the tool is completed, it is necessary to record the seals and metal parts for maintenance and replacement so that the user can understand the state of the tool after repair, analyse and judge the tool failure when problems occur, and find a solution to the problem.



preparation

- 2-4 prepare the assembly drawing



preparation

- 2-5 Required auxiliary equipment and related Hand tools:

preparation

Retrievable Packer Parts list

1	O-Ring	2	O-Ring	3	O-Ring
4	O-Ring	5	O-Ring	6	O-Ring
7	O-Ring	8	O-Ring	9	O-Ring
10	O-Ring	11	O-Ring	12	O-Ring
13	O-Ring	16	shearscrew	17	shearscrew
18	shearscrew	19	End cap	20	Bumper Housing
21	Upper mandrel connector	22	Piston	23	Pull release sleeve
24	Collet sub	25	Poppet	26	T-seal
27	Latch sub	28	Split ring	29	Spring Housing
30	Upper mandrel	31	Poppet spring	32	Element
33	Bottom sub	34	Bleeder plug	35	Back Up Ring
36	Mandrel	37	Delayed Inflate Ring	38	Shear Screw
40	Poppet Housing	42	Shear Sub	44	Seat Catcher
45	Ball Seat	56	Shear Screw	57	Shear Adapter
58	Shear Ring	60	Fishing Neck	61	Equalizing Sleeve
64	Equalizing sub	65	Equalizing sub connector	66	Setting Ball(0.5”)
67	Equalizing Ball (0.625”)				

Tool maintenance process

Thru-Tubing Retrievable Packer Tool maintenance special tools and commonly used hand tools

No	Tool Name	Quantity	Note
1	Vise	1	
2	24”Pipe wrenches	2	
3	Adjustable wrench	1	
4	Allen wrench	Some	
5	Common Hand Tools	some	
6	O ring special tools	1	

RTV Packer maintenance hand tool preparation

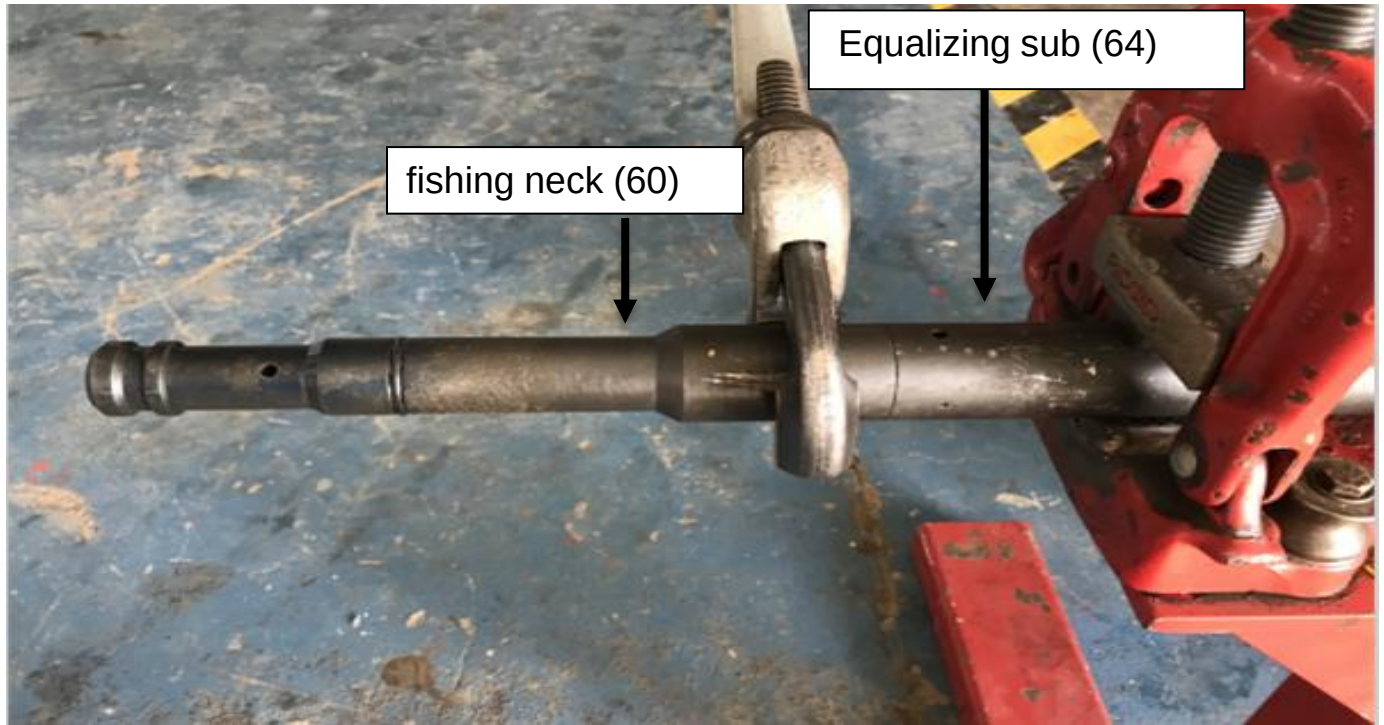
Tool maintenance process

- 2-5 Safety related requirements
- 2-5-1 the maintenance place is an indoor maintenance place. Try to avoid the maintenance of windy weather.
- 2-5-2 Safety identification inspections include, but are not limited to: (1) wearing PPE; (2) avoiding mechanical injuries and the like.

Tool maintenance process

3-1 Removal steps

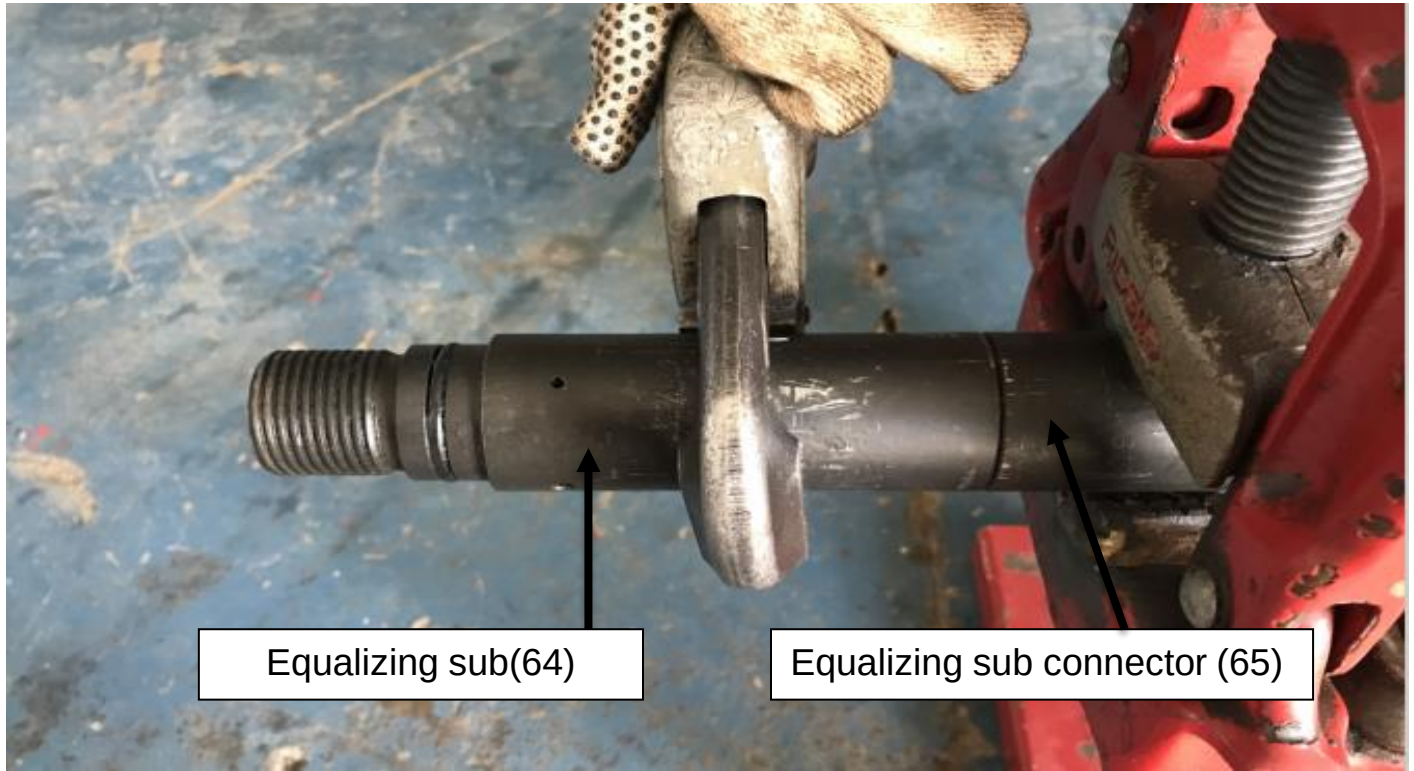
3-1-1 Disassemble the fishing neck [60] and Equalizing sub [64]



Tool maintenance process

3-1 Removal steps

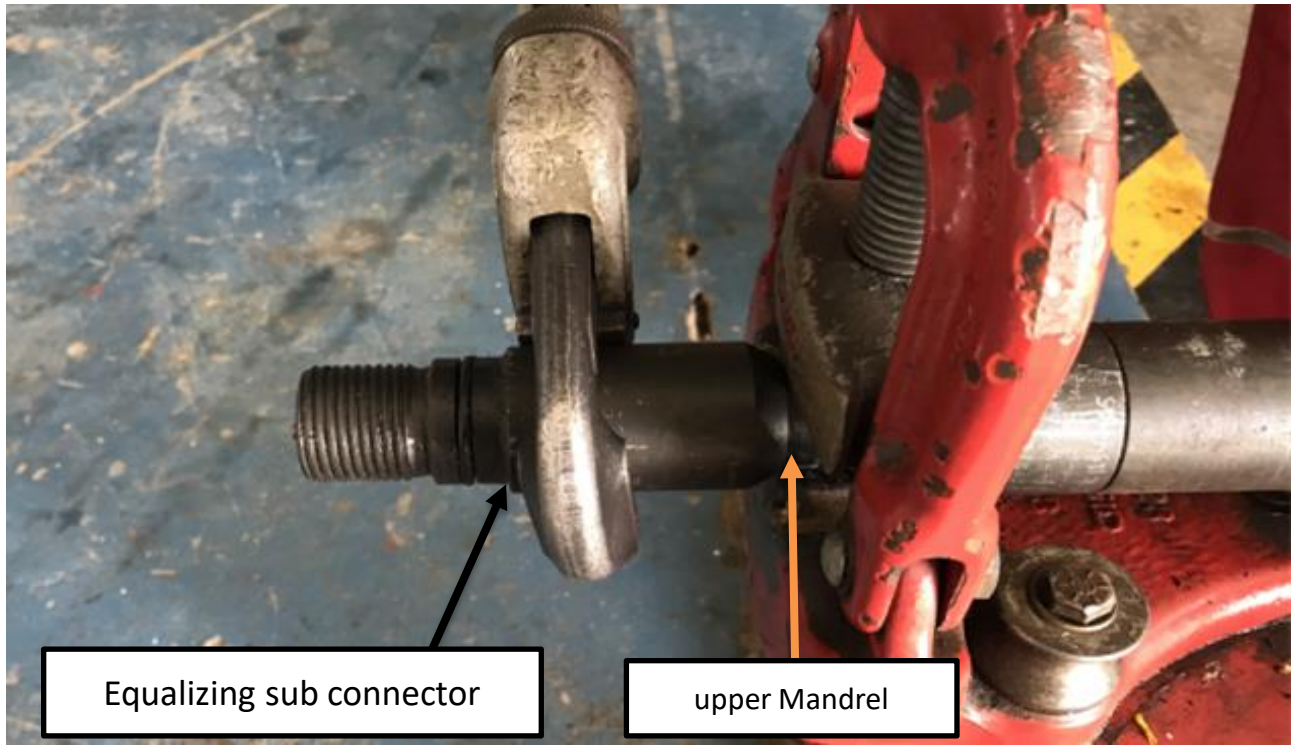
3-1-2 Remove the Equalizing sub [64] and Equalizing sub connector[65]]



Tool maintenance process

3-1 Removal steps

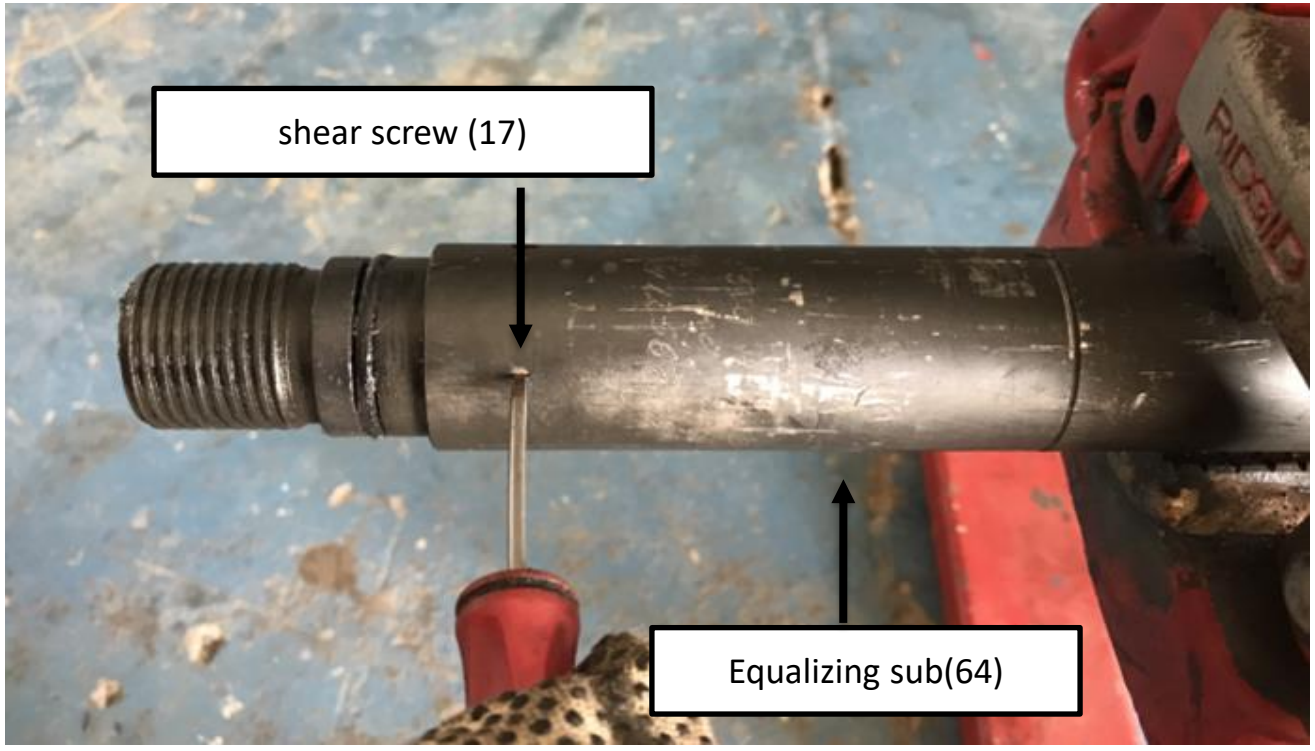
3-1-3 Remove the Equalizing sub connector [65] from the upper Mandrel [30]



Tool maintenance process

3-1 Removal steps

3-1-4 Remove the shear screw (17) on the Equalizing sub[64]



Tool maintenance process

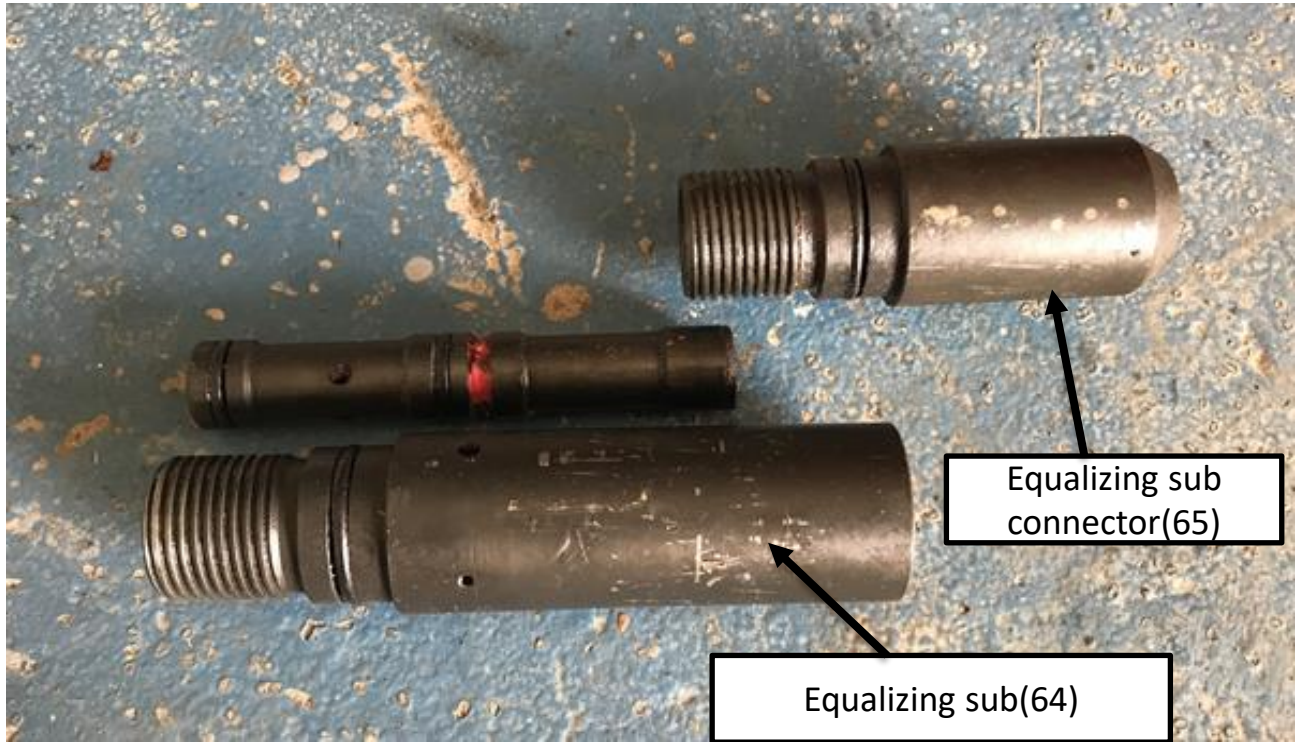
3-1 Removal steps

3-1-5 Separation of Equalizing sub [64] Equalizing sleeve[61] by shock

Tool maintenance process

3-1 Removal steps

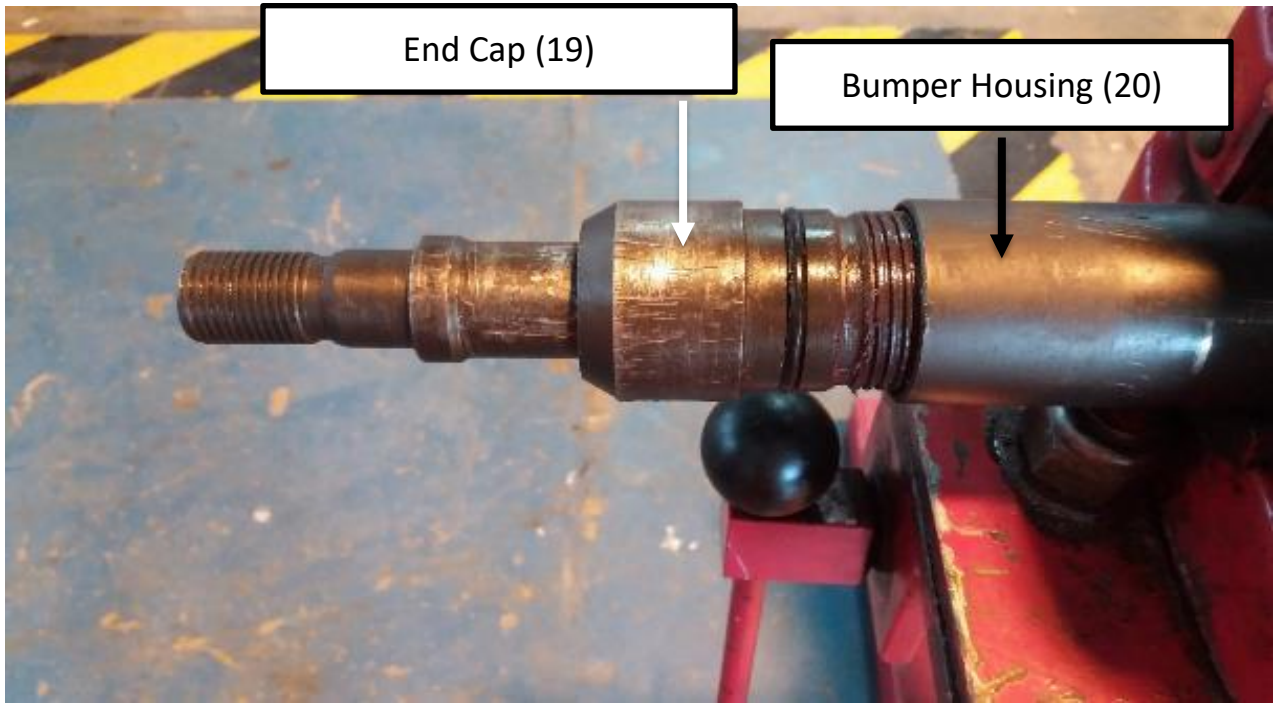
3-1-6 Equalizing sub part has been disassembled



Tool maintenance process

3-1 Removal steps

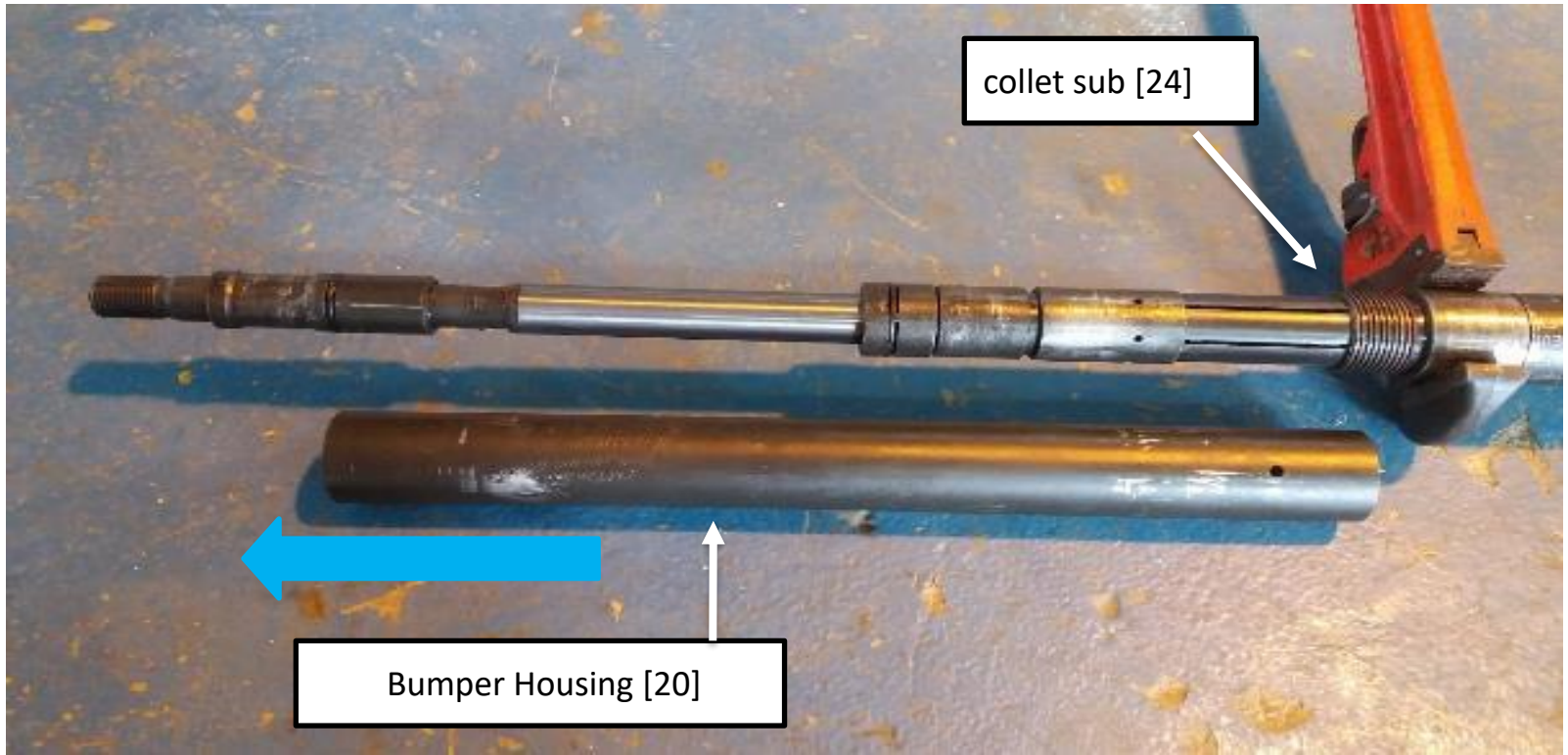
3-1-7 Remove the end cap [19] from the Bumper Housing[20]



Tool maintenance process

3-1 Removal steps

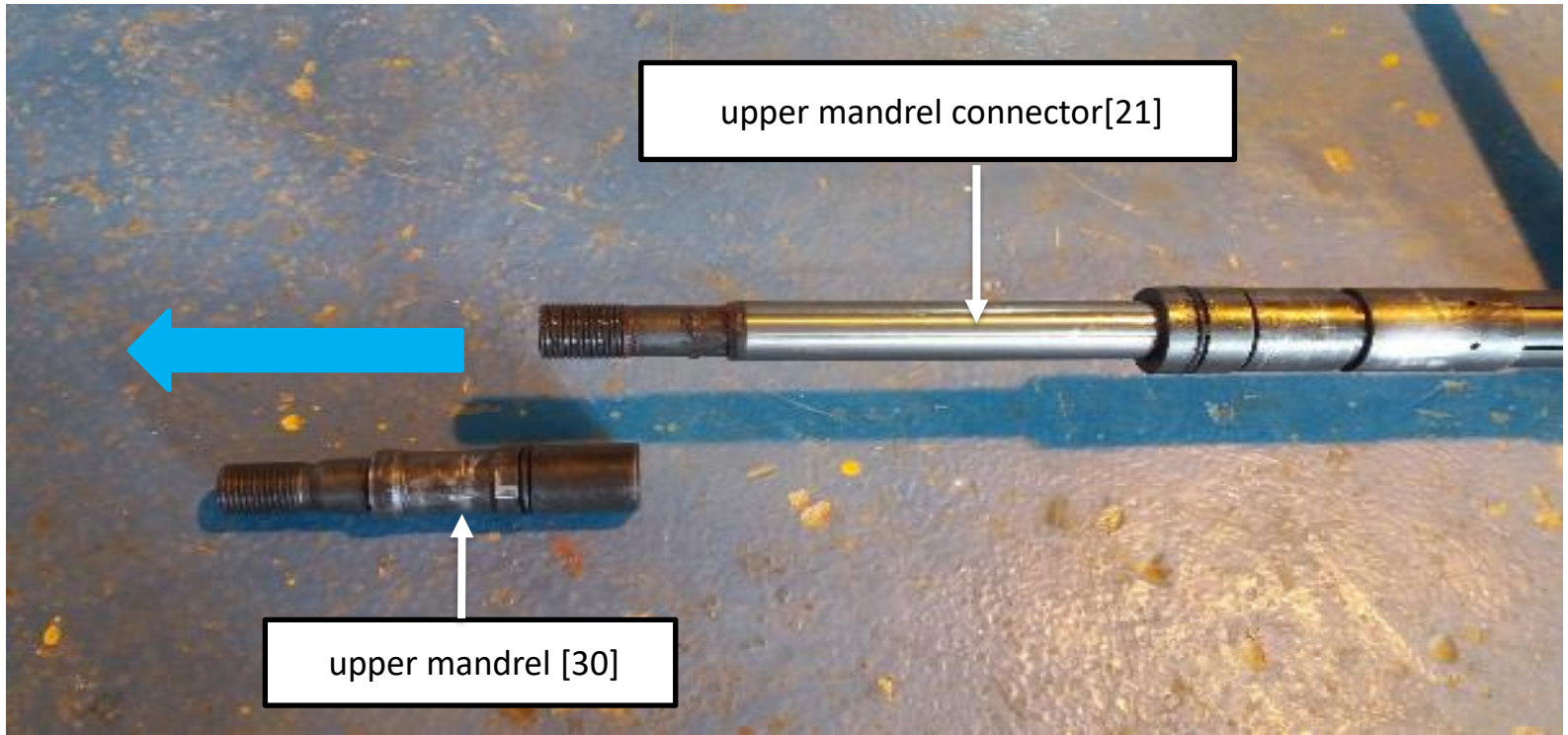
3-1-8 Remove the Bumper Housing [20] from the collet sub [24]



Tool maintenance process

3-1 Removal steps

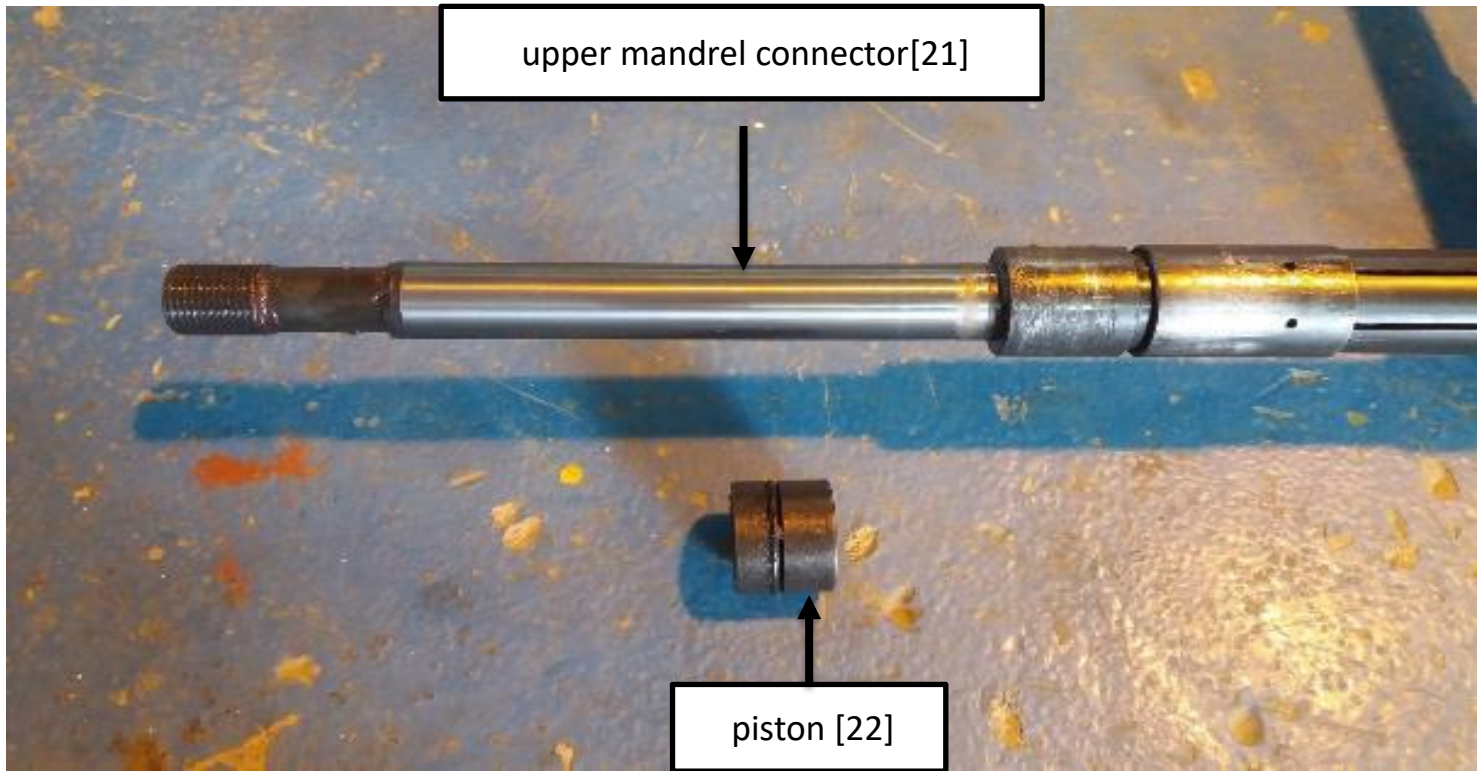
3-1-9 Remove the upper mandrel [30] from the upper mandrel connector [21]



Tool maintenance process

3-1 Removal steps

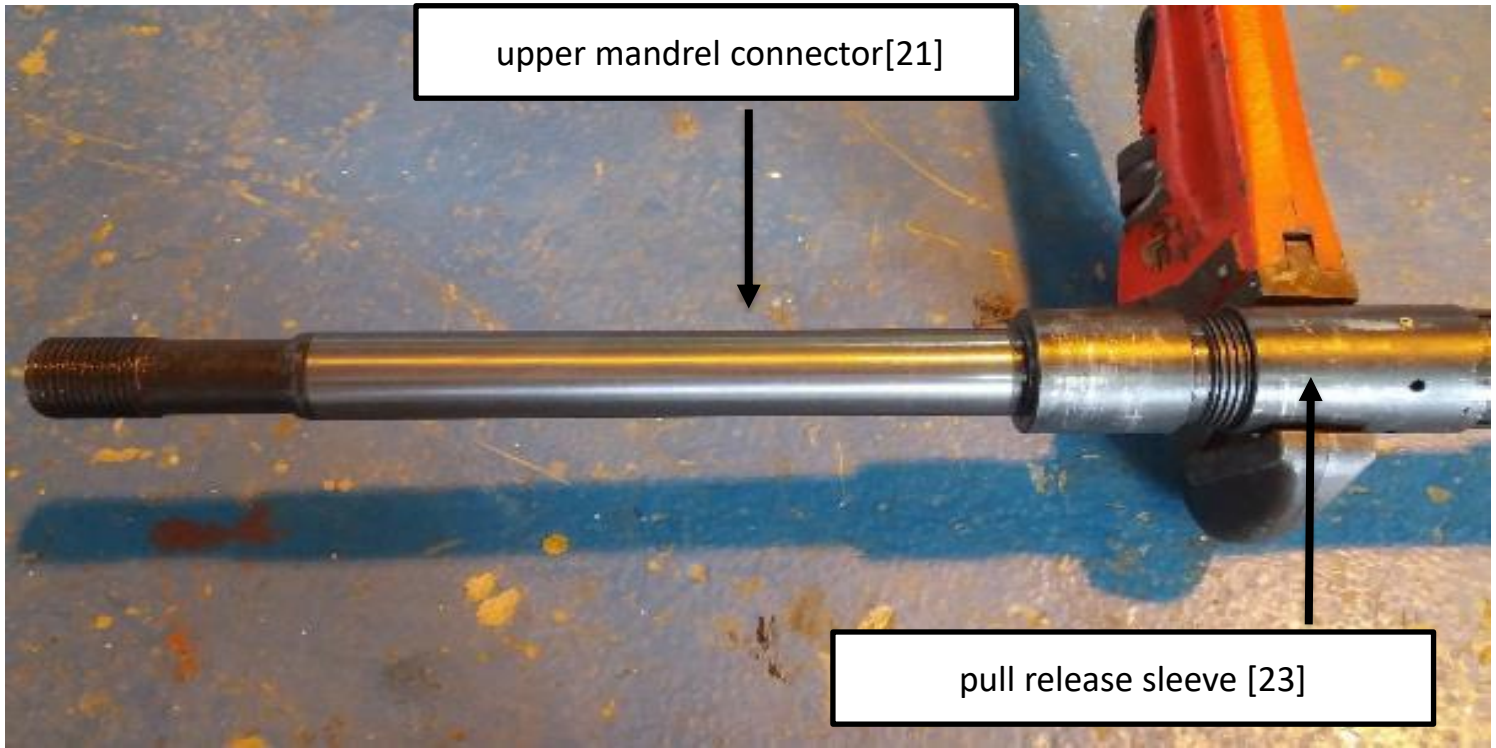
3-1-10 Remove the piston [22] from the upper mandrel connector[21]



Tool maintenance process

3-1 Removal steps

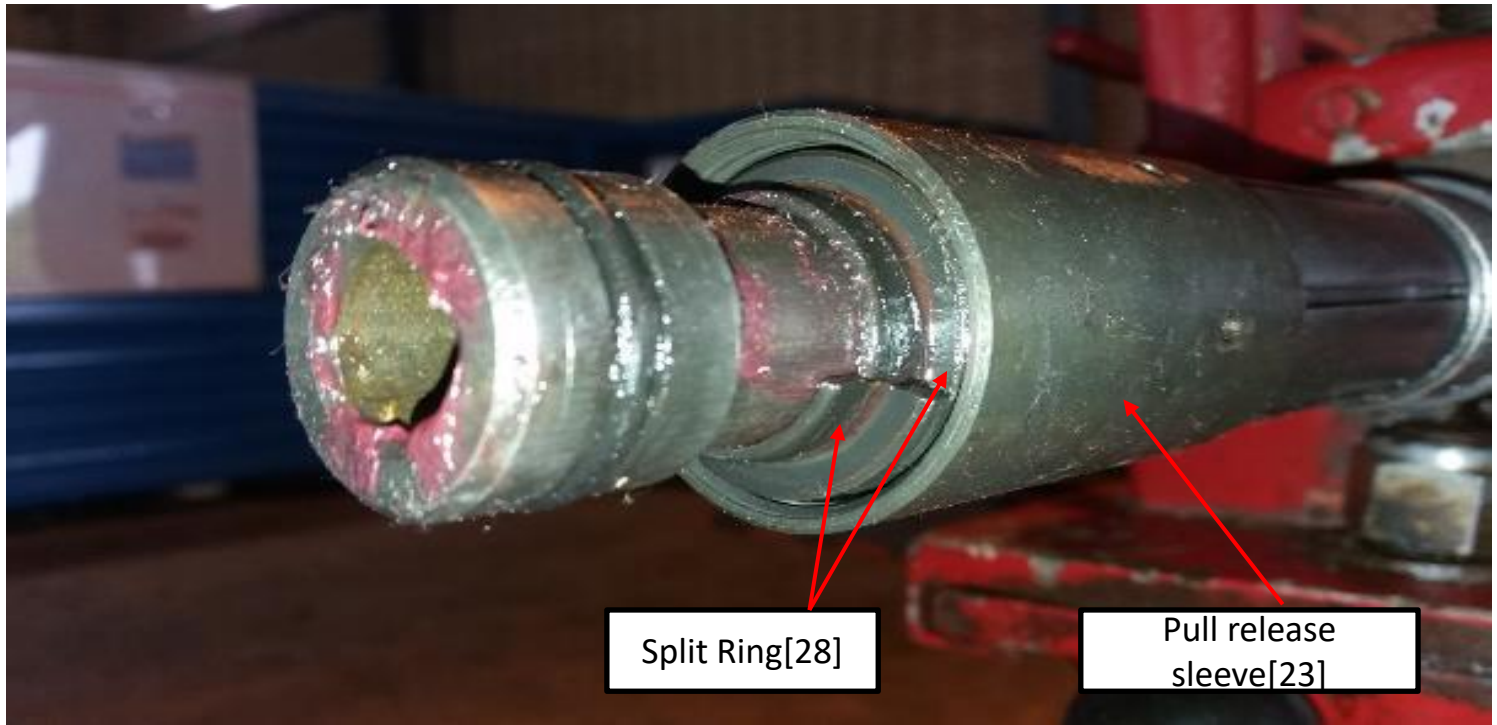
3-1-11 Remove the upper mandrel connector[21] from the pull release sleeve [23]



Tool maintenance process

3-1 Removal steps

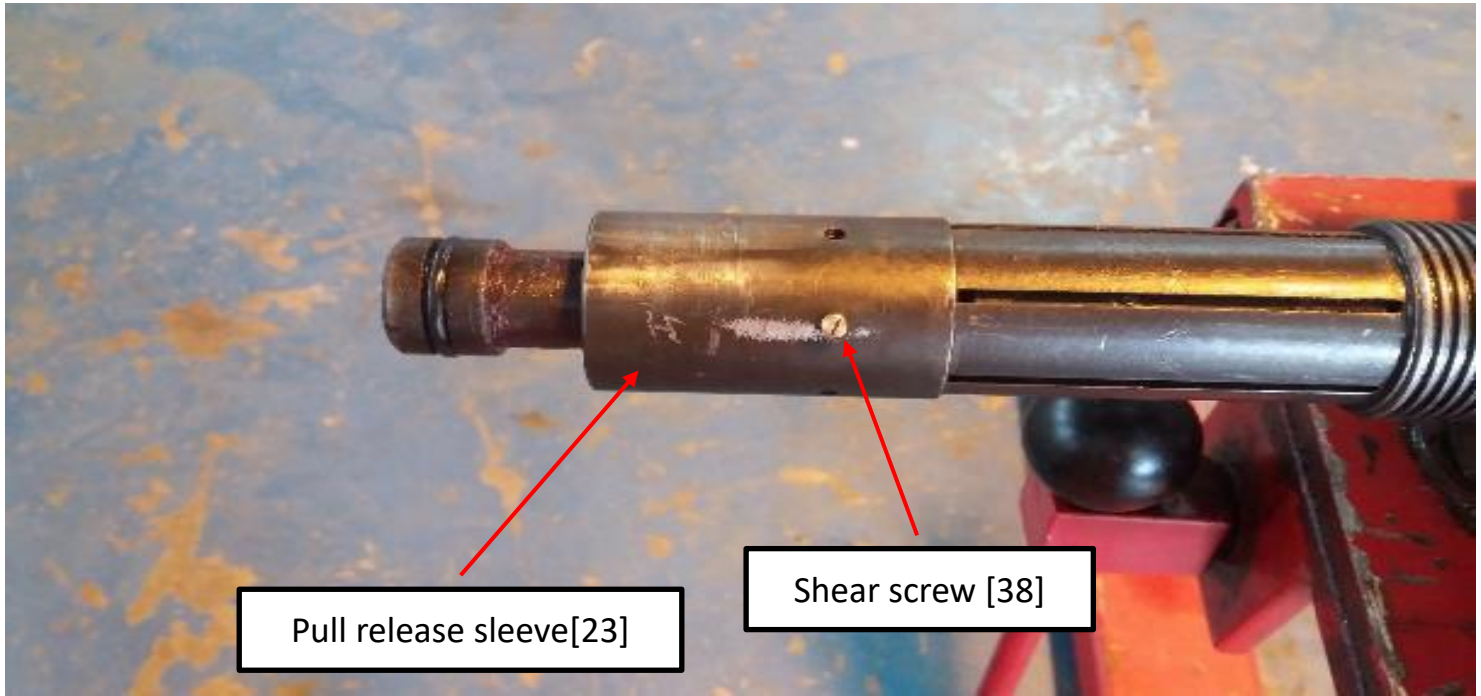
3-1-12 Remove the split ring [28] in the pull release sleeve [23]



Tool maintenance process

3-1 Removal steps

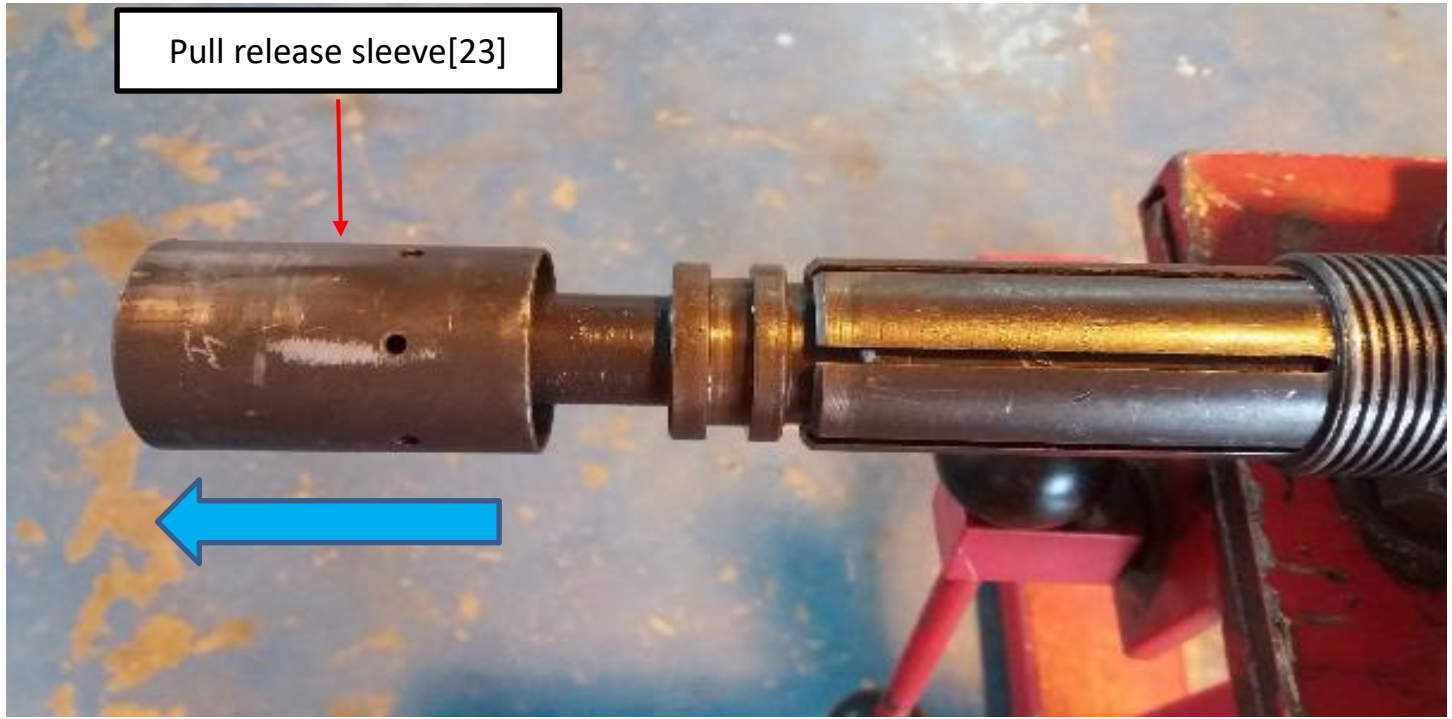
3-1-13 Remove the shear screw [38] on the pull release sleeve [23]



Tool maintenance process

3-1 Removal steps

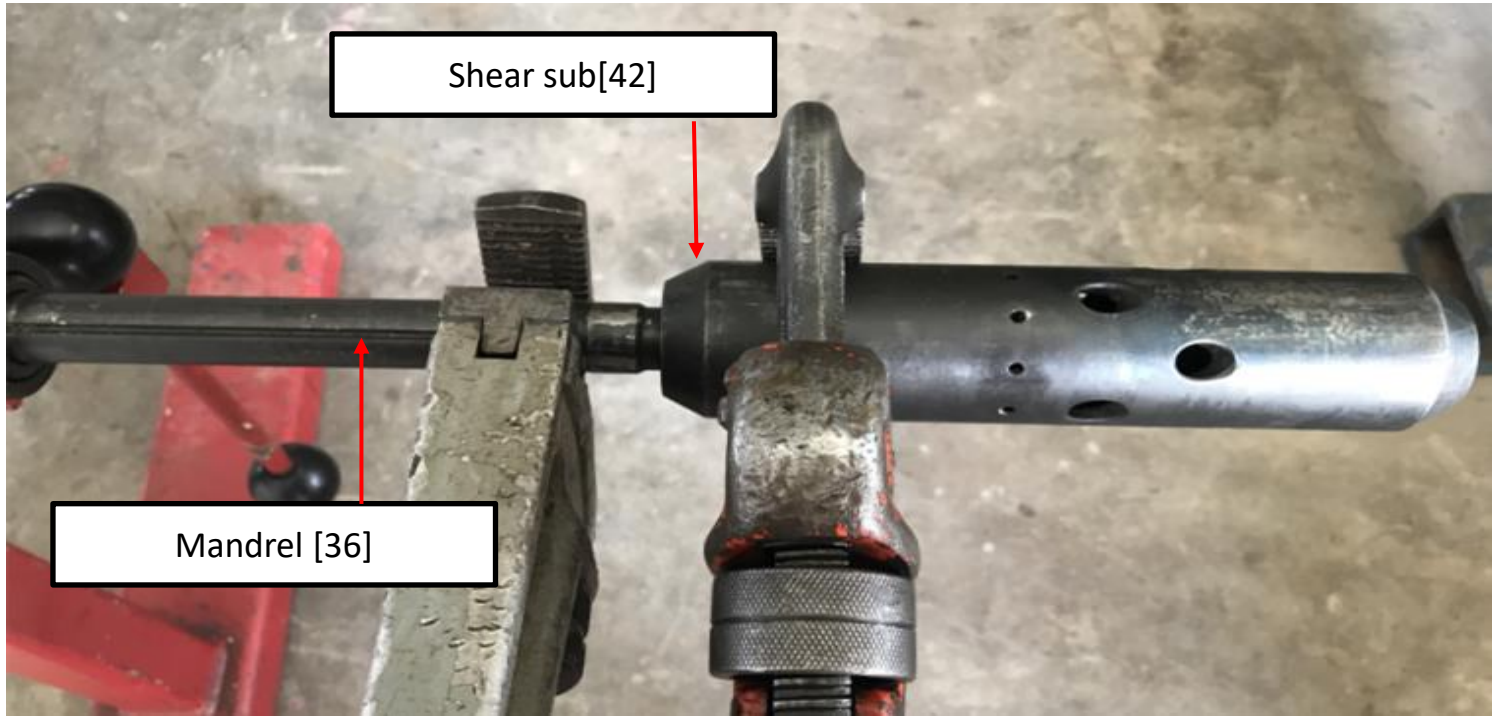
3-1-14 Remove the pull release sleeve



Tool maintenance process

3-1 Removal steps

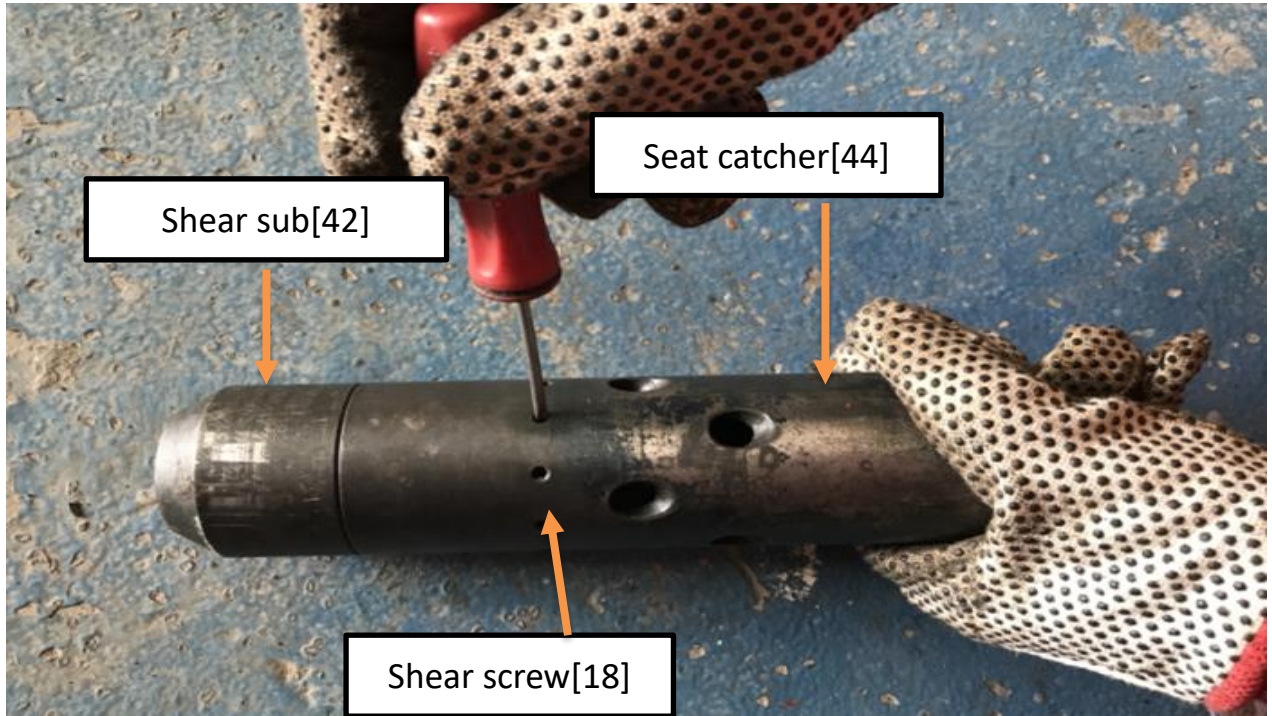
3-1-15 separate the shear sub [42] from mandrel[36]



Tool maintenance process

3-1 Removal steps

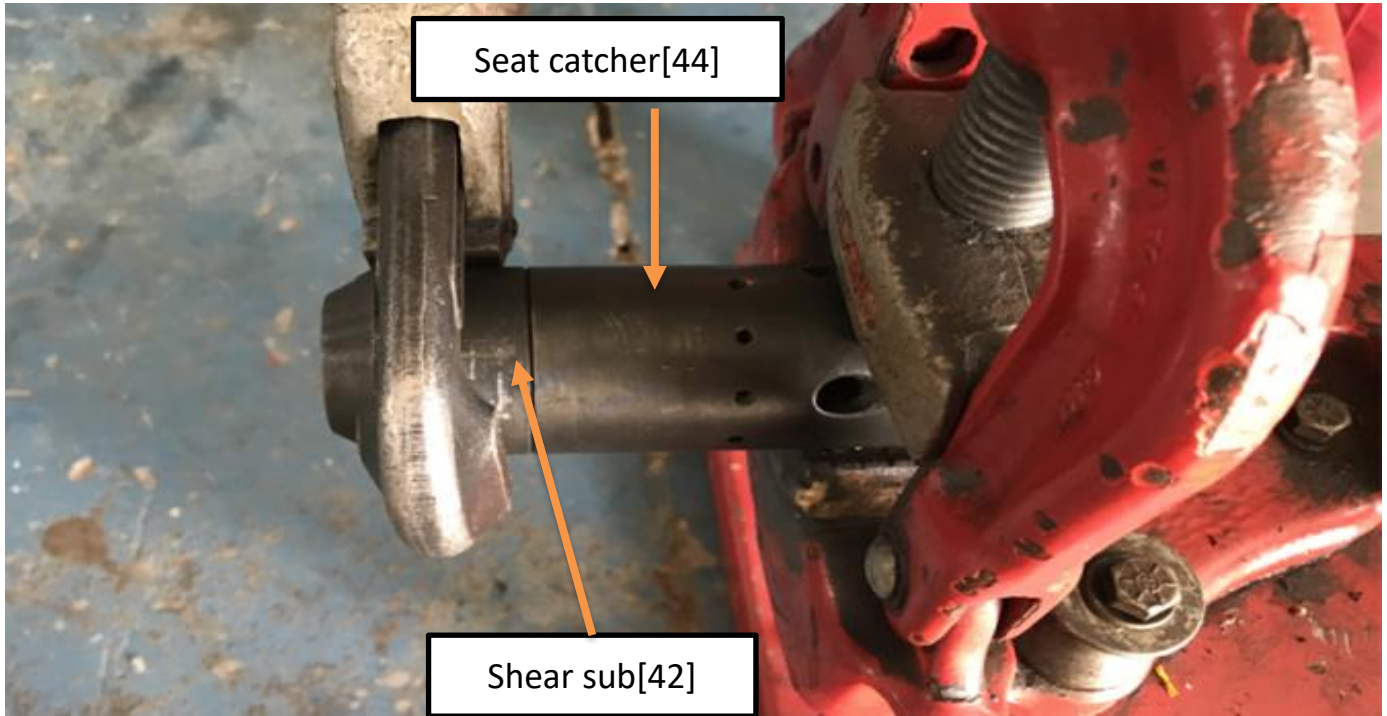
3-1-16 remove all of the shear screws[18] on the seat catcher[44]



Tool maintenance process

3-1 Removal steps

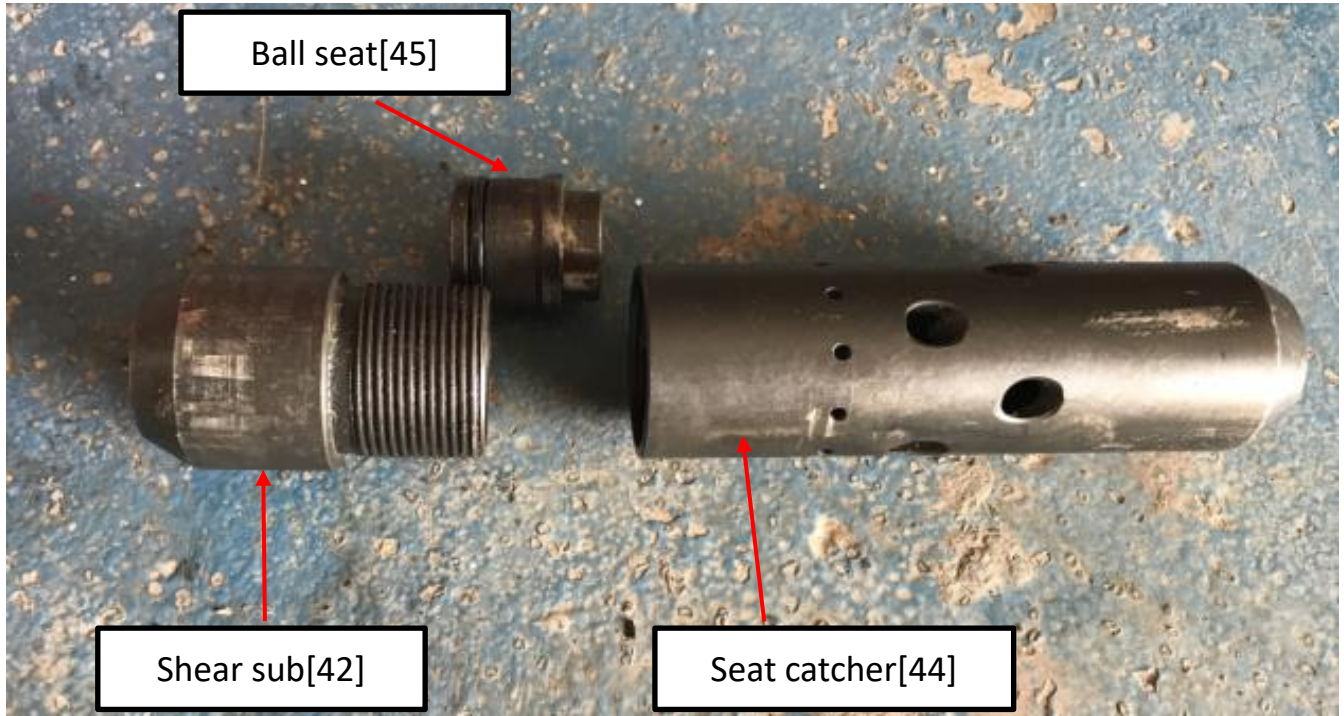
3-1-17 Separate the shear sub[42] from the seat catcher[44]



Tool maintenance process

3-1 Removal steps

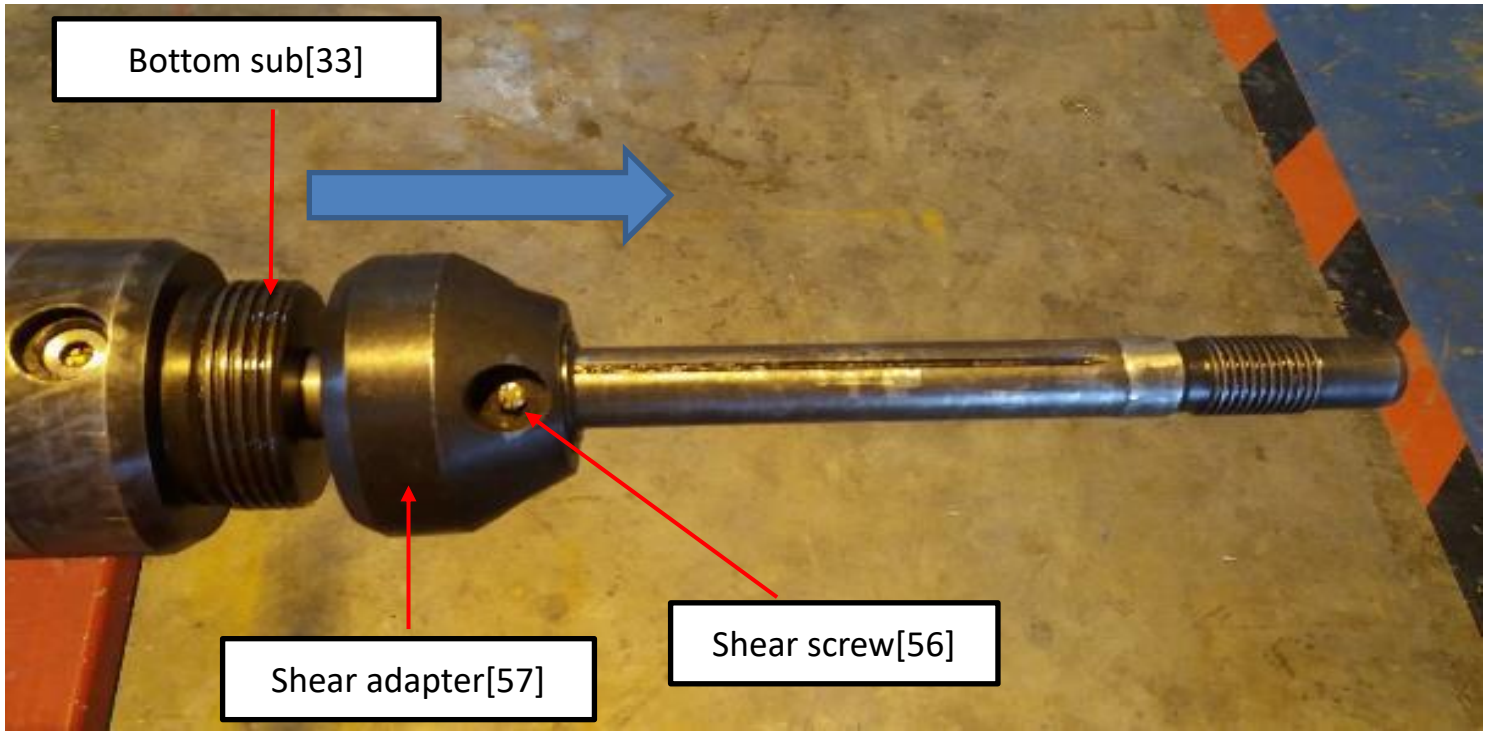
3-1-18 remove the shear sub[42]and ball seat [45] from the seat catcher[44]



Tool maintenance process

3-1 Removal steps

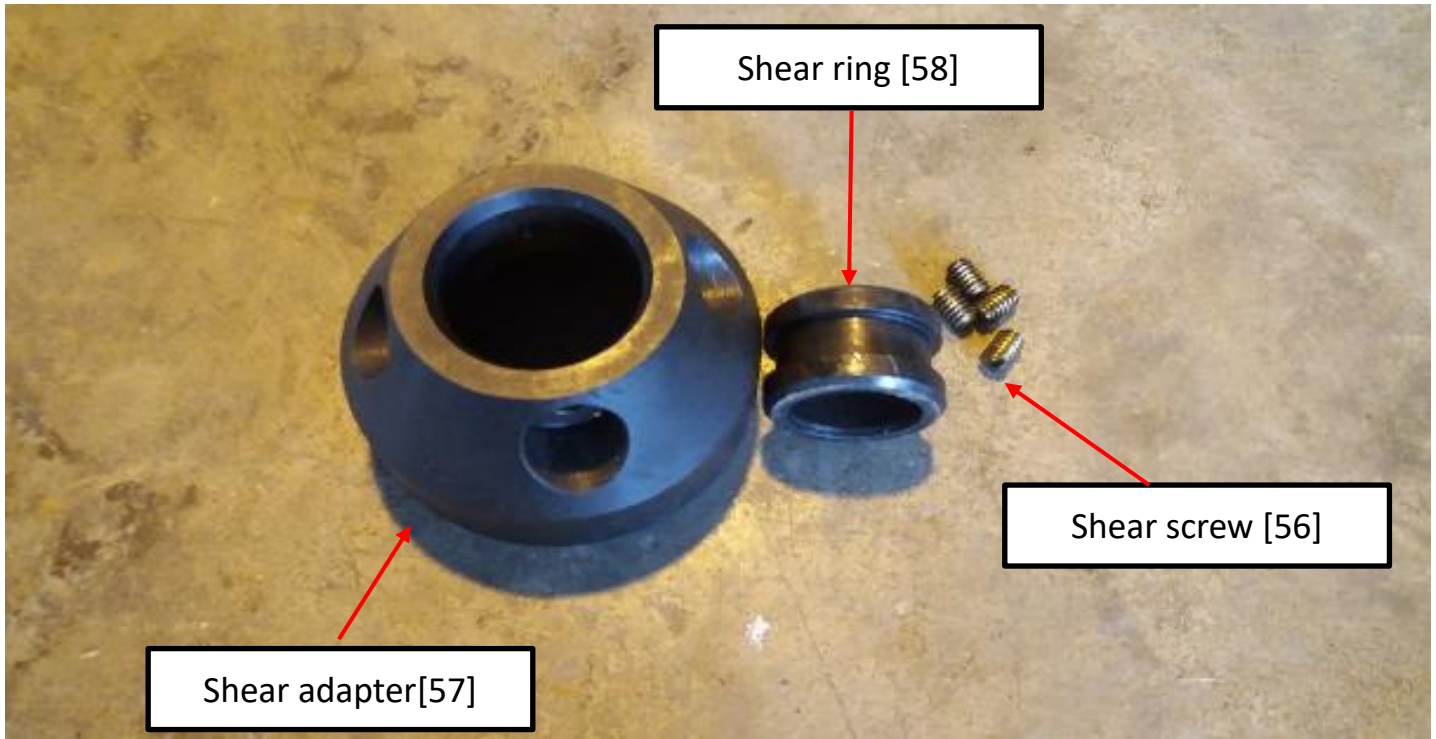
3-1-19 remove the shear screw[56]and drag out shear adapter [57] from the mandrel



Tool maintenance process

3-1 Removal steps

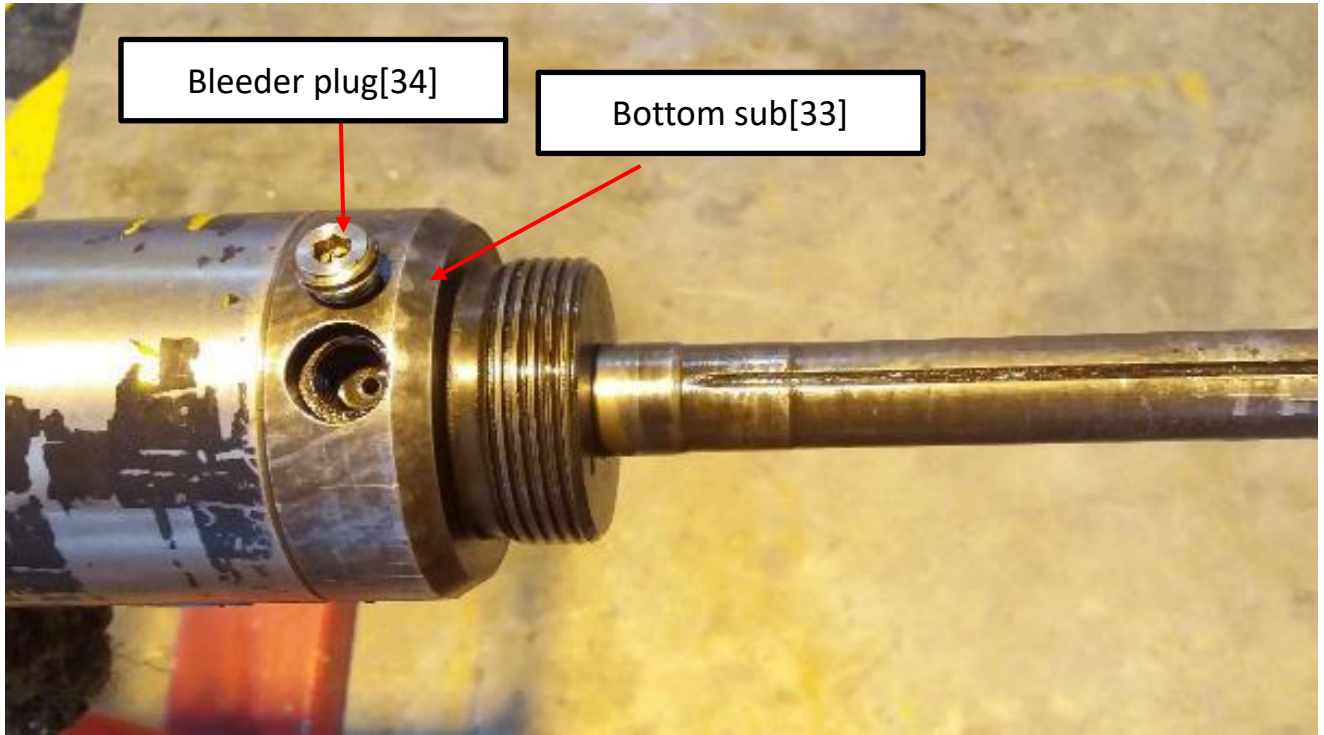
3-1-20 separate the shear adapter [57] and shear ring [56]



Tool maintenance process

3-1 Removal steps

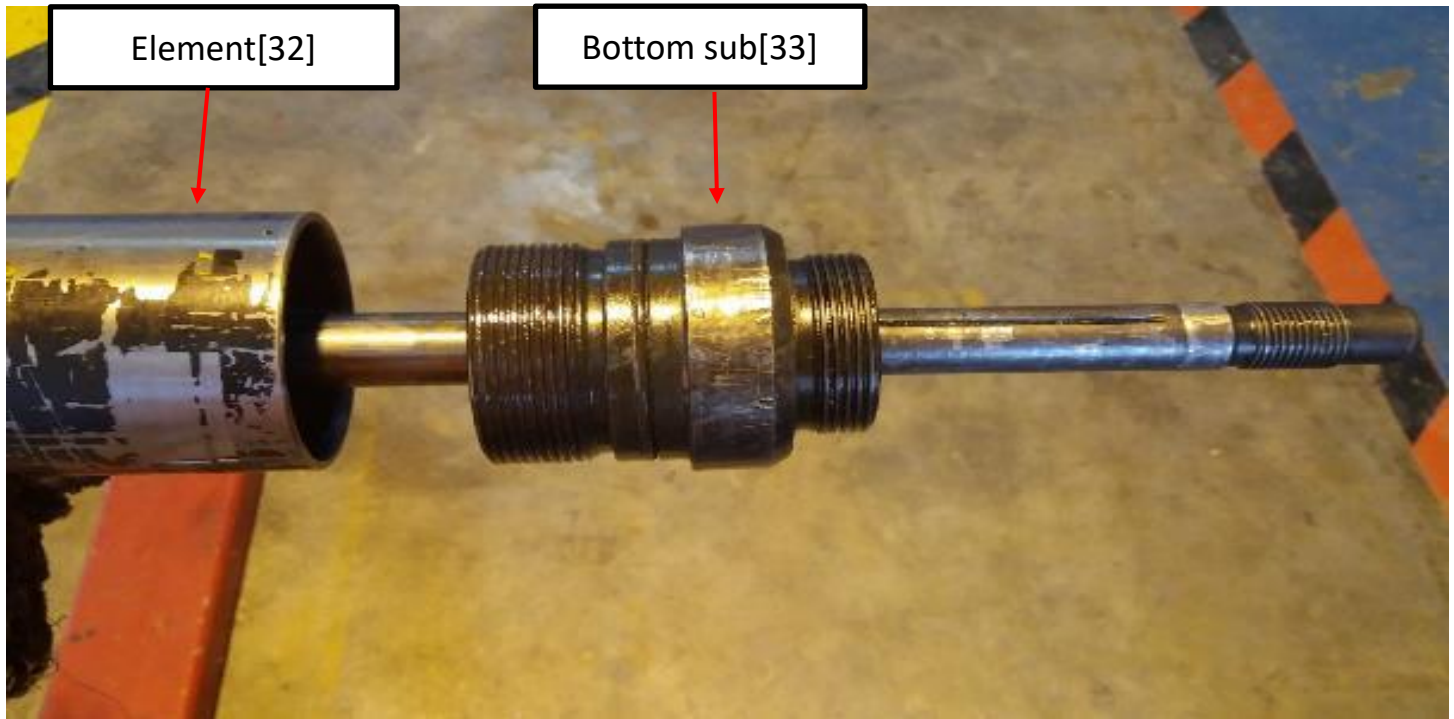
3-1-21 Remove the bleeder plug [34] from bottom sub [33]



Tool maintenance process

3-1 Removal steps

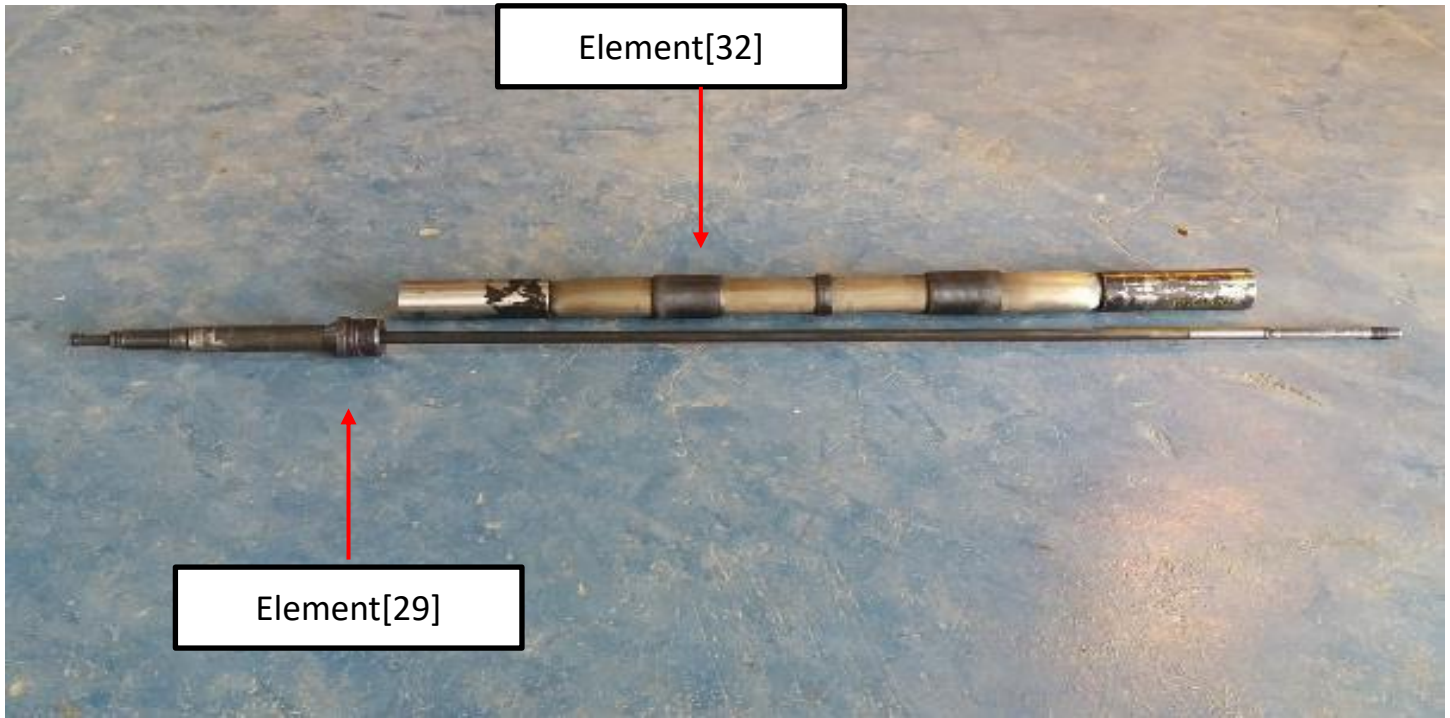
3-1-22 separate the element [32] from bottom sub [33]



Tool maintenance process

3-1 Removal steps

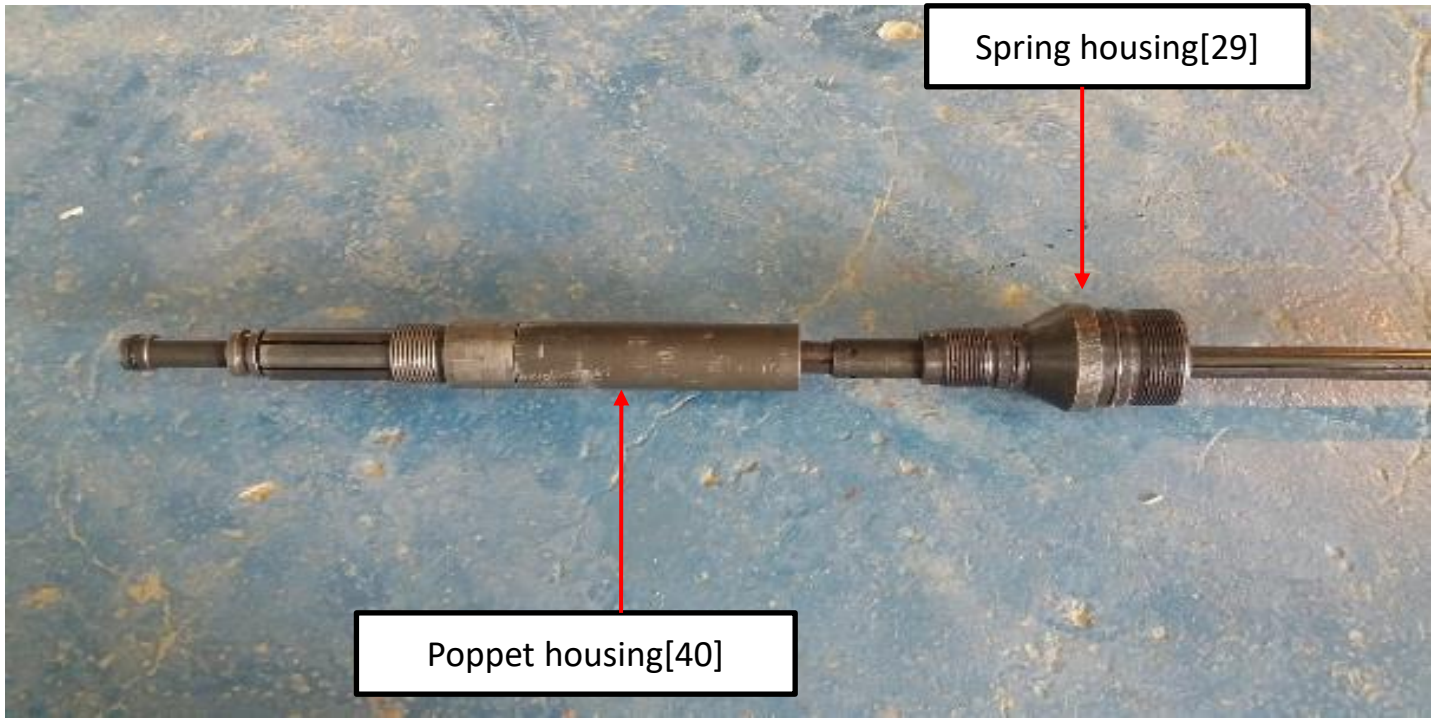
3-1-23 separate the element [32] from mandrel [ ]



Tool maintenance process

3-1 Removal steps

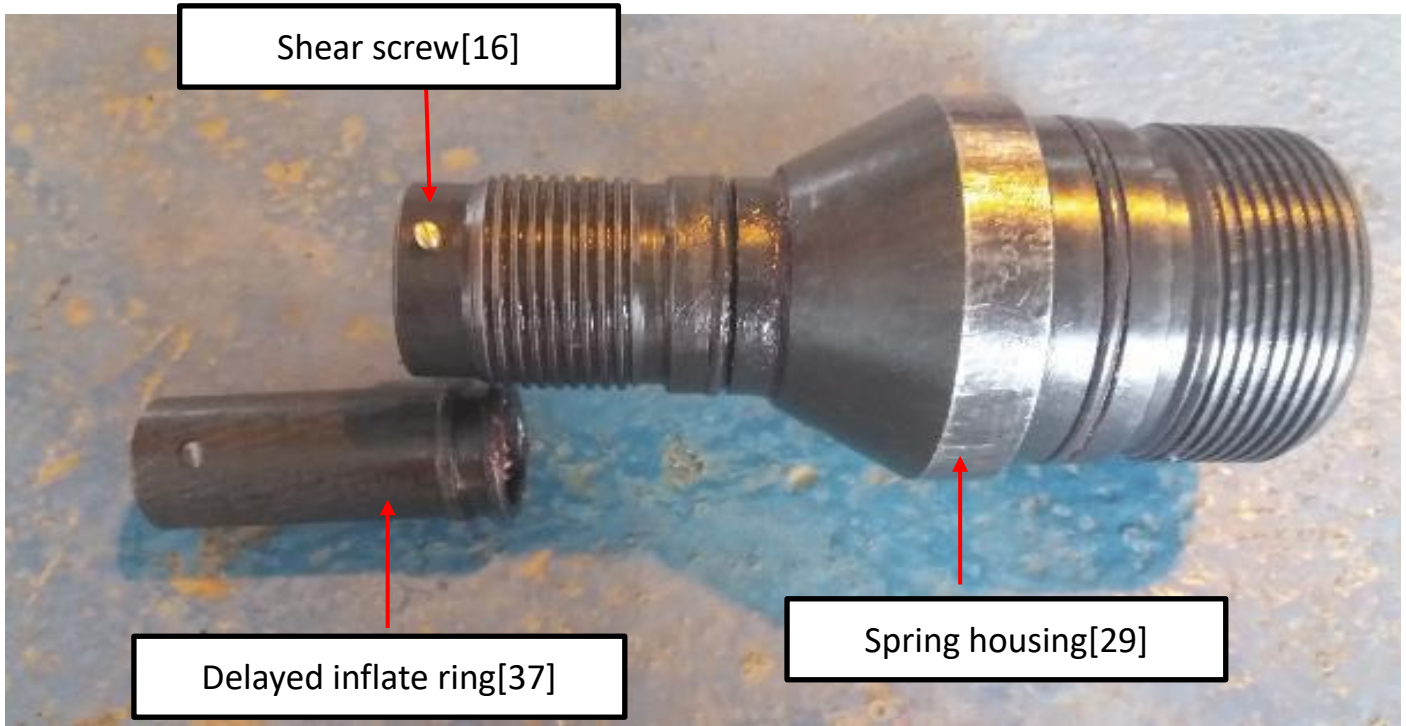
3-1-24 separate poppet housing[40]from spring housing[29]



Tool maintenance process

3-1 Removal steps

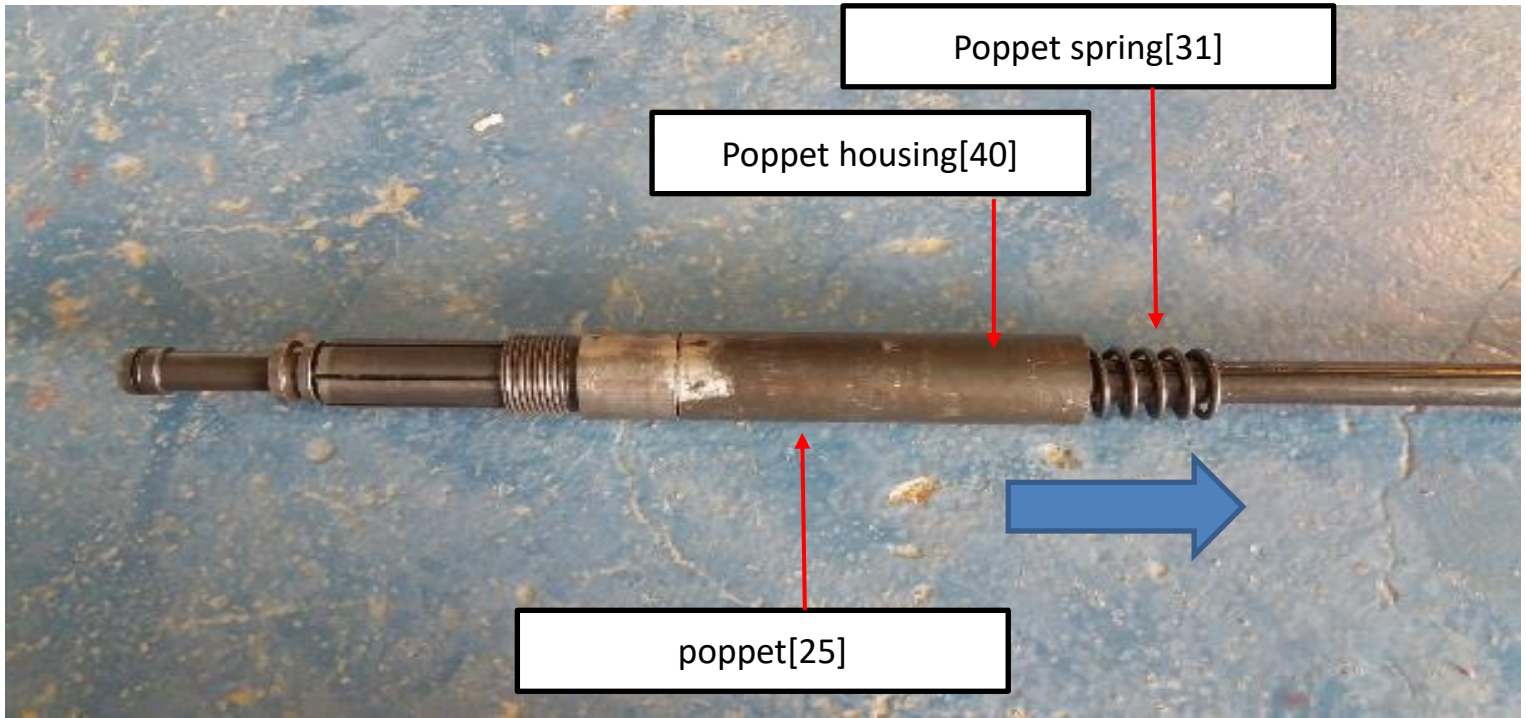
3-1-25 Open shear screw[16] and separate delayed inflate ring [37]from spring housing[29]



Tool maintenance process

3-1 Removal steps

3-1-26 Remove Poppet Housing[40] from Poppet spring[31]



Tool maintenance process

3-1 Removal steps

3-1-27 Remove poppet housing[40]from mandrel[36]

Tool maintenance process

3-1 Removal steps

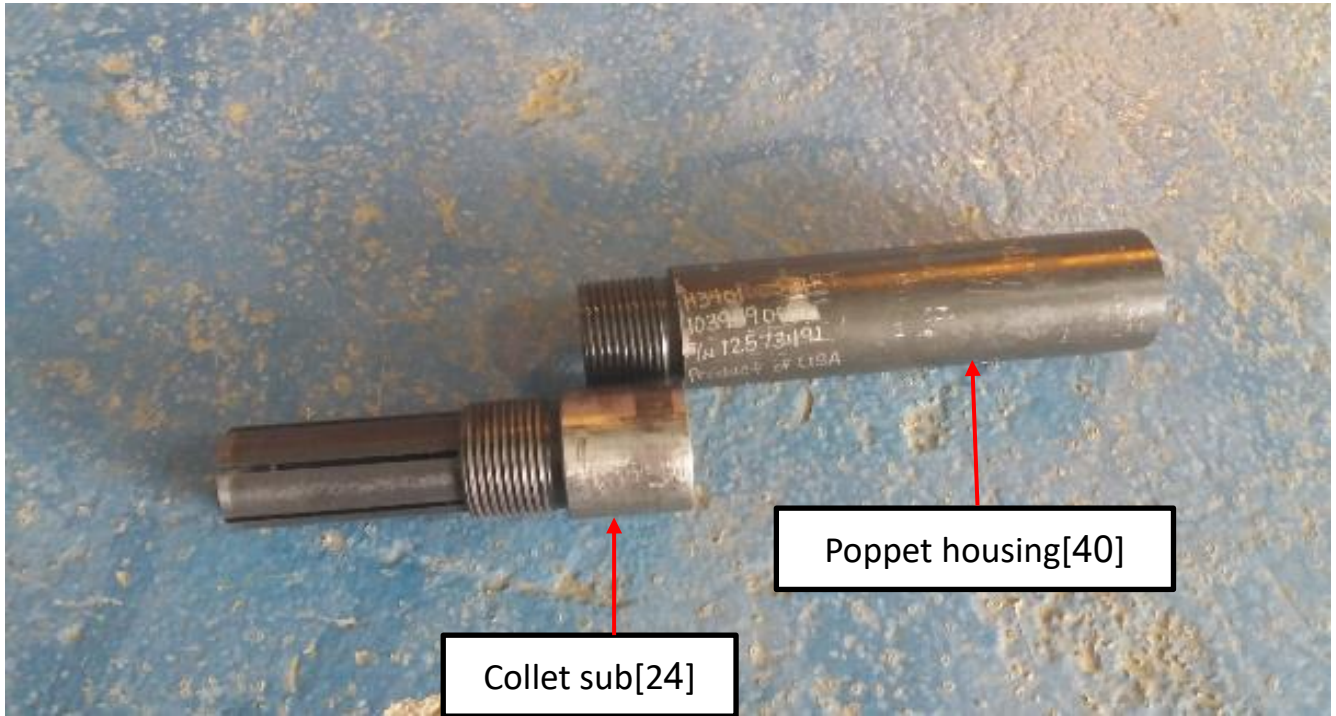
3-1-28 Remove Latch sub[27] from mandrel[36]

Latch sub[27]

Tool maintenance process

3-1 Removal steps

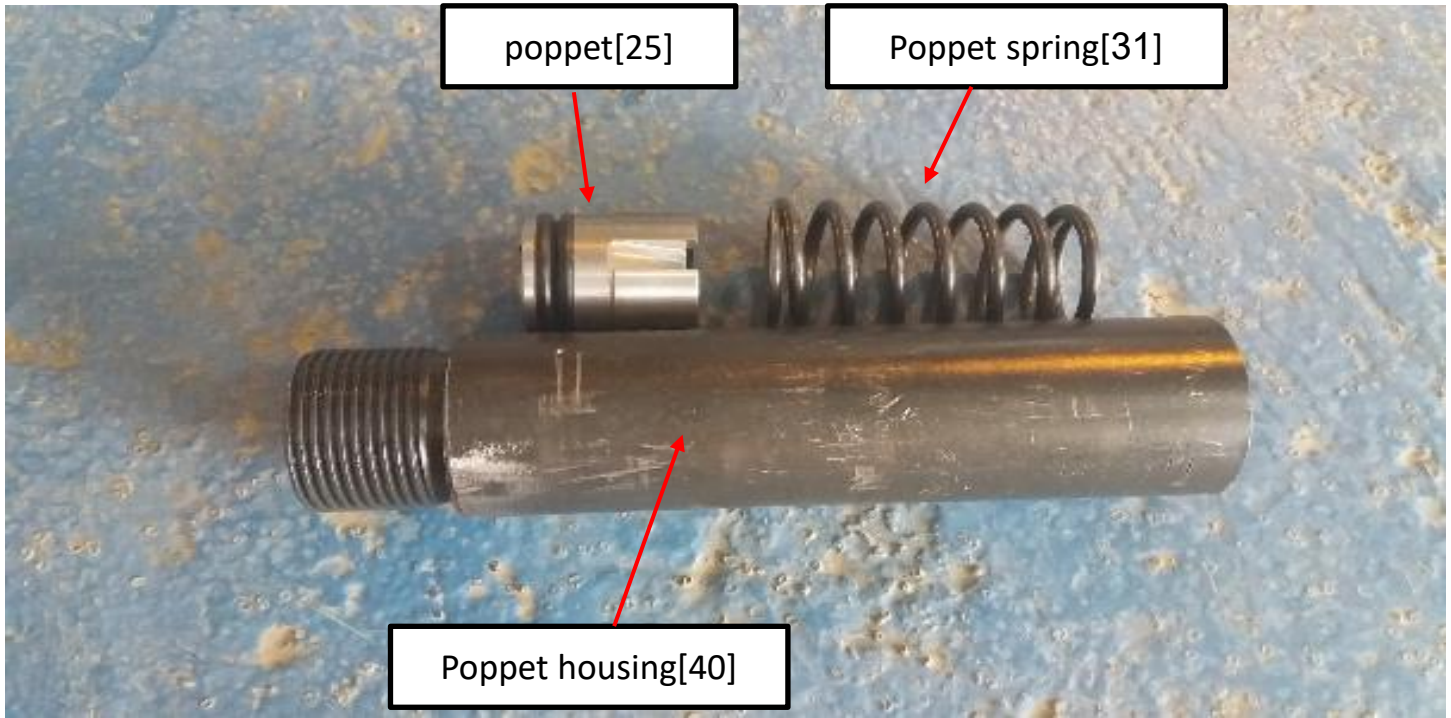
3-1-29 Separate the collet sub [24] and the poppet housing [40]



Tool maintenance process

3-1 Removal steps

3-1-30 Remove the poppet[25] and poppet spring[from poppet housing[40]



Tool maintenance process

3.1 Inspect all O-rings on each component for damage.

3.2 After using diesel oil to remove oil from the components of the tool, clean it with clean water and blow it with compressed air, especially to ensure that the inner wall of the tool barrel is clean.

3.3 Check all parts for damage.

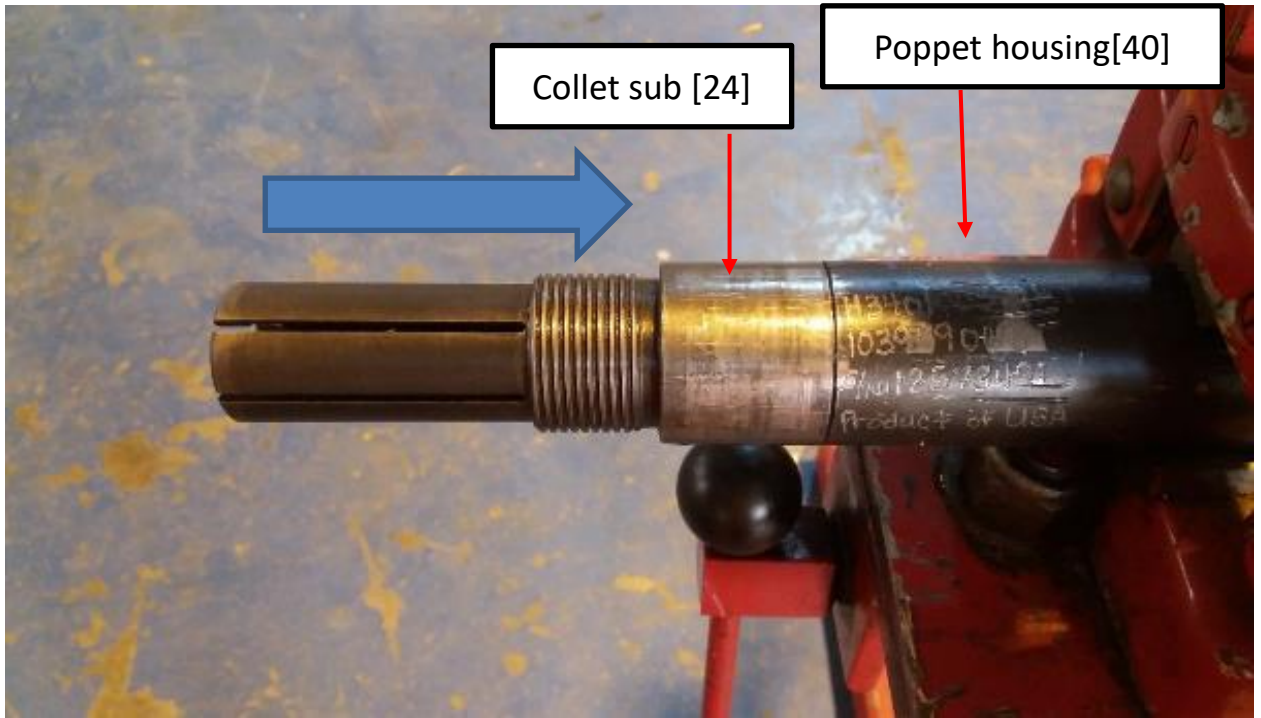
3.4 Replace the damaged part and record the part number of the newly replaced part on the maintenance log sheet.

3.5 Apply a little oil on the surface of each spring and O-ring

Tool maintenance process

3-2 installation steps

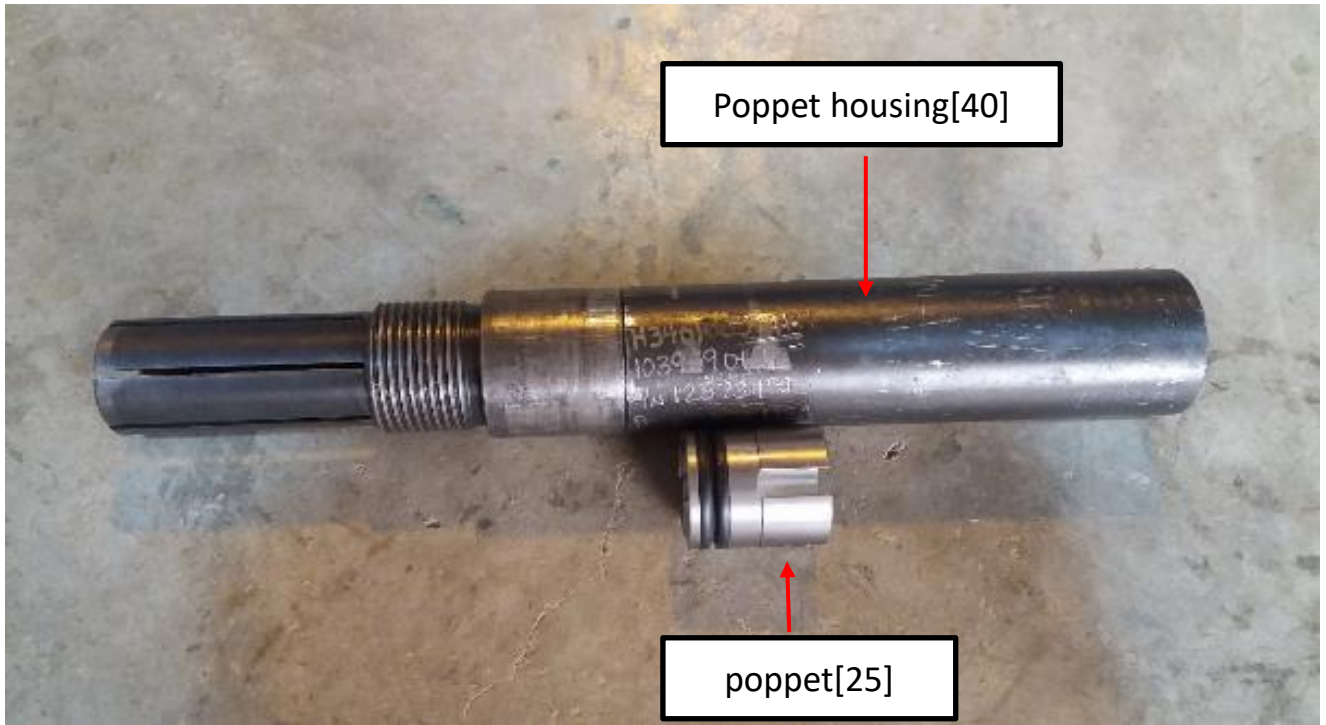
3-2-1 Connect the collet sub [24] to the poppet housing [40]



Tool maintenance process

3-2 installation steps

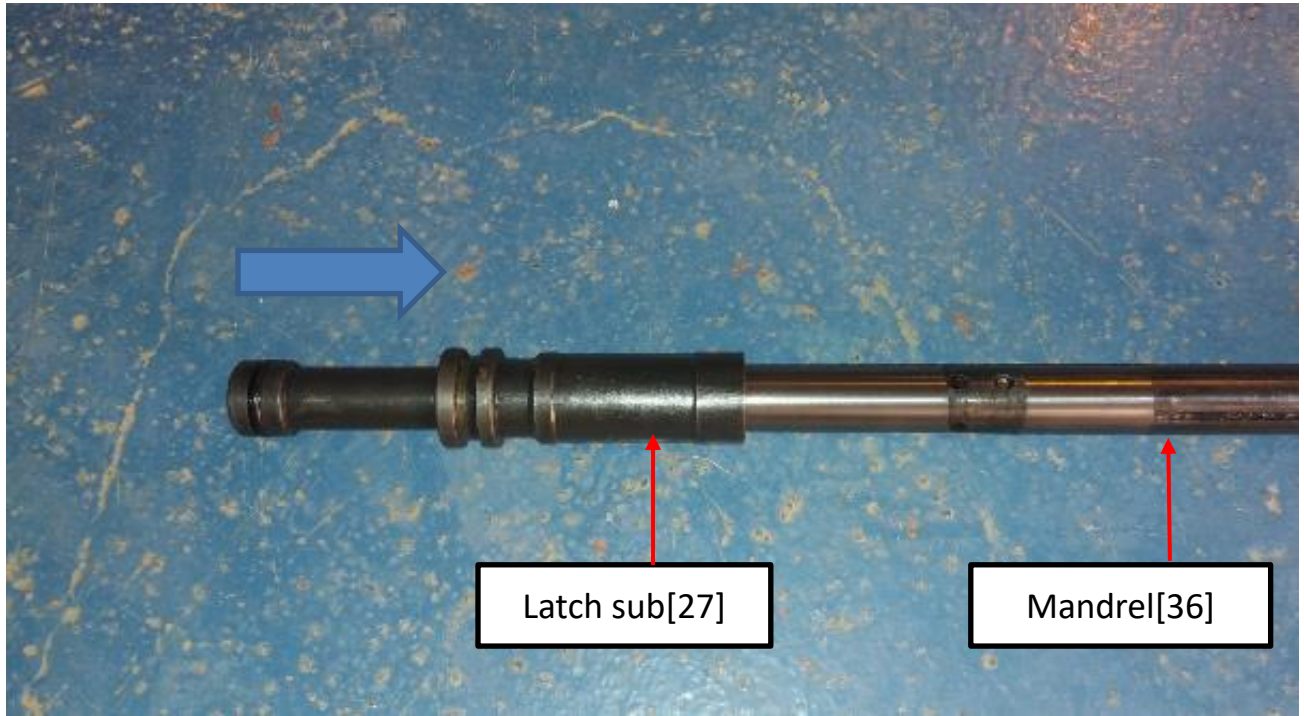
3-2-2 Connect the collet sub [24] to the poppet housing [40]



Tool maintenance process

3-2 installation steps

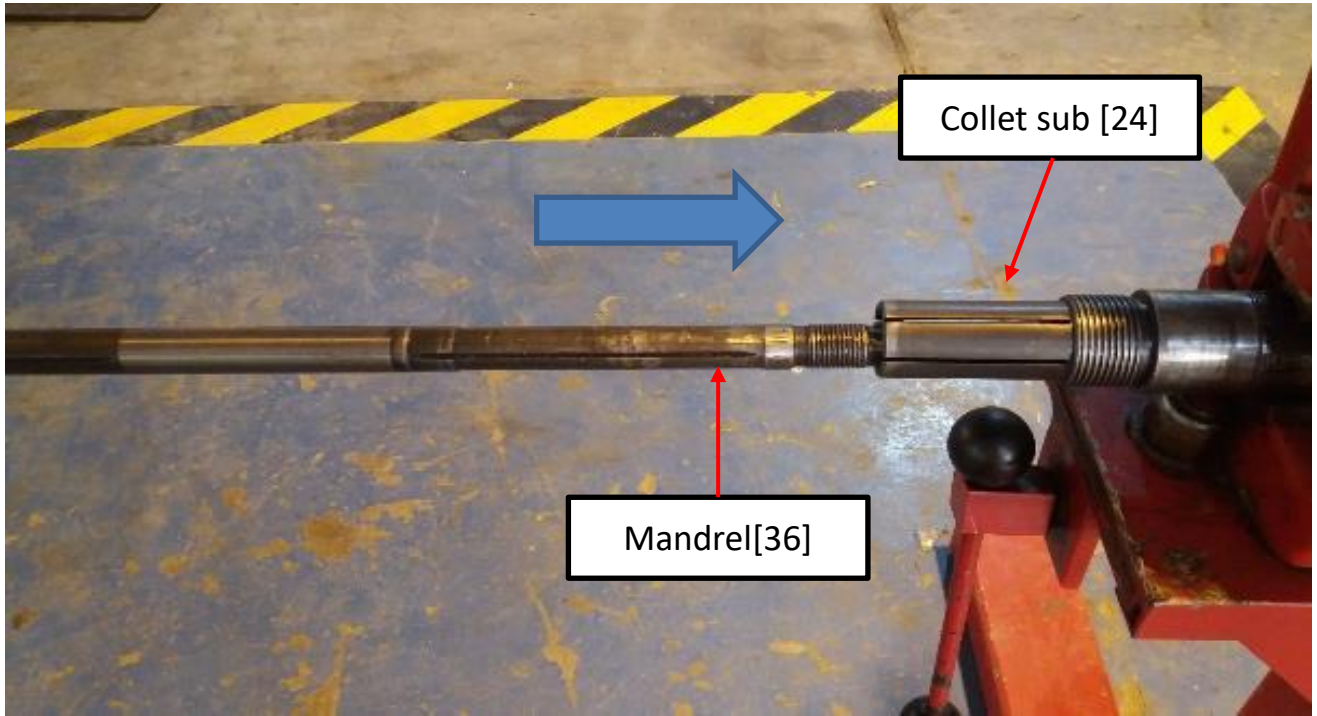
3-2-3 Connect Latch sub[27] to Mandrel[36]



Tool maintenance process

3-2 installation steps

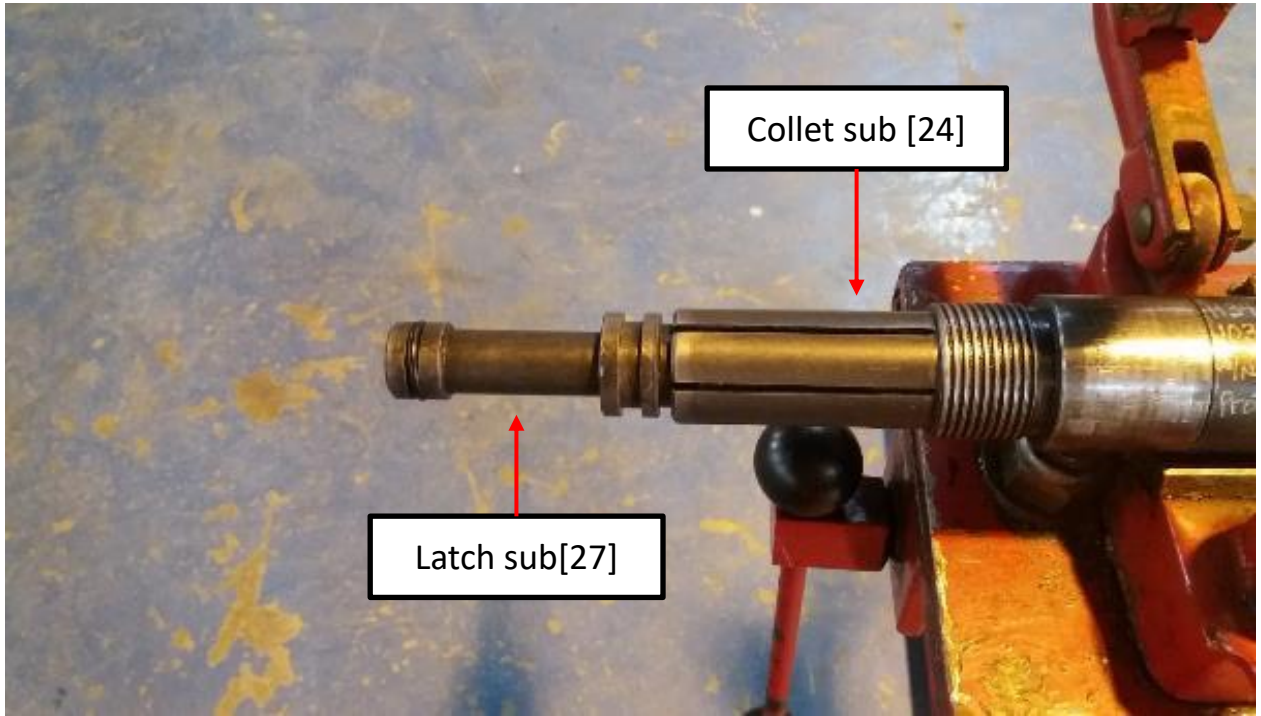
3-2-4 Connect the mandrel [36] to the collet sub [24]



Tool maintenance process

3-2 installation steps

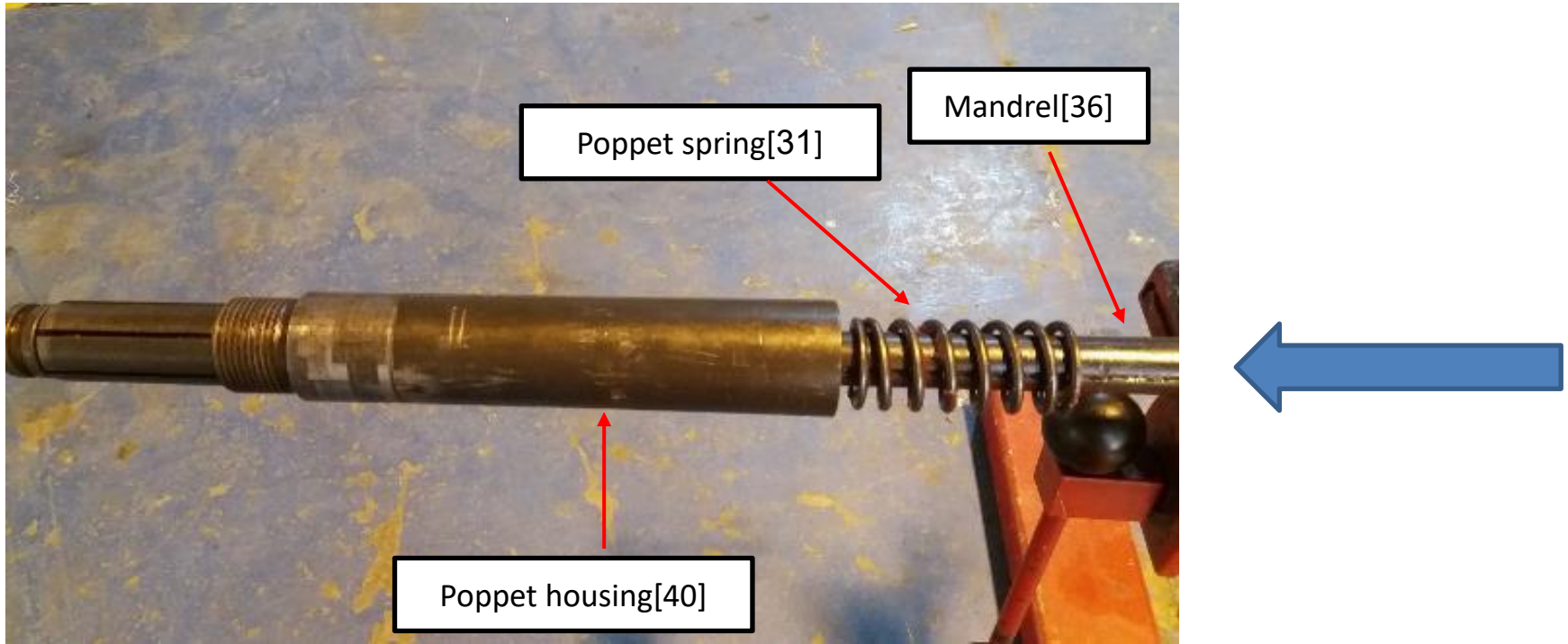
3-2-5 Connect the [27] to the collet sub [24]



Tool maintenance process

3-2 installation steps

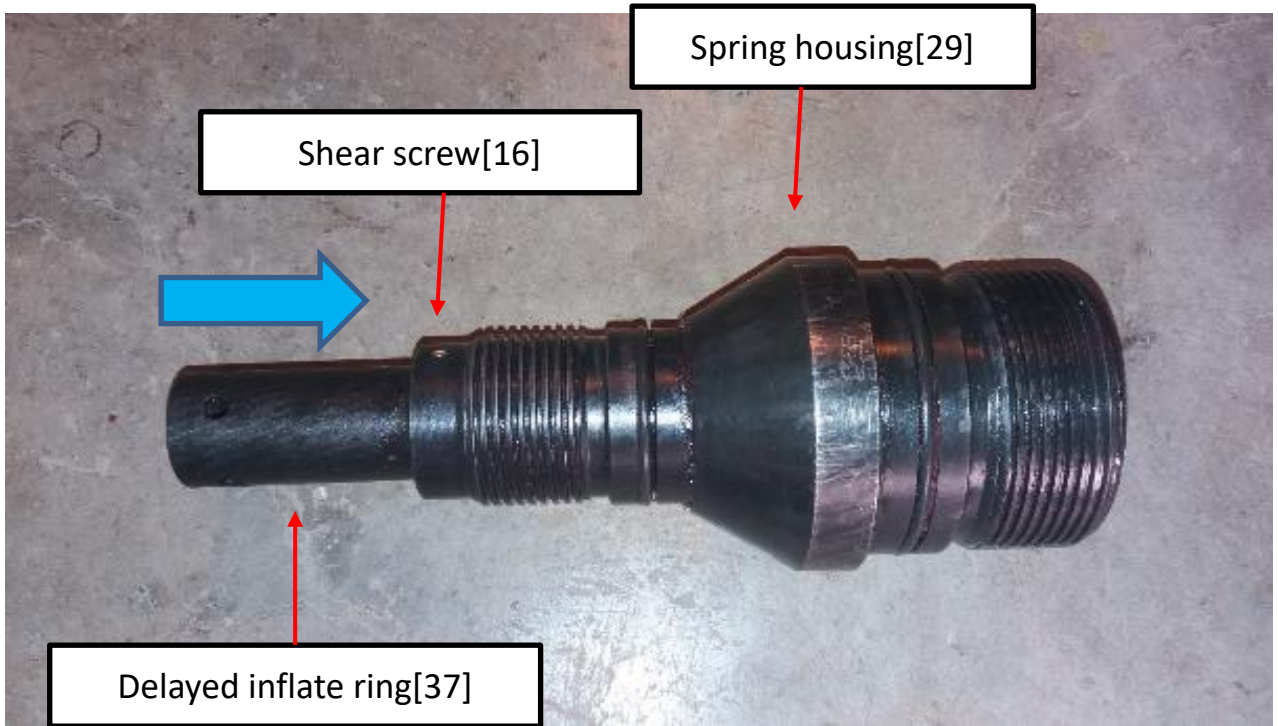
3-2-6 Pass the spring [31] from the right end of the mandrel [36] and push it into the poppet housing [40]]



Tool maintenance process

3-2 installation steps

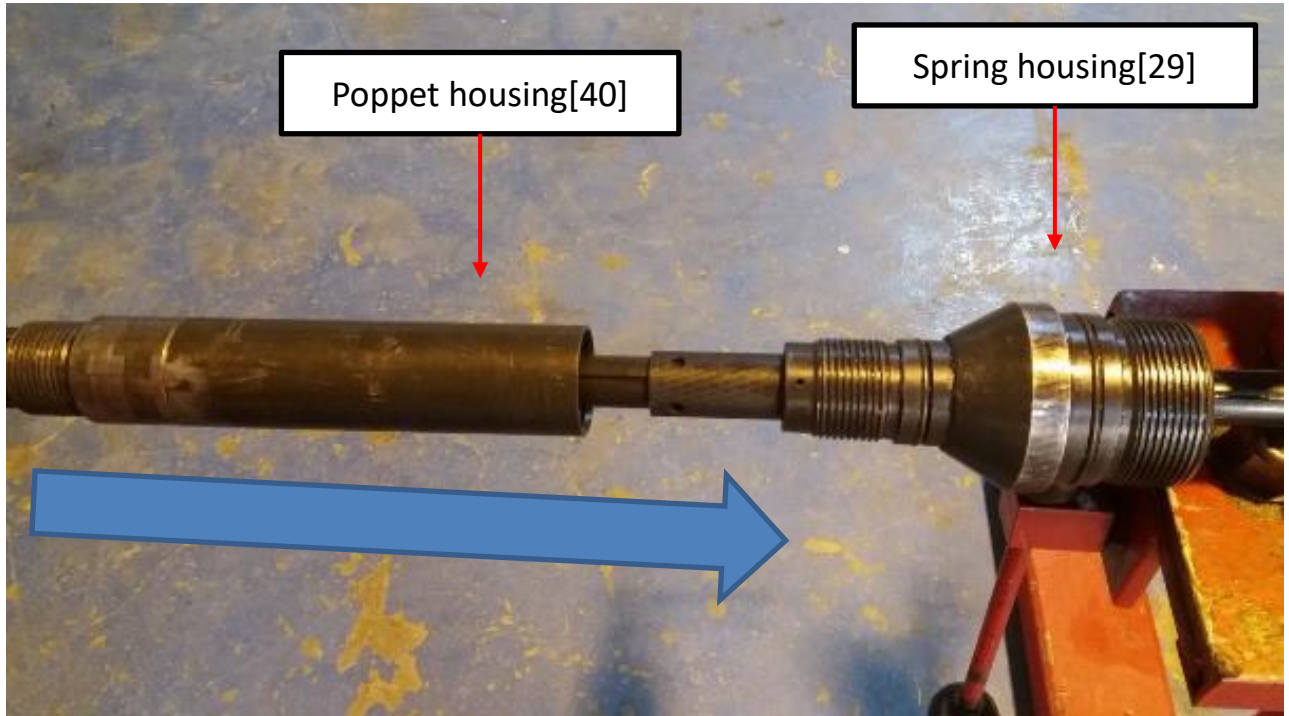
3-2-7 Connect the delayed inflate ring [37] through the shear pin [16] and the spring housing [29]



TOOL MAINTENANCE PROCESS

3-2 installation steps

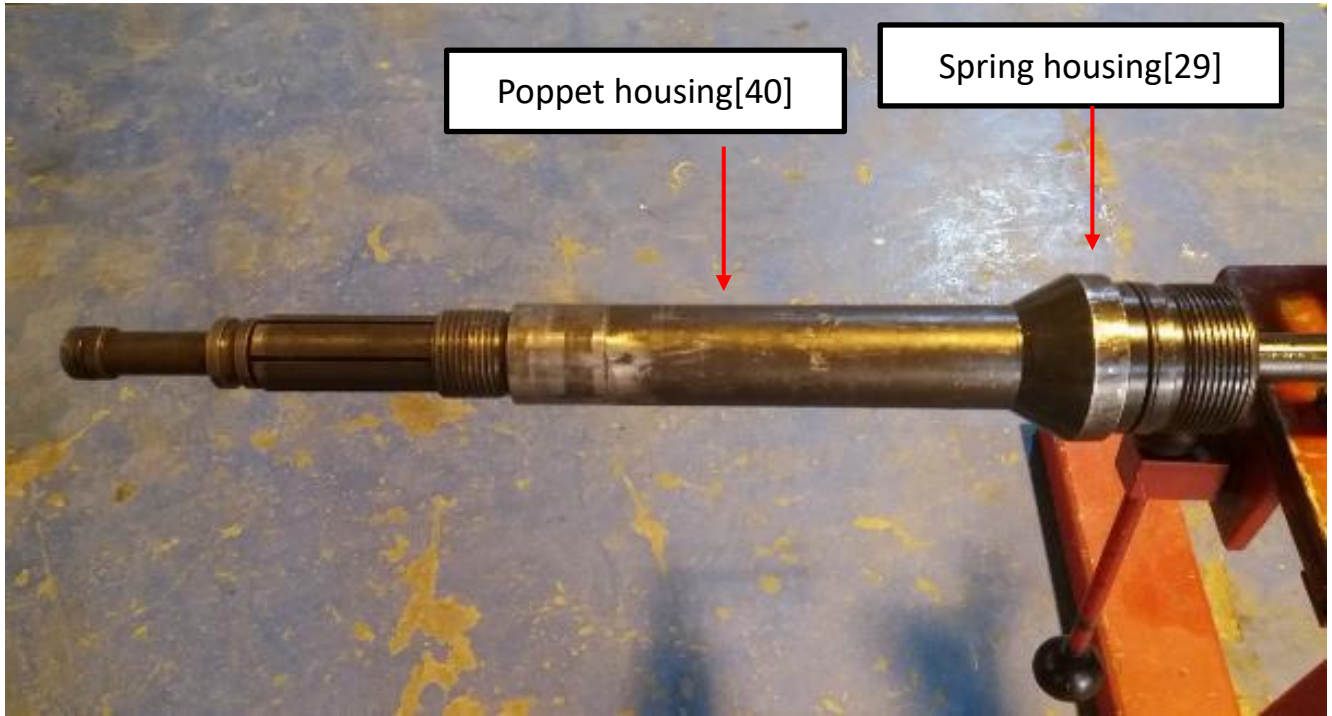
3-2-8 Connect the spring housing [29] and the poppet housing [40]



TOOL MAINTENANCE PROCESS

3-2 installation steps

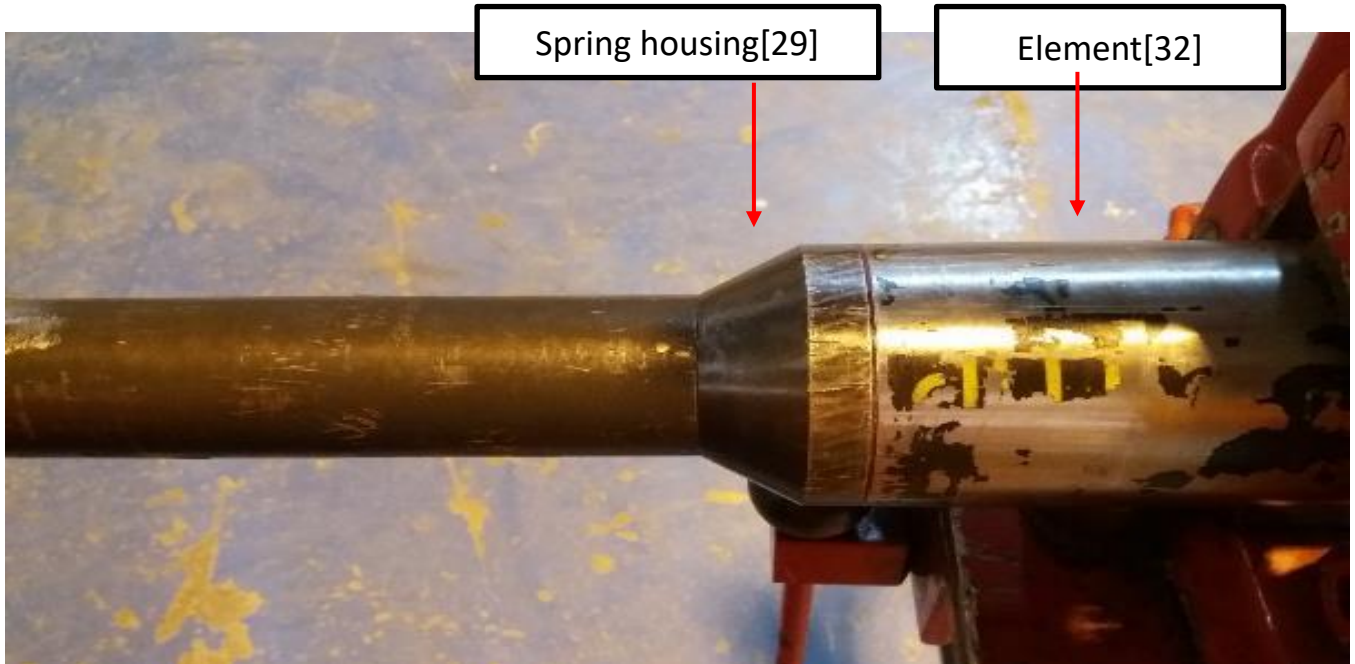
3-2-9 The connection of the joint on the [29] and the expansion valve sleeve [40] is completed



TOOL MAINTENANCE PROCESS

3-2 installation steps

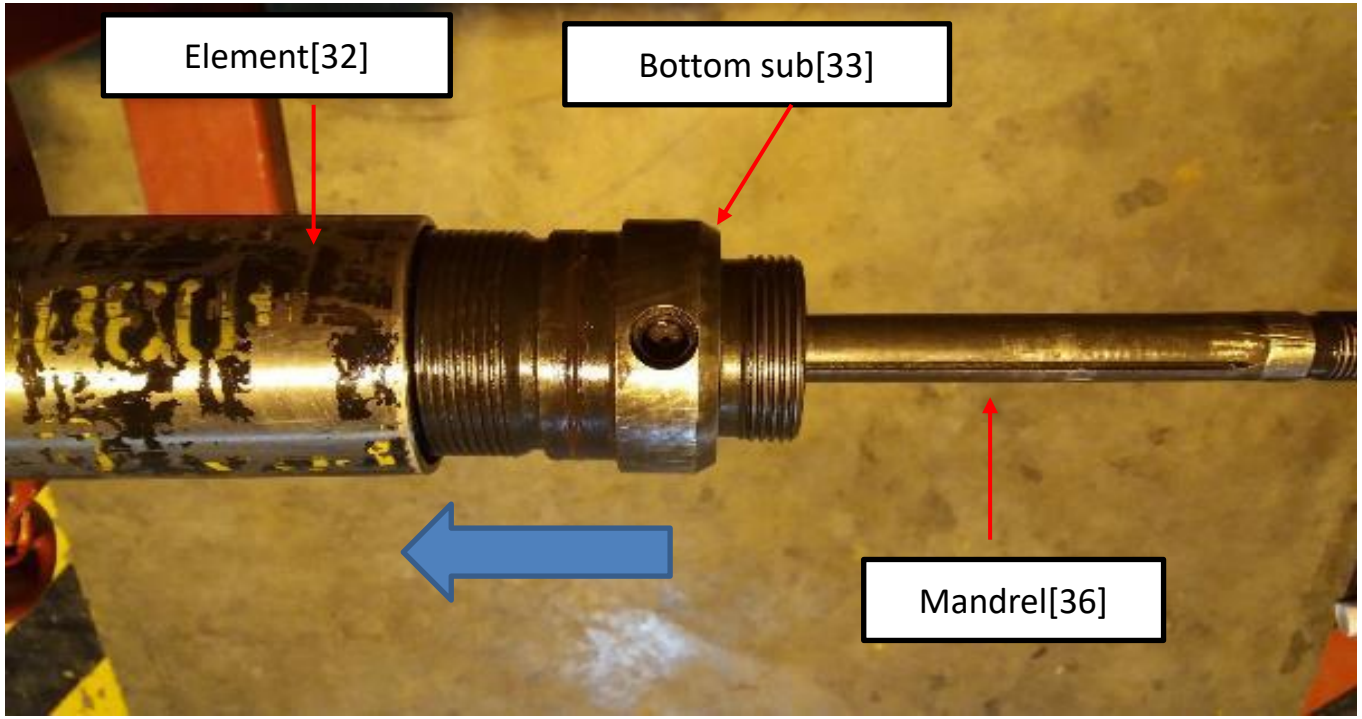
3-2-10 Pass the element [32] from the right end of the mandrel [36] and connect it with the upper joint [29]. Pay attention to distinguish the upper and lower ends of the Element. method: At this time, when holding the buckle on the plastic bucket by hand, the opening direction of the steel strip is opposite to that of the hand, and the feeling is rough; when the shackle is buckled, the opening direction of the steel strip is the same as the direction of the hand movement, and the feeling is smooth.



TOOL MAINTENANCE PROCESS

3-2 installation steps

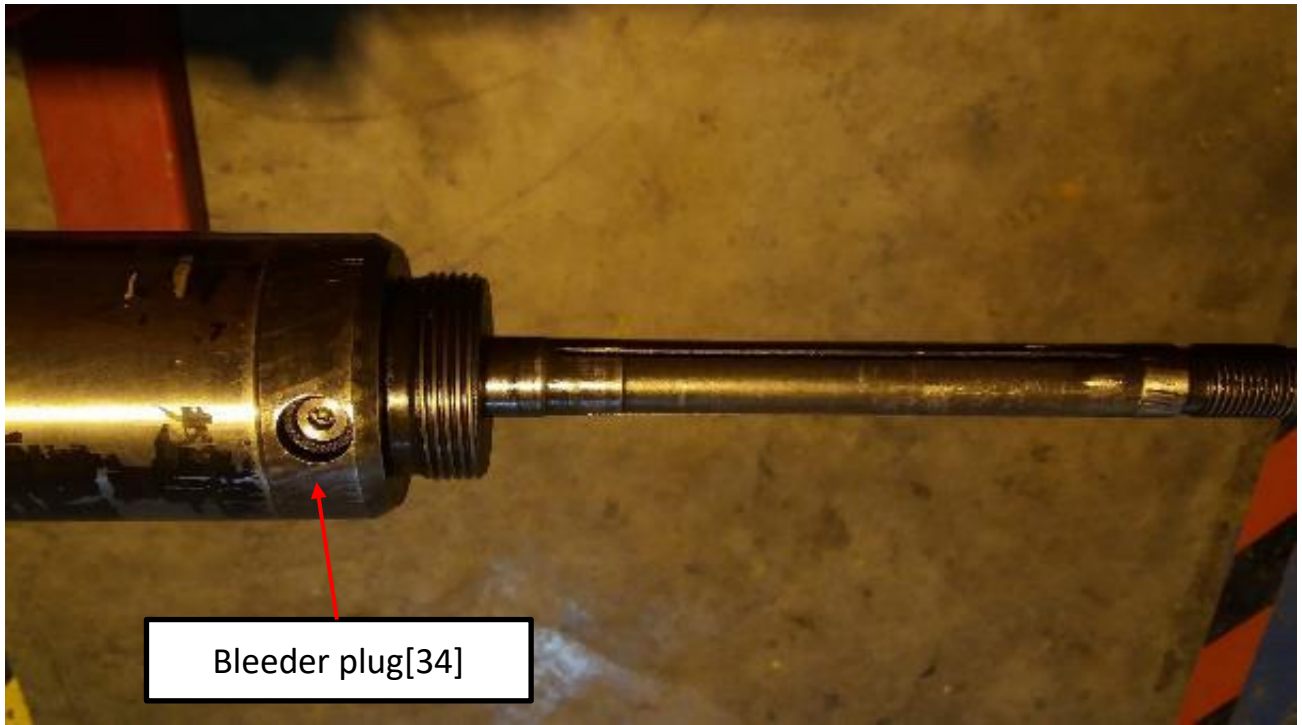
3-2-11 Pass the bottom sub [33] through the right end of the mandrel [36] and connect it with the lower end of the element [32].



TOOL MAINTENANCE PROCESS

3-2 installation steps

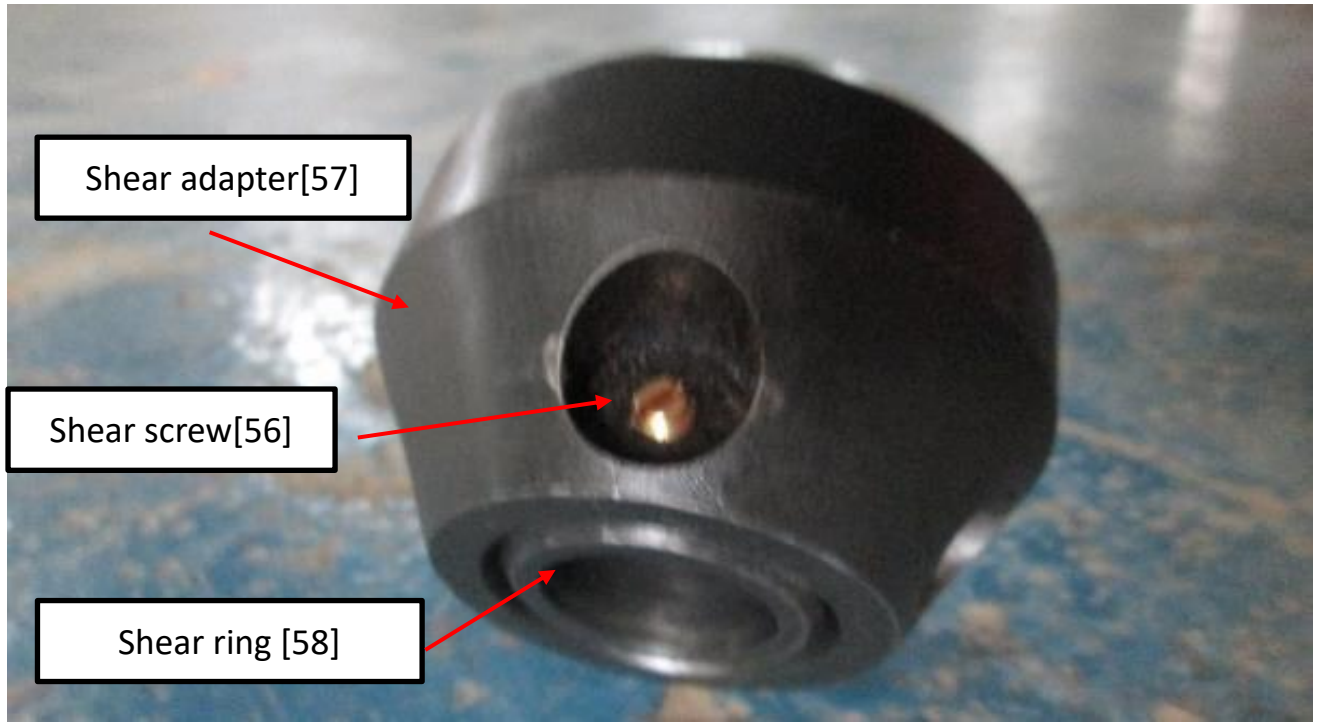
3-2-12 Install the bleeder plug [34]on the bottom sub [33].



TOOL MAINTENANCE PROCESS

3-2 installation steps

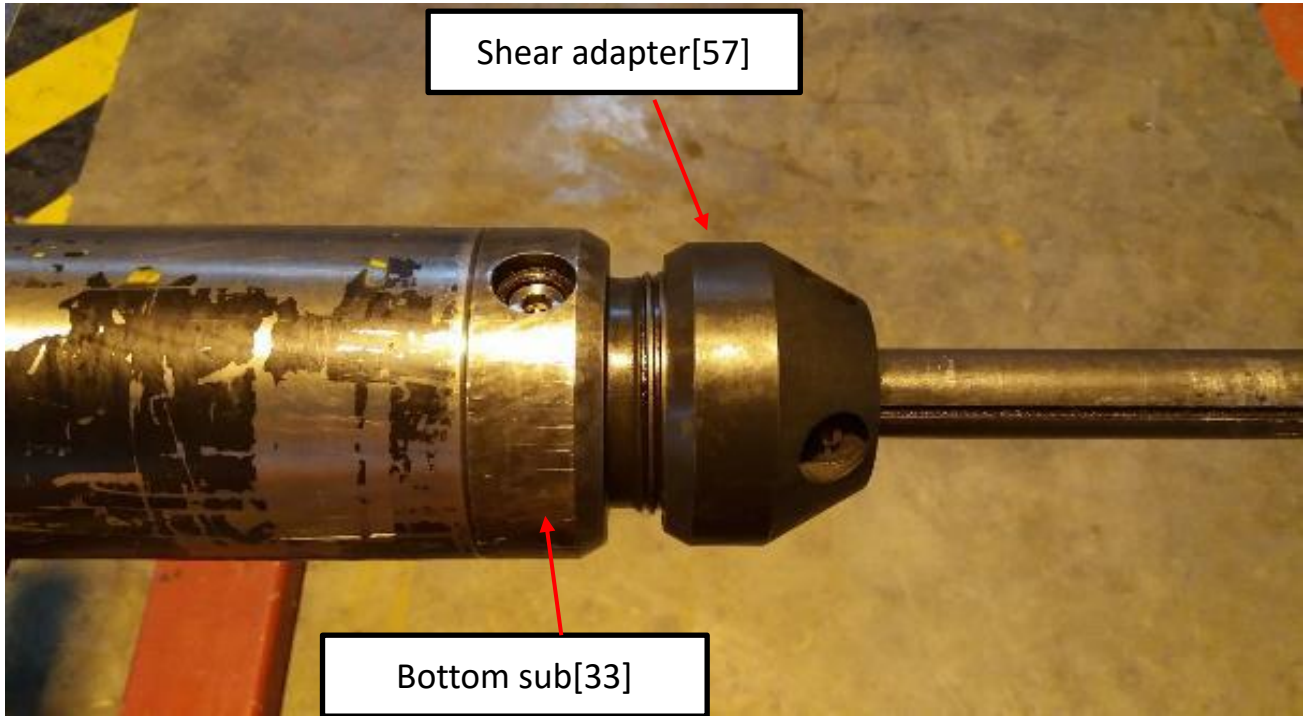
3-2-13 Place the shear ring [58] inside the shear adapter[57] and secure with shear screw [56].



TOOL MAINTENANCE PROCESS

3-2 installation steps

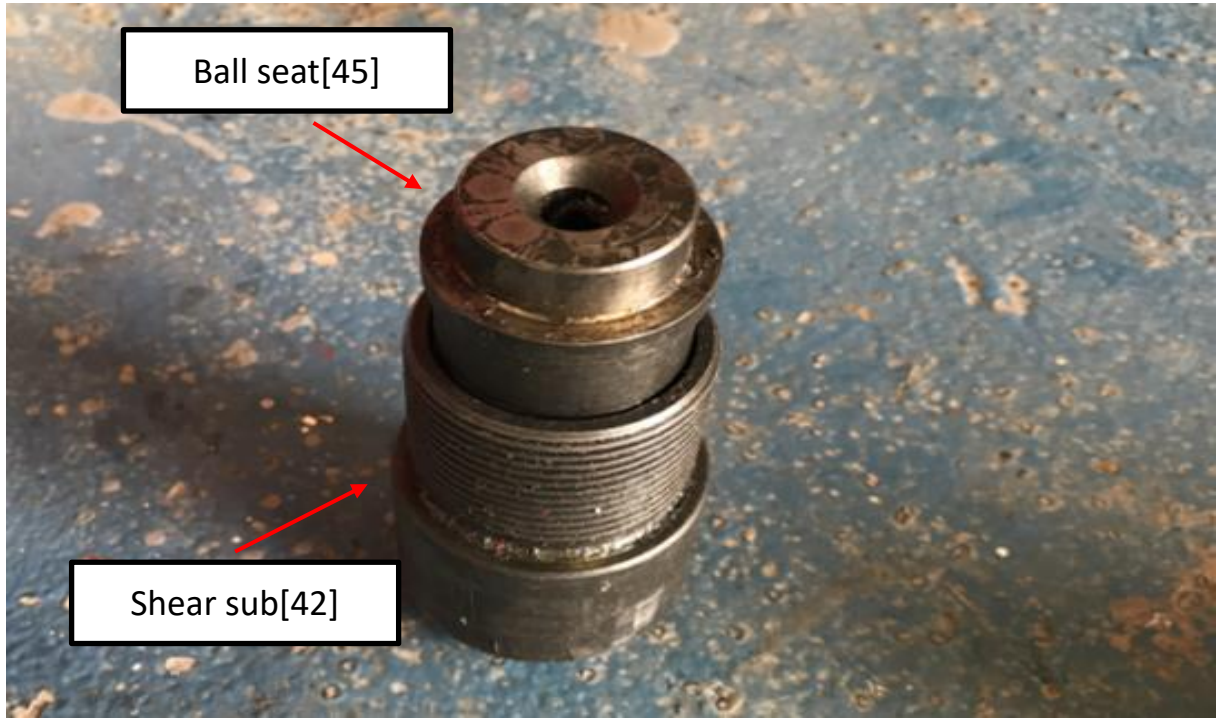
3-2-14 Connect the shear connector [57] to the bottom sub [33]. Be careful not to tighten at this time to prevent damage to the shear screw.



TOOL MAINTENANCE PROCESS

3-2 installation steps

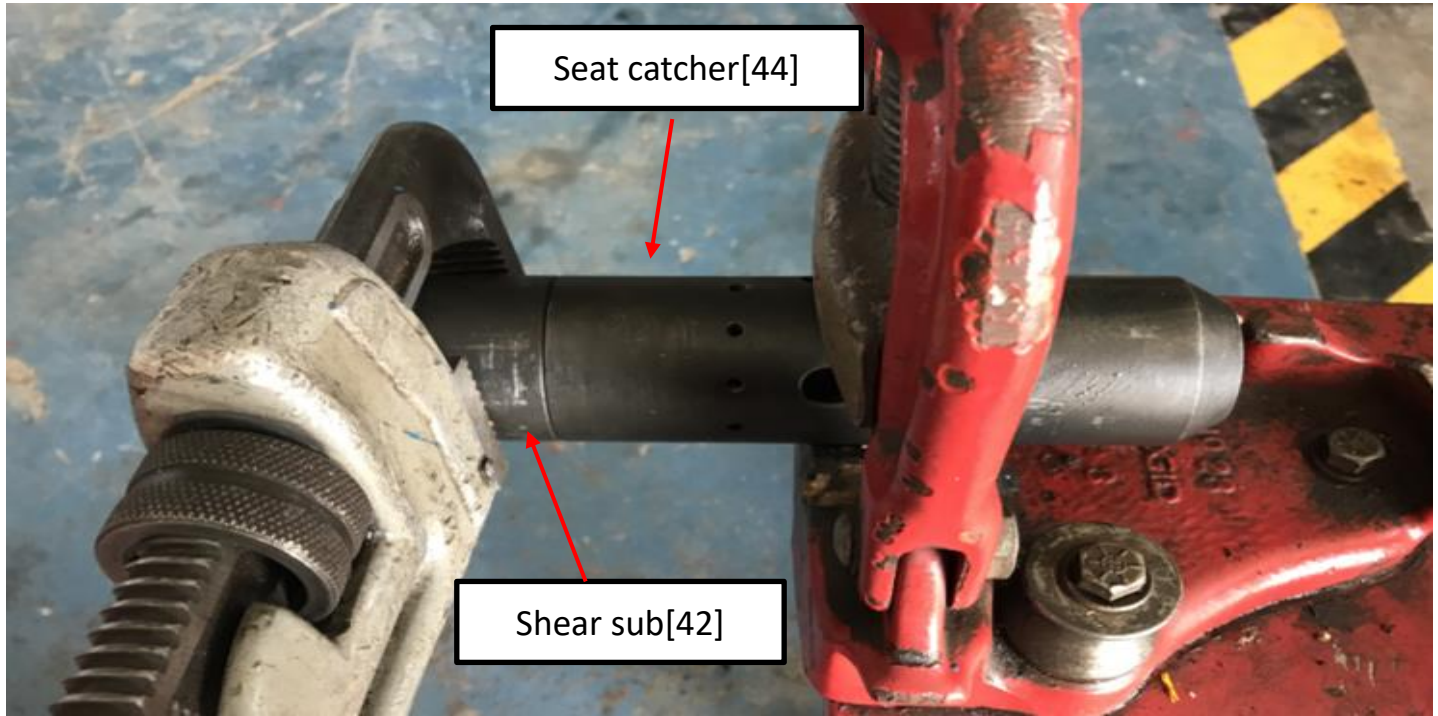
3-2-15 Connect the shear sub [42] and the ball seat [45]



TOOL MAINTENANCE PROCESS

3-2 installation steps

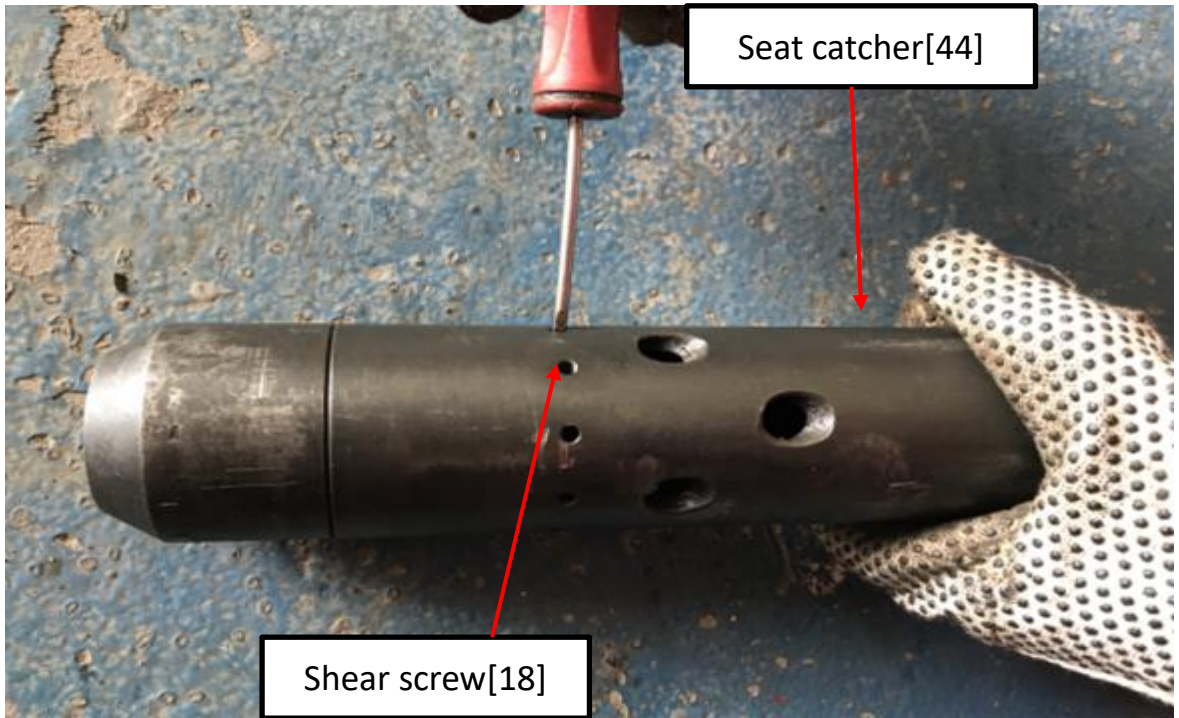
3-2-16 Connect the shear sub[42] to the ball seat catcher [44]



TOOL MAINTENANCE PROCESS

3-2 installation steps

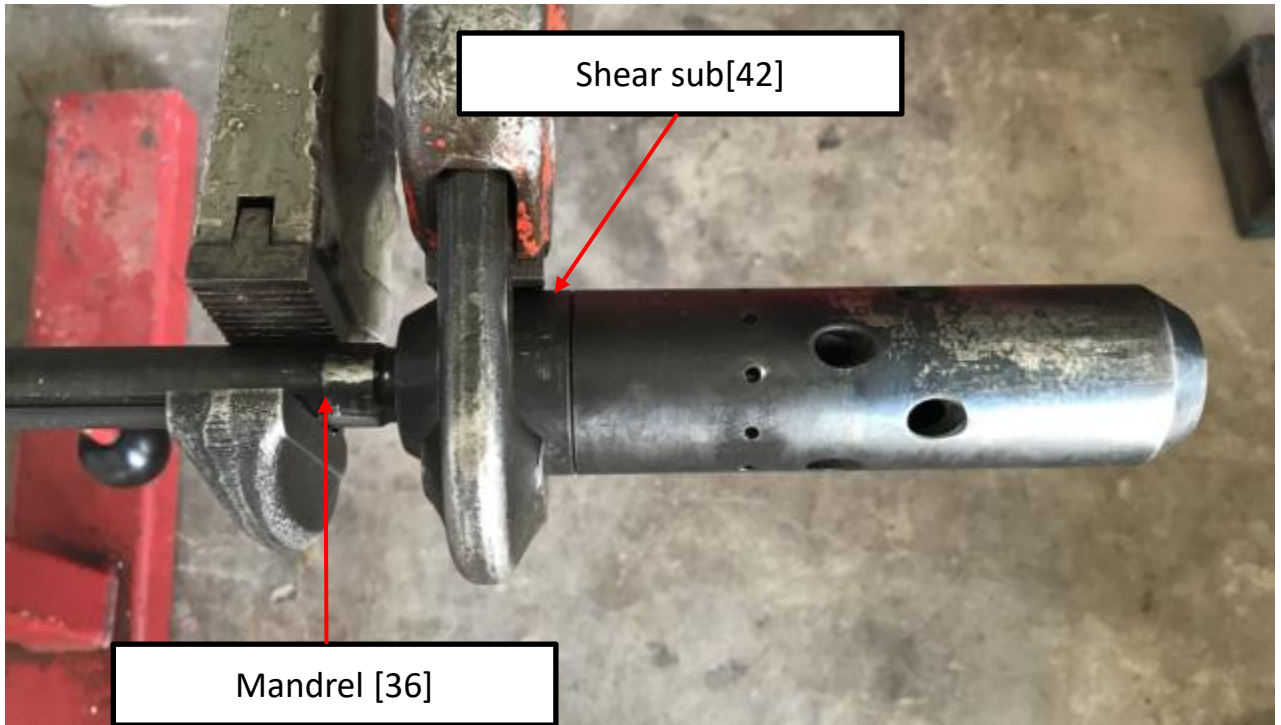
3-2-17 Attach the shear pin [18] to the seat catcher [44]



TOOL MAINTENANCE PROCESS

3-2 installation steps

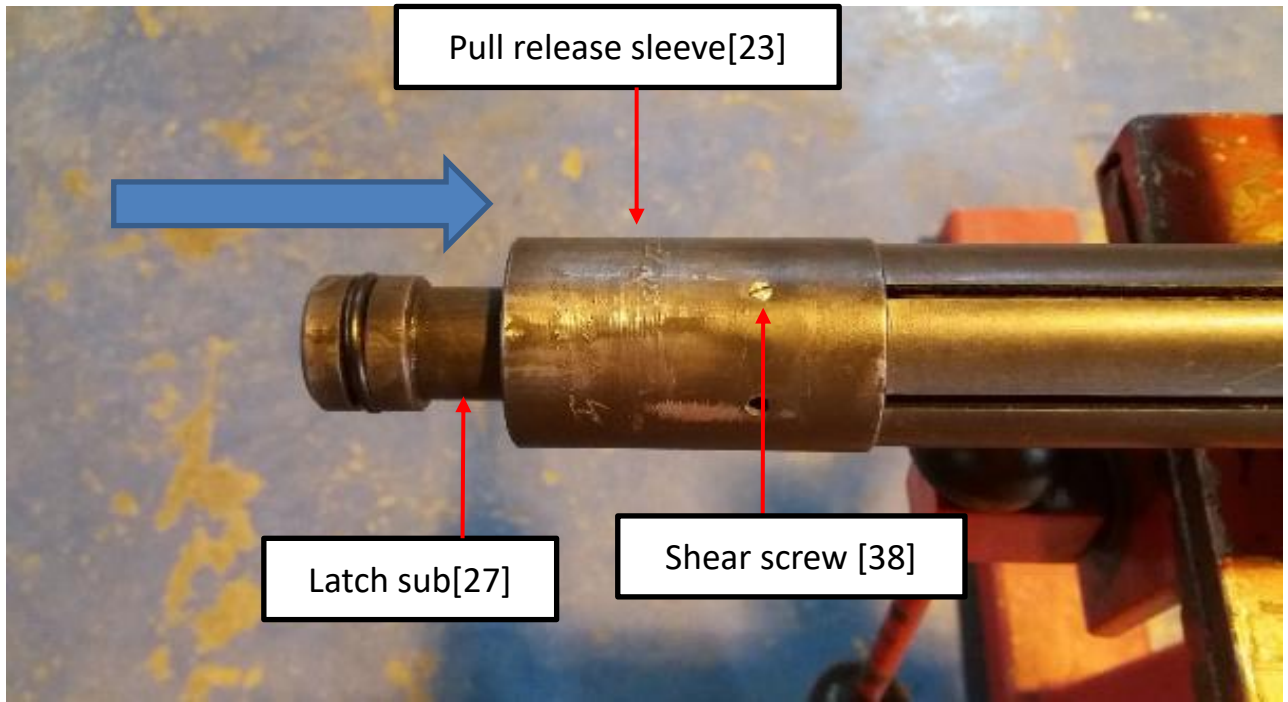
3-2-18 Connect the shear sub section [42] and the mandrel [36]



TOOL MAINTENANCE PROCESS

3-2 installation steps

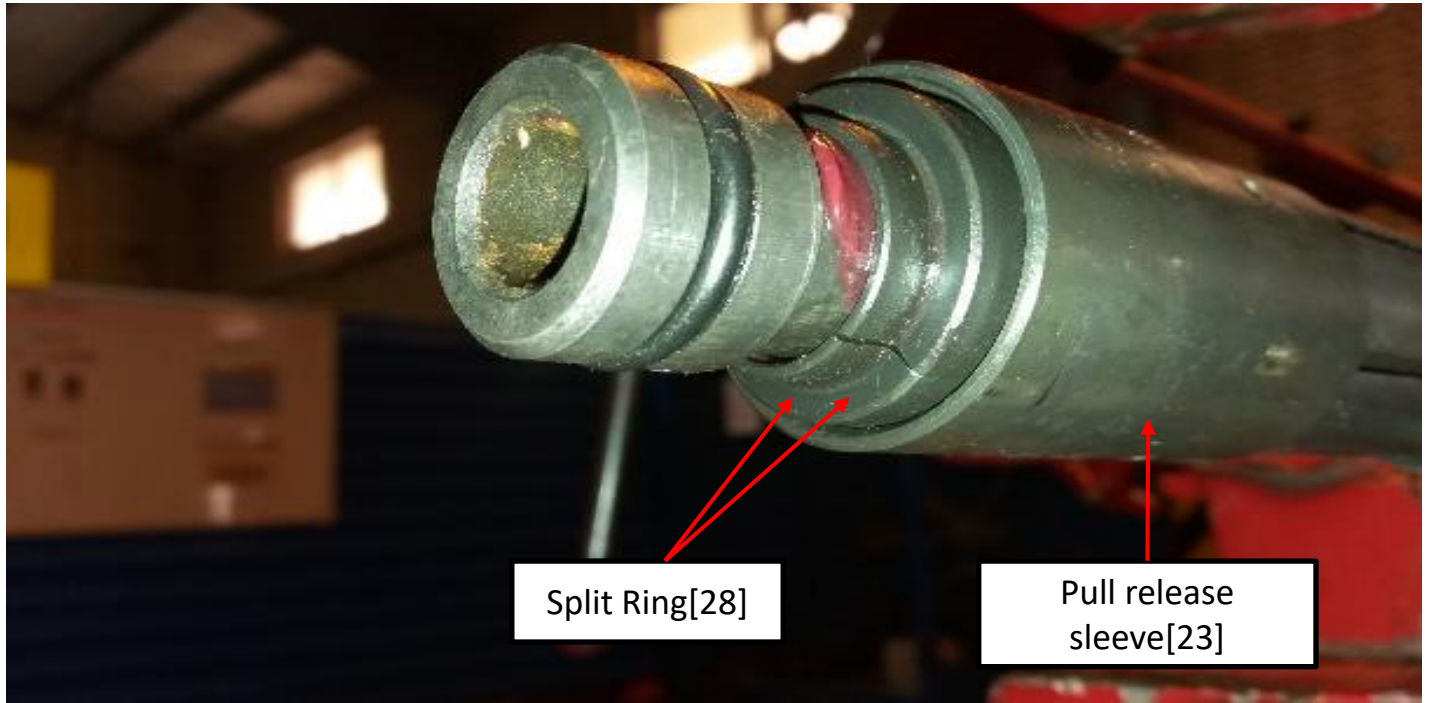
3-2-19 At the other end of the tool, the pull release sleeve [23] is secured to the latch sub [27] via a shear pin [38]. As shown below. **The number of pins** here determines the lifting force required when the packer is unsealed



TOOL MAINTENANCE PROCESS

3-2 installation steps

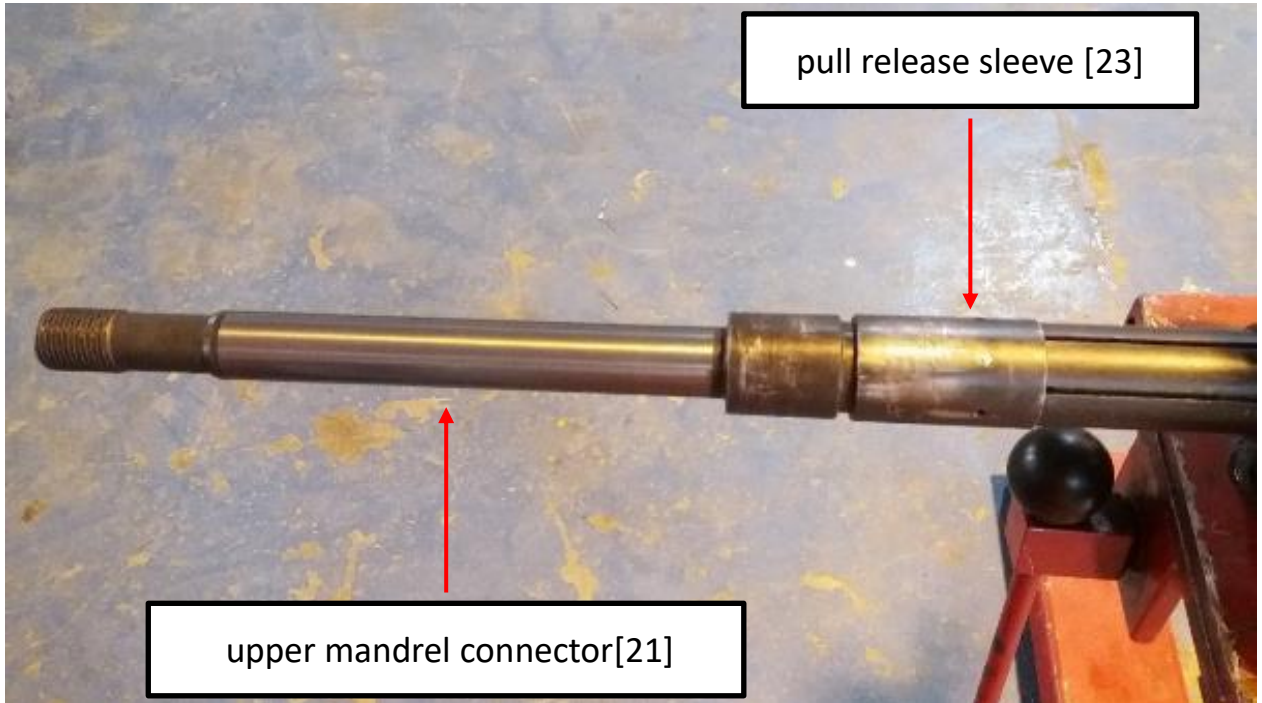
3-2-20 Place the split ring [28] into the pull release sleeve [23] and secure it with oil. Pay attention to **the direction of the snap ring**, as shown below



TOOL MAINTENANCE PROCESS

3-2 installation steps

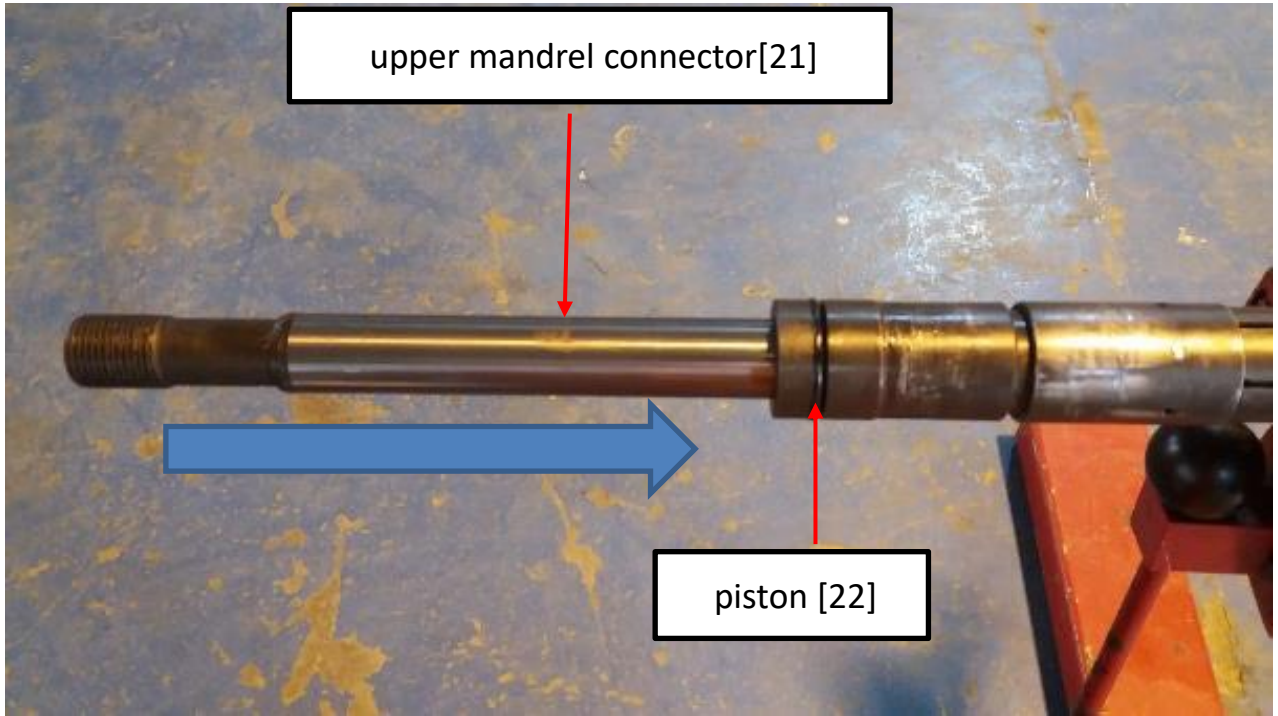
3-2-21 Connect the upper mandrel connector[21] and pull release sleeve [23]. Shock-absorbing spindle surface is a sealing surface



TOOL MAINTENANCE PROCESS

3-2 installation steps

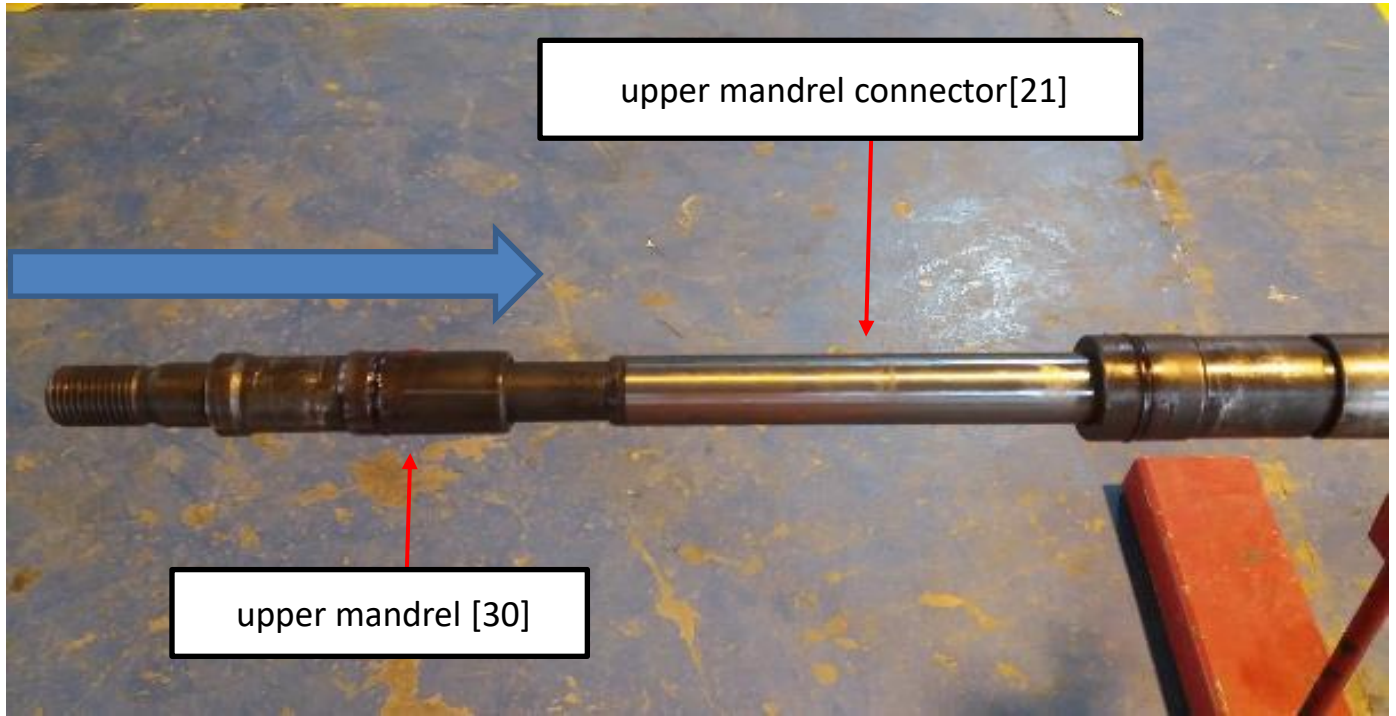
3-2-22 Install the piston [22] to the upper mandrel connector[21]



TOOL MAINTENANCE PROCESS

3-2 installation steps

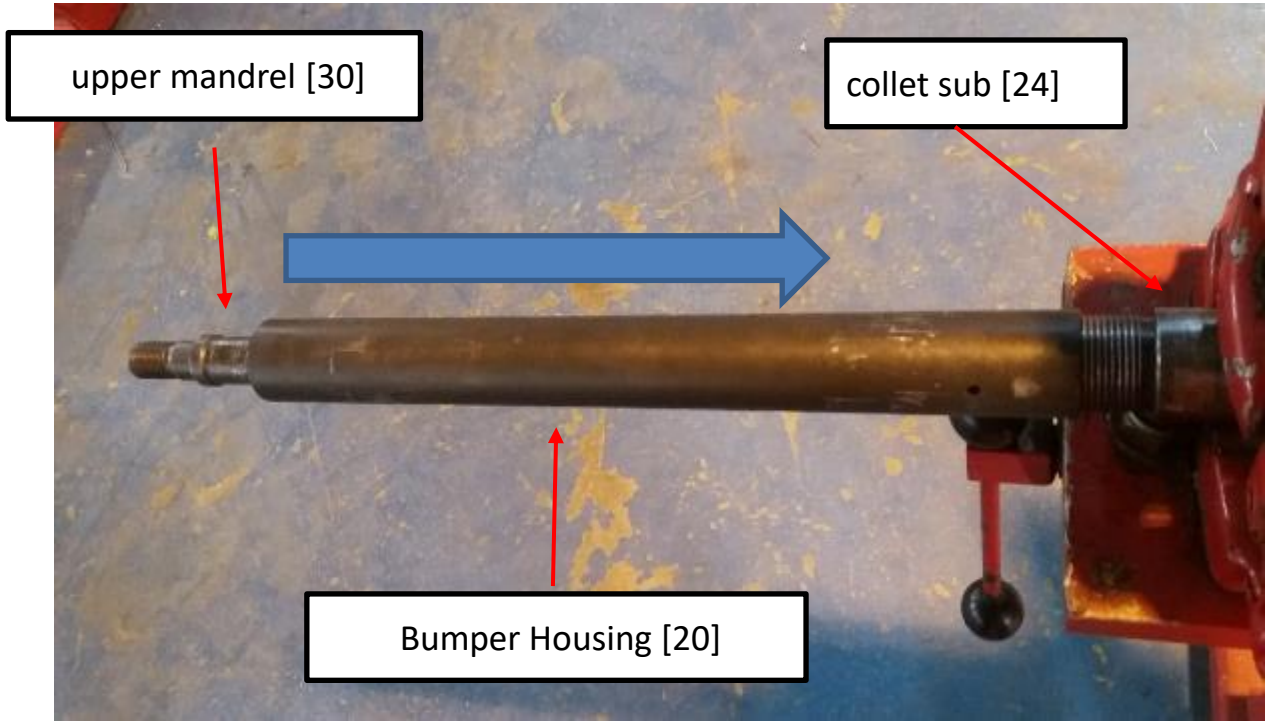
3-2-23 Insert Upper mandrel[30] to upper mandrel connector[21]



TOOL MAINTENANCE PROCESS

3-2 installation steps

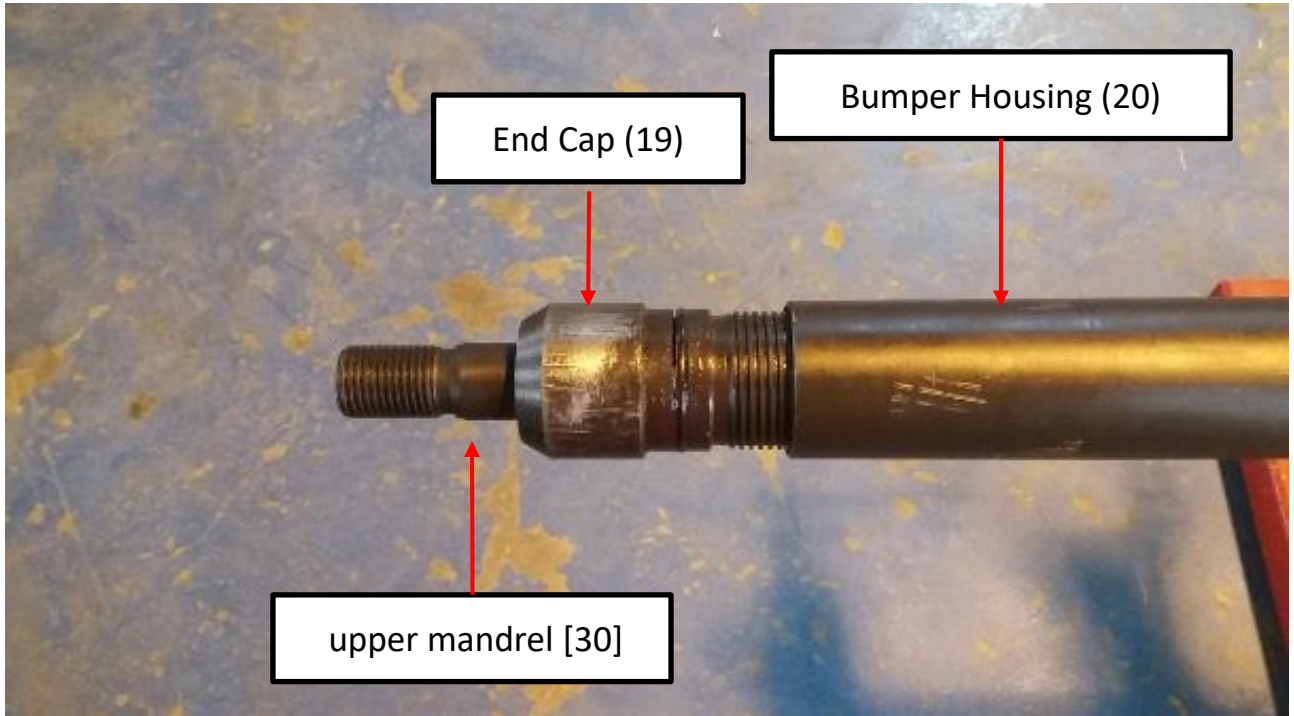
3-2-24 Slide Bumper Housing[20] to collet sub[24]



TOOL MAINTENANCE PROCESS

3-2 installation steps

3-2-25 Insert the end cap [19] to the Bumper Housing[20]



TOOL MAINTENANCE PROCESS

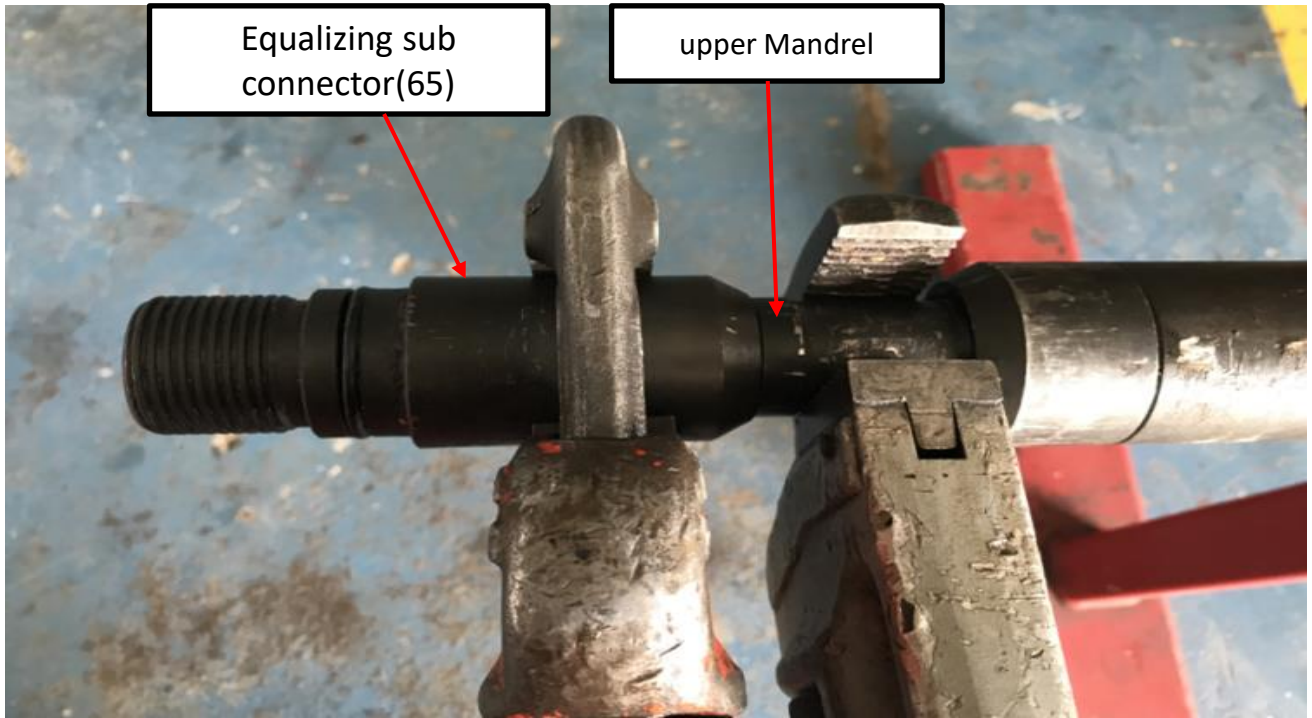
3-1 Removal steps

3-2-26 the view of Equalizing sub [64] Equalizing sleeve[61], insert the equalizing sleeve into the equalizing sub.

TOOL MAINTENANCE PROCESS

3-2 Installation steps

3-2-27 Tighten the Equalizing sub Connector [65] to the upper mandrel[30]



TOOL MAINTENANCE PROCESS

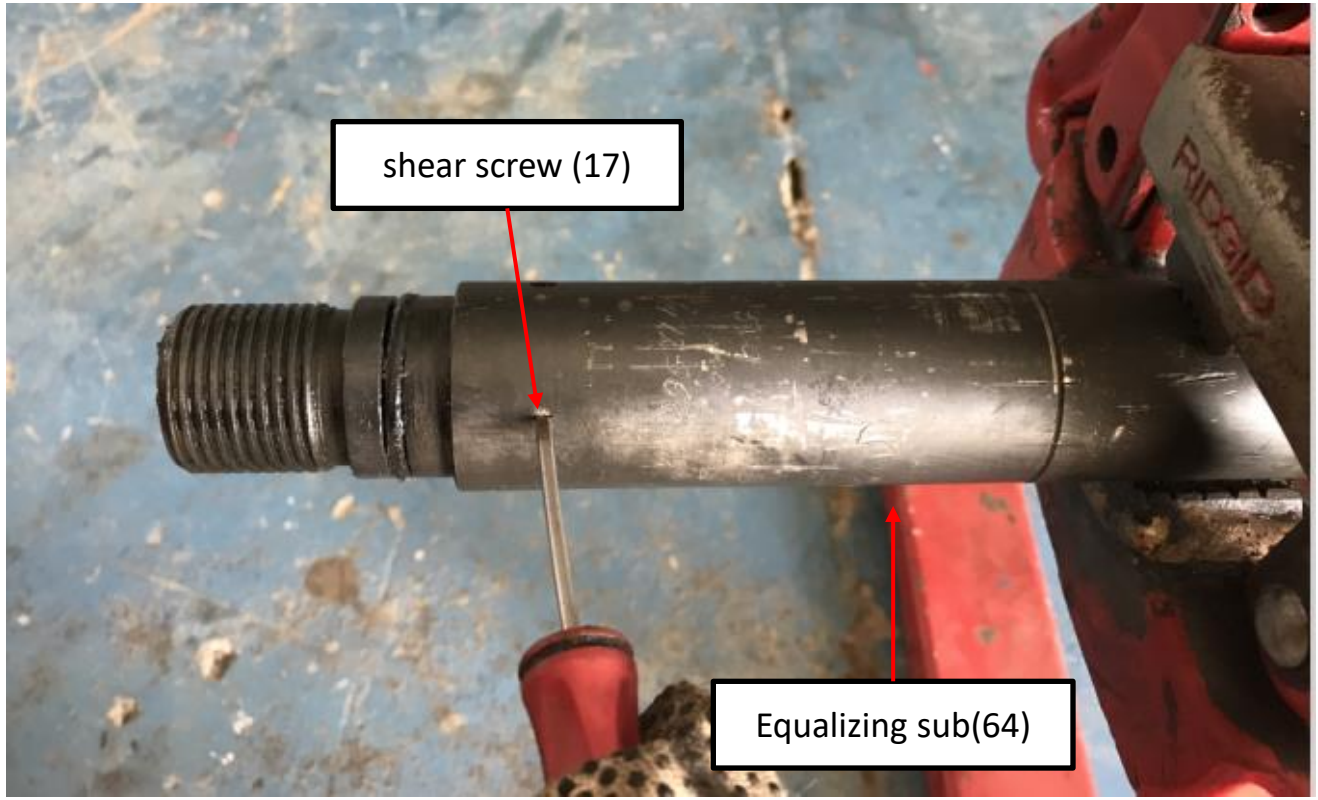
3-2 installation steps

3-2-28 Tighten the Equalizing sub[64] to the Equalizing sub connector[]

TOOL MAINTENANCE PROCESS

3-2 installation steps

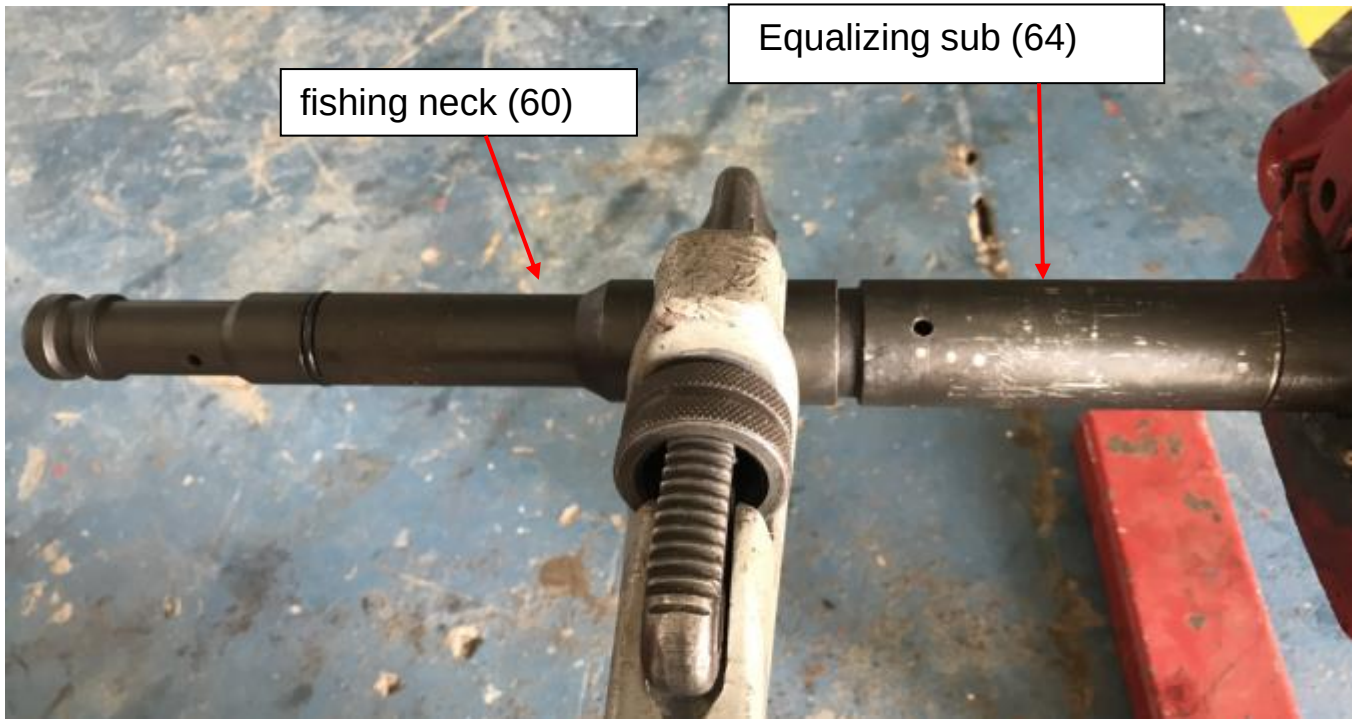
3-2-29 Tighten the shear screw [17] to the Equalizing sub[64]



TOOL MAINTENANCE PROCESS

3-2 installation steps

3-2-30 Tighten the fishing neck [60] to the Equalizing sub[64]



End Of Maintenance

- **Maintenance completely**

End Of Maintenance

- Apply a small amount of butter to all the exposed threads and holes in the tool.
  Wear wire on both ends of the tool;
  Move the test pressure qualified tool to the qualified equipment area.
  Remove the pressure record card and fill in the relevant information (country, region, field name, well name, tool name, date, time, etc.).
  Fill in the tool maintenance record form, and the coiled tubing engineer must sign and confirm it.
  Fill in the tool status label and attach it to the wire.
  Neatly tidy tools, remove safety signs and warning tapes, report forms and drawings, provide convenience for next operation, and clean wastes, such as old seals, on the spot according to waste disposal regulations.

End Of Maintenance

- For different sizes of set internal diameters, the packer is subject to different pressure values. It is necessary to select the appropriate number of shear pins according to the well conditions. Specific need to query the tool data sheet (Data sheet). The following table shows the working pressure values in the manual for each shear pin value.

Shear Screw Values - 2.13" Running Tool

No. of Screws	1	2	3	4	5	6
Delayed Inflate Ring	450 psi	900 psi	-	-	-	-
Ball Seat	-	1,000 psi	1,500 psi	2,000 psi	2,500 psi	3,000 psi
Equalizing Sleeve	800 psi	1,600 psi	-	-	-	-
Release to deflate	-	1,800 lb	2,700 lb	3,600 lb	4,600 lb	5,500 lb
Emergency Disconnect	-	800 psi	1,200 psi	1,600 psi	2,000 psi	2,400 psi
Shear Adapter	Use 4 Shear Screws for Maximum Benefit					

End Of Maintenance

Shear pin number selection

Shear Screw Values - 3.00" Running Tool

No. of Screws	1	2	3	4	5	6
Delayed Inflate Ring	600 psi	1,200 psi	-	-	-	-
Ball Seat	-	1,200 psi	1,750 psi	2,350 psi	2,950 psi	3,500 psi
Equalizing Sleeve	1,200 psi	2,400 psi	-	-	-	-
Release to deflate	-	1,800 lb	2,700 lb	3,600 lb	4,600 lb	5,500 lb
Ball Seat ■ (Running Tool)	-	1,200 psi	-	-	-	-
Emergency Disconnect	-	-	1,800 psi	2,400 psi	3,000 psi	3,600 psi
Shear Adapter	Use 3 Shear Screws for Maximum Benefit					

■ Running tool ball seat must shear out before pressure can act on the collet support to disconnect from packer.

♦ Values apply only to screws furnished by Baker Oil Tools. Use of screws from other sources must be verified by Engineering.

Tool maintenance process

3.1 Inspect all O-rings on each component for damage.

3.2 After using diesel oil to remove oil from the components of the tool, clean it with clean water and blow it with compressed air, especially to ensure that the inner wall of the tool barrel is clean.

3.3 Check all parts for damage.

3.4 Replace the damaged part and record the part number of the newly replaced part on the maintenance log sheet.

3.5 Apply a little oil on the surface of each spring and O-ring

- **4- End of maintenance**

- 4-1 Tool disposal
- 4-1-1 Apply a small amount of butter to all the exposed threads and holes in the tool
- 4-1-2 Wear wire on both ends of the tool
- 4-1-3 pressure test the tools
- 4-2 fill in the document
- 4-2-1 remove the pressure record card and fill in relevant information (country area, oilfield name, well name, tool name, date, time, etc.)
- 4-2-2 Fill in the tool maintenance record form, CTU engineers must sign and confirm
- 4-2-3 Fill in the tool status label and attach it to the wire

End Of Maintenance

- Apply a small amount of butter to all the exposed threads and holes in the tool.
  Wear wire on both ends of the tool;
  Move the test pressure qualified tool to the qualified equipment area.
  Remove the pressure record card and fill in the relevant information (country, region, field name, well name, tool name, date, time, etc.).
  Fill in the tool maintenance record form, and the coiled tubing engineer must sign and confirm it.
  Fill in the tool status label and attach it to the wire.
  Neatly tidy tools, remove safety signs and warning tapes, report forms and drawings, provide convenience for next operation, and clean wastes, such as old seals, on the spot according to waste disposal regulations.

End Of Maintenance

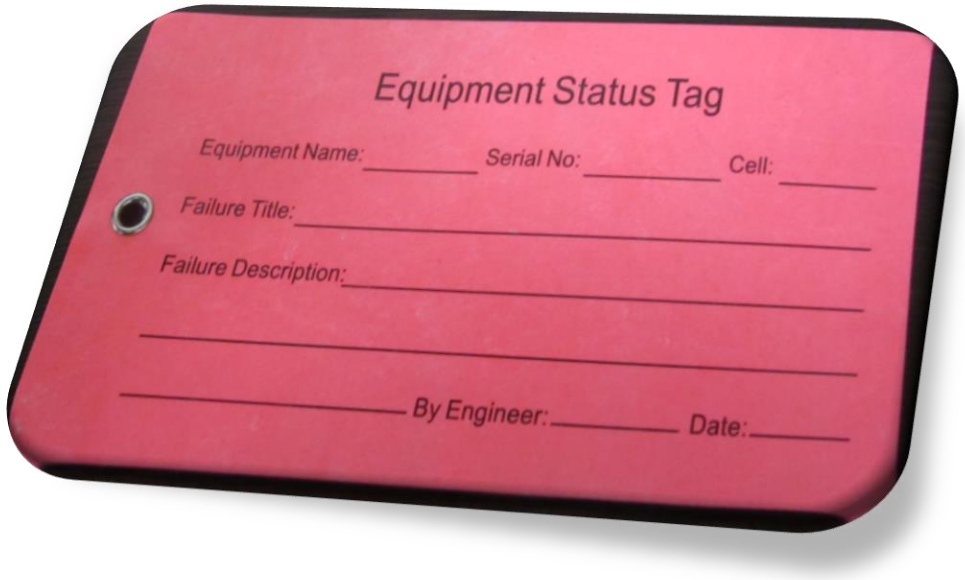
- Note: The tool status label is divided into 3 colors
- The green card indicates that the maintenance of the tool, pressure test, and function test are completed. The status is good and can be used.

End Of Maintenance

- The yellow card indicates that there are some minor problems in the process of tool maintenance, pressure test, and debugging. However, after the repair or re-maintenance, the function can be restored and reused.

End Of Maintenance

- Red card indicates that the tool has been irreparably damaged and can no longer be used



- 5- Finishing work
- Neatly tidy up the tools, remove safety signs and warning tapes, and archive reports and drawings to facilitate the next operation. Clean wastes and other waste seals in accordance with waste disposal regulations.

Thanks for your attention