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INDIAN MARK 2 Major Maintenance Guideline



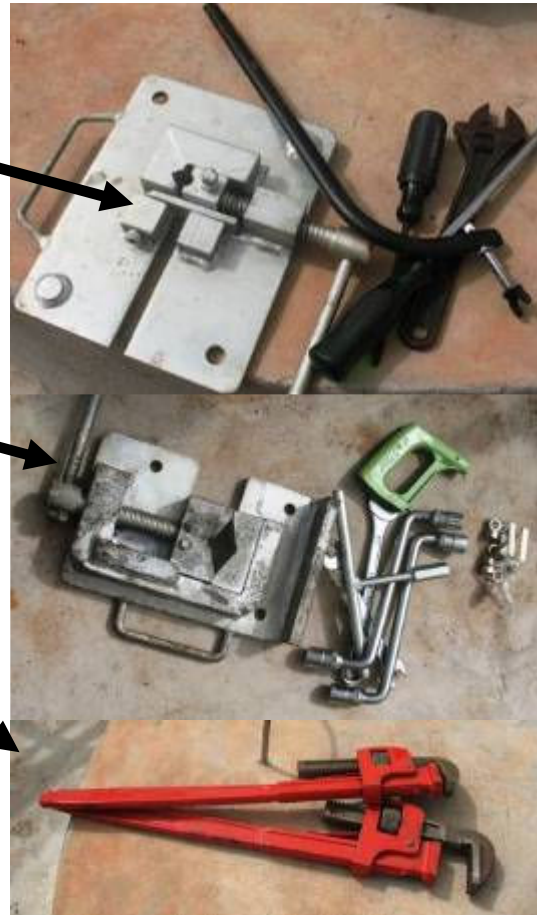


A) Preparations

I. Before leaving for the field

1. Tell the community when you plan to come for maintenance. Ask them to inform the Pump Caretakers to attend the maintenance. Inform them of the cost of the maintenance and the possibility of extra costs if it is necessary to change damaged spare parts.
2. Take some extra spare parts to the field:
 - Long nuts
 - Lock nuts
 - Bolts
 - Nipple
 - Rubber seal for cylinder and Pipes
3. Make sure you have all required tools and spare parts:

- ✓ Chain lifter
- ✓ Connecting rod clamp
- ✓ Grease
- ✓ Hack saw blade
- ✓ Hack saw frame
- ✓ Hammer
- ✓ Screw driver flat s/s
- ✓ Screw driver Philips
- ✓ Riser pipe clamp
- ✓ Shifting spanner
- ✓ 2 Elbow spanners 17/19mm
- ✓ Spanner flat 17/19mm
- ✓ Spanner flat 19/24mm
- ✓ T-Bolt
- ✓ 2 Wrenches 2FT=66cm
- ✓ 2 Bolts 19mm
- ✓ 6 Nuts 19mm
- ✓ 2 Long Nut 19mm
- ✓ **A METAL BRUSH**





II. Preparation in the field

1. First introduce the people and the agenda.



2. Ask them to bring head pans filled with water, soap and a dust cloth

B) Get started

I. Pump Caretaker basic training

1. Refresh the memory of the Pump Caretakers: Present and explain the name and use of every tool and spare parts to the Pump Caretaker
2. Ask all non concerned people to go out of the fence. Are allowed to enter only Field Supervisor, Pump Officer, Pump Caretakers and eventually Water Committee members
3. Ask one of them to repeat the name spare parts and tools





II. Inspection of the head pump

1. First have a general inspection of the outside: fence, general gleaning, pump appearance
2. Open inspection cover:
 - Verify the tightening of the head pump bolts
 - Move the handle to verify if its movement is normal, if there is no strange sounds or friction
 - Move the handle to verify if the amplitude of the up and down chain movement is sufficient.
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 - Ask the Pump Caretakers when did they inspect the pump last time
 - Ask them when did they grease the chain last time



III. Removing the chain

- 1) Lift the handle
- 2) Use the chain lifter to lift the chain.
- 3) Use the elbow spanner to loose the self-locking nut. Disconnect the chain from the handle and from the connecting rod.
- 4) Use the dust cloth to clean the chain, remove the old grease from the chain
- 5) Verify if the chain links are not bent or damaged



If the self locking nut an dits bolt are damaged or if the chain is bent or damaged you must replace them



IV. Dismantling the head body

- 1) Loose the nuts and bolts with the elbow spanner to free the body head.
- 2) Lift and remove the body head on the water tank.
- 3) Loose the nut on the rod thread. Remove the cover plate



If bolts or nuts from the head pump are missing, damaged or broken, you must replace them

V. Dismantling the water tank

1. Lift the water tank. Place the pipe clamp on the pedestal and fix it with bolts. Tight the clamp.
2. Use the Wrenches to hold the pipe while loosening manually the water tank





VI. Dismantling the pipe

Take care! The more deep is the well, the more heavy is the pipe!

1. Lift up the first riser pipe by releasing the clamp: 1 person release carefully the clamp, 2-3 persons must maintain firmly the pipe.

ENSURE A GOOD COMMUNICATION BETWEEN THE WORKERS

NOT TO LET THE PIPE FALL IN THE WELL



2. Lift totally the first pipe. Tight the clamp

3. Use the Wrenches to loose the Pipe.

4. Keep the clamp tighten. Raise the upper pipe to see the connecting rod

5. Loose locknuts from long nut (upper locknut first, lowest locknut at the end)



The pipe should be maintained straight during tighten

6. Once the connecting rod is loosen, hold the pipe keeping the rod inside the pipe
7. Proceed the same way for the remaining pipes until you remove the cylinder.



VII. Dismantling the cylinder & Inspection

1. Before dismantling the cylinder, inspect its general outside aspect.



2. Fill it with water to check if any leakage occurs





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3. Then dismantle all parts
4. Verify every component. Inspect if any wear or damage
5. Inspect the upper and lower ring seal, the 2 rubber buckets of the piston and the rubber seals of the piston and foot valves.



**If any rubber seal is damage
or wear, you must change it**



C) Cleaning

I. General cleaning

1. Put water in the head pan, add soap.
2. Use a dust cloth and a metal brush to clean every component of the cylinder, pipes and connecting rods.

Remove the seal from the pipes before cleaning them with the metal brush not to damage them. If anyone of them is broken or missing, you must change it

3. Remove all dust and old grease.
Brush all thread to clean them properly



Left: 6 month old pipe thread with grease. Right: The same pipe after cleaning, ready to use



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4. Clean every rods, every thread. Remove any track of old grease, dust or rust.
5. Grease every thread, change any damaged or broken seal, and replace every seal.
6. Reassemble the cylinder and test it to verify its proper use and check for any leakage.



**Ask the Pump Caretakers to brush hand
clean the water outlet of the water tank.
Tell them to clean it properly**



The water Outlet must be cleaned regularly, once every 2 weeks or once a month at least by the Pump Caretaker.

A dirty water outlet is a major source of contamination of the water coming out of the pump.

Pump users must not grab the water outlet

D) Reassembling

II. Pump unit installation

- 1) Replace the piston into the cylinder. Grease the threads and use the wrenches to tighten the cylinder. Test the cylinder in a bucket filled with water to check if any leakage. Verify the proper use of the cylinder.
- 2) Screw the piston rod to the first connection rod. Use spanners flat 19mm x2. Note that the chain lifter could be used as a 19 spanner



- 3) Screw the cylinder to the first riser pipe. Wrench 60cm x 2 (one tight the cylinder, one tight the riser pipe)

Grease every thread before screwing and connecting pipes or connecting



III. Riser pipes system installation

The shortest pipes and connected rods must be connected first. They must be connected at the bottom of the riser pipes system.

This way the shortest pipes will only support the load of the cylinder. The last upper pipes support the load of the entire pipe column. The shorter pipes are the most fragile and are not able to support this load.

Screw the nipple directly to the cylinder. Tight then the shortest pipe

This procedure required a very clear and good communication between the workers. It is very important that all workers stay concentrated

How to fix rods and pipes?

1) Remove the cover from the pedestal
Put the cylinder inside the pedestal buy holding the first pipe. THE CYLINDER CAN NOT GO THROUGHT THE PIPE CLAMP.

Fix the riser clamp to the head of the pedestal. Use Elbow spanners 17. Fix the riser pipe with the clamp. 1 person carry and tight the pipe carefully in his hand, 1 person tight the clamp.



2) Put the 2nd connecting rod inside the 2nd riser pipe (same length for both and same direction: female/female and male/male)

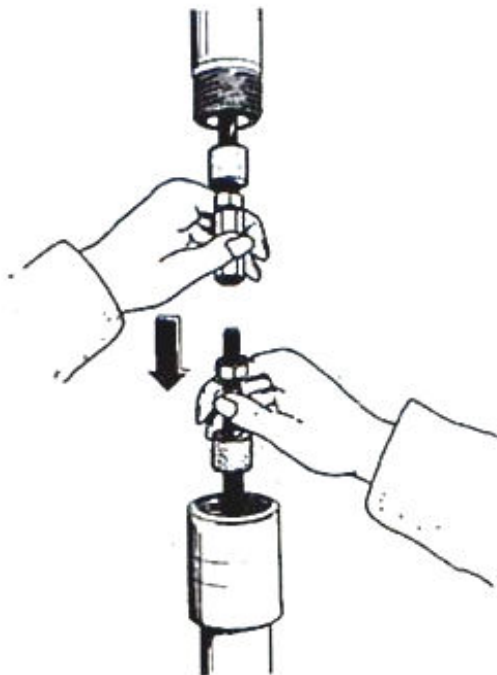


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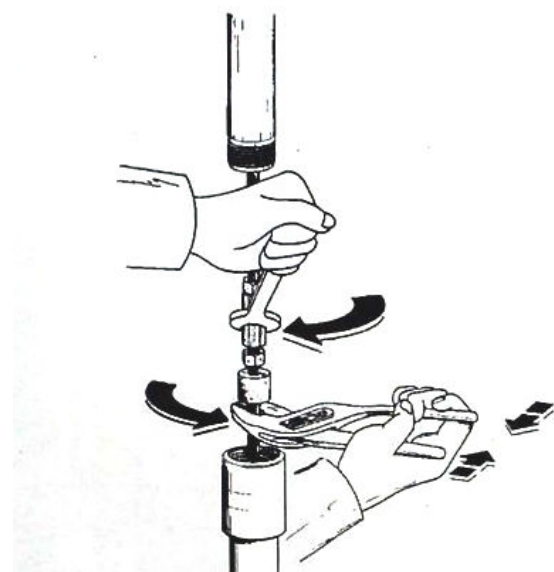


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3) Lift the 2nd Riser pipe and Connecting rod and maintain them straight above the clamp. Grease the threads



4) Lift the upper riser pipe to be able to connect the connecting rod to the lower part. Screw long nut on lower end of rod.



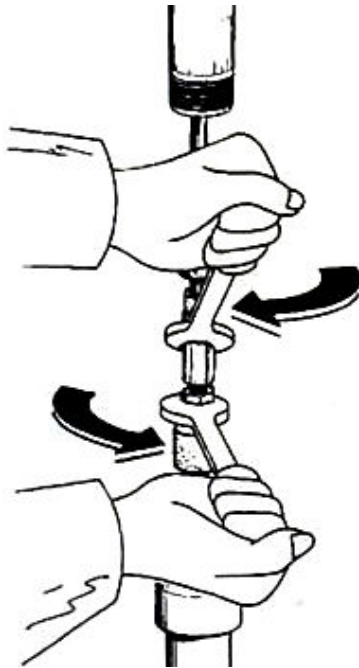
5) Screw both rods half way into the long nut. Use spanner flat 19 (to tight the nut) and shifting spanner (to tight the rod).



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6) Tighten locknuts against long nut (lower locknut first, upper locknut at the end)

7) Grease the pipe threads. Screw riser pipe. Tighten it with the wrenches (one tight the cylinder, one tight the riser pipe)



The pipe should be maintained straight during tighten

Take care that the seal enter properly between male and female threads. You can help it with the screw drive flat. Take care not to damage it. If the Seal do not enter, loose the upper pipe and try another pipe.



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8) Lift down the riser pipe by releasing the clamp: 1 person release carefully the clamp, 2-3 persons must maintain firmly the pipe.



9) Continue the process for the remaining pipes

Take care! The more pipes you add, the more heavy it is!

11) Screw the T-bolt on the rod thread and lift it. Install and tighten the rod clamp. Loosen the T-bolt





IV. Water tank installation

1) Lift and place the water tank on the nipple. Make the rod enter the bottom hole. Tighten the T-Bolt.



2) Loosen and remove the rod clamp. Screw the water tank. Use the Wrenches to hold it while tightening the water tank. Lift the rod with the T-Bolt if necessary.

3) Loosen the pipe clamp and carefully let the pipe and water tank go down. Screw the water tank on the pedestal.



V. Installation of the head body

Screw the T-Bolt on the rod. Lift it. Place and tighten the rod clamp. Loosen the T-Bolt.

- 4) Place the pierced cover plate. Screw a nut on the rod thread
- 5) Screw the chain on the connecting rod. Tighten fully. Use the chain lifter as a 19 spanner
- 6) Lift and place the body head on the water tank.
- 7) Fully tighten the nuts and bolts with the elbow spanner to fix the body head.



VI. Fixing the chain

- 1) Lift the handle
- 2) Use the chain lifter to lift the chain.





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3) Connect the chain to the handle. Use the self-locking nut. Tighten fully by using 2 elbow spanners



Before closing the inspection cover:

- Tighten all bolts of the head pump.
- Move the handle to verify if the amplitude of the up and down chain movement is sufficient.



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VII. Finishing

1) Fetch water to verify to good working of the pump. Fill a bucket with water





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2) Sweep and clean with water the cover and the apron



3) Close the access cover and lock it with a padlock. Close the pump by putting in chains the handle and lock it with a padlock if necessary.

VIII. Discussion with the community

Once the maintenance is finished, take times to discuss with the community members about the maintenance: what has been done, cleaned, repaired and/or changed.

Emphasize the need of regular and minor maintenance.

For the first 6 months maintenance, every damaged seals or spare parts must be changed for free. Take time to explain the real cost of this maintenance to the community. Highlight that this spare parts cost may occur during the next maintenance and that they will have to pay for it.

Insist on the necessity to make money provision at the village level (contribution, money profit) to be able to face any possible expense in the future.

For any other maintenance, when the guaranty of “free spare parts” is over. Take time to speak with the community after the dismantling and cleaning. You must explain them the cost and type of spare parts you plan to change. You must have their agreement before changing it and reassembling the pump