

COMMUNITY TRAINING MANUAL
IN
OPERATION AND MAINTENANCE
OF
THE AFRIDEV HAND PUMP.

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FOR COMMUNITY WATER SUPPLY AND
SANITATION (IKO)



Produced by;
Kwale Water and Sanitation Project (KWASP)
In Collaboration with
KENYA WATER FOR HEALTH ORGANISATION
(KWAHO)

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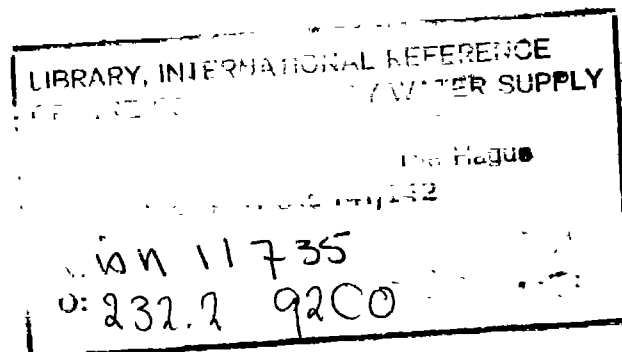
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To you all AHSANTE SANA.

Mwero Mkalla
SENIOR PROGRAMME OFFICER

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PREFACE

Kwale Water and Sanitation Project (KWASP) has been implementing a community based water supply and sanitation programme in co-operation with Kenya Water for Health Organisation (KWAHO) for the past eight years. For effective community participation, the Project has been developing appropriate approaches and educational materials for use during community training process.

The production of training materials on operation and maintenance of handpumps and other simple water supply facilities as well as Health Education and Sanitation aspects are progressive attempts to document field experiences. It is envisaged that this manual will be very useful to field trainers. It will also supplement the Afridev maintenance card which was specifically designed to be used by both the community volunteer caretakers and trainers.

The manual is based on practical experiences and whoever uses it, should easily be able to follow the described procedures. Several field pre-tests have been carried out by our extension staff for more than four years. It is therefore anticipated that this manual shall go a long way to realise the objectives of community training in operation and maintenance of Afridev Handpump.

L.K. Biwott

PROJECT MANAGER - (Kwale Water and Sanitation Project)

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INTRODUCTION.

a. COMMUNITY TRAINING:

This is one of the important pillars of sustainability as envisaged by Kwale Water and Sanitation Project. Over the years, training of volunteers to be caretakers has always formed a basis of proper future Operation and Maintenance (o & m) of provided facilities by user communities.

The trained caretakers are accountable to the water and sanitation committees who in most cases have no technical knowledge on the pumps. To date a total of 1,325 caretakers are manning over 260 handed over pumps.

b. TRAINING CONTENT.

The training programme is aimed at imparting skills in pump repairs, pump parts handling during repairs and simple hygiene practices/habits on water.

c. TRAINING FORMAT.

The content is divided into three basic areas namely:-

- Names and functions of the different pump parts.
- Symptoms and natures of breakdowns.
- Repairs.

These three basic areas are further subdivided into seven lessons for ease of coverage and understanding. Continous assesments, quizzes, competetions and final assesments are included. All the lessons are conducted on site using the actual pumps. The caretakers are further exposed to practical pump installations and repairs e.g. rising main repairs, broken pumprods e.t.c.

d. THE TRAINERS.

The trainers are social mobilizers who have a lot of experience on pump operations. They in most cases, come from within the comminites and are very fluent in the local language. Use of local names for some of the pump parts facilitates easy understanding by the trainees. The trainers have mainly been women, who have also attracted the participation of women in the community training programme.

PREPARATION FOR TRAINING.

IMPORTANT STEPS TO BE FOLLOWED BY THE TRAINER:-

STEP 1 Call at the Chief's Office:- this would mainly be for introduction purposes. One would be introduced to the Assistant Chief, the area CDA, and also the village chairmen of the respective villages.

Here the objectives of the project, and those of the training programme are clearly explained to them. Their expected roles and that of the communities are also spelt out.

STEP 2 Get authority to move out to the water points in the villages. The village chairmen would assist you to know the number of pumps in their villages.

STEP 3 Organise for training awareness meetings with the help of the village chairman. Meetings are organised depending on the distance between the water points, so that several points converge at one central place.

The village chairman, all community members, committee officials, and other leaders in the villages should attend.

The trainers then come back to the office to seek support from other sections e.g. Health and community sections.

STEP 4 Training Awareness Meetings

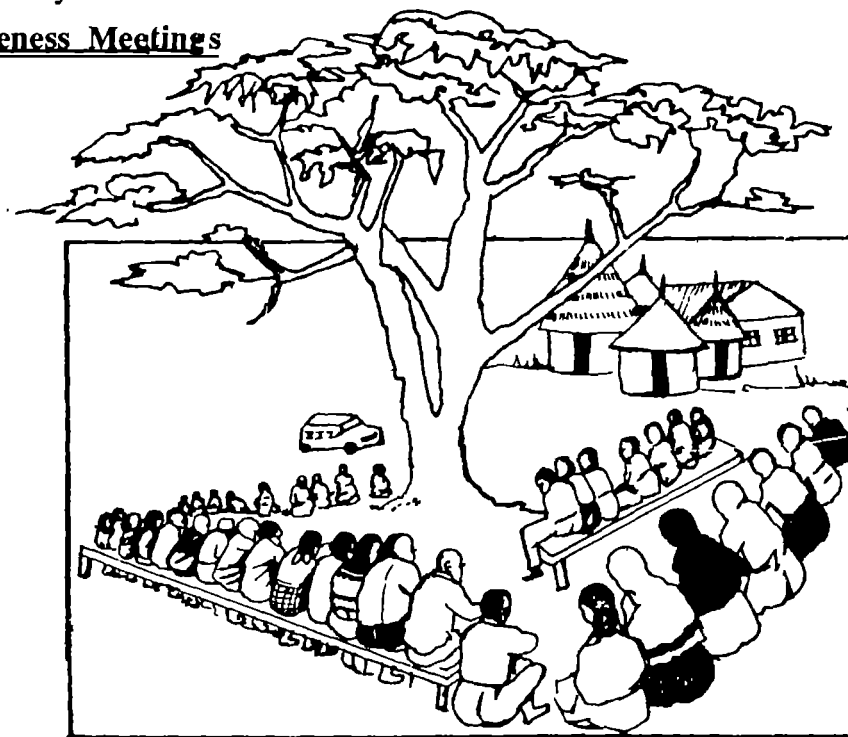


FIG. 1. AWARENESS MEETING.

a Introduction:-

The meeting begins with a prayer. This is followed by an introduction of those officers and leaders in attendance.

b Speeches

- Each officer talks on his/her subject as follows:-
- Project objective - (general).
- Community organisation/participation (Ministry of Culture and social Services.)
- Health education - (Ministry of Health)
- Need for training - (Kenya Water for Health Organisation)

In case other sections are not represented, then one can still cover the areas in the same order. The communities are then given time to select their own trainees (volunteers) and set dates for the trainers to meet with selected caretakers.

STEP 5 First meeting with the selected trainees

In attendance are:-

1. The trainer/s
2. The trainees.
3. Official/s of the water points accompanying their trainees (optional)

AGENDA

1. Re-visit need for training.
2. Prepare list of names of all trainees.
3. The trainees with the help of trainers establish training centres according topreference and convenience.
4. The training programme / time table is then set by both the trainers and the trainees.

STEP 6 At the first centre e.g Enzi ya Nyayo:

1. Introduction of the trainees is again necessary.
2. Attendance register is prepared.
3. In case attendance is poor; then:-
 - (i) teach those who are present and send for the rest in the next session.or
 - (ii) Postpone the session and conduct home visits.

Other necessary information include:-

- Existence of committees for the water points.
- Existence of contributions for operation and maintenance.
- others.

In case of any problems, the area CDA's or CDO can be of great assistance.

LESSON 1 - NAMES AND FUNCTIONS OF THE OUTER PARTS OF THE AFRIDEV PUMP:

The teacher / trainer calls names from the attendance register, takes notes of absentees and seeks reasons for their absence. The names and functions of all pump parts above the ground. (both theory and practical) are introduced.

a The name of the pump is Afridev which means African Developed pump.

The technology employed is easy and simple, that is why it uses only two tools for its maintenance.

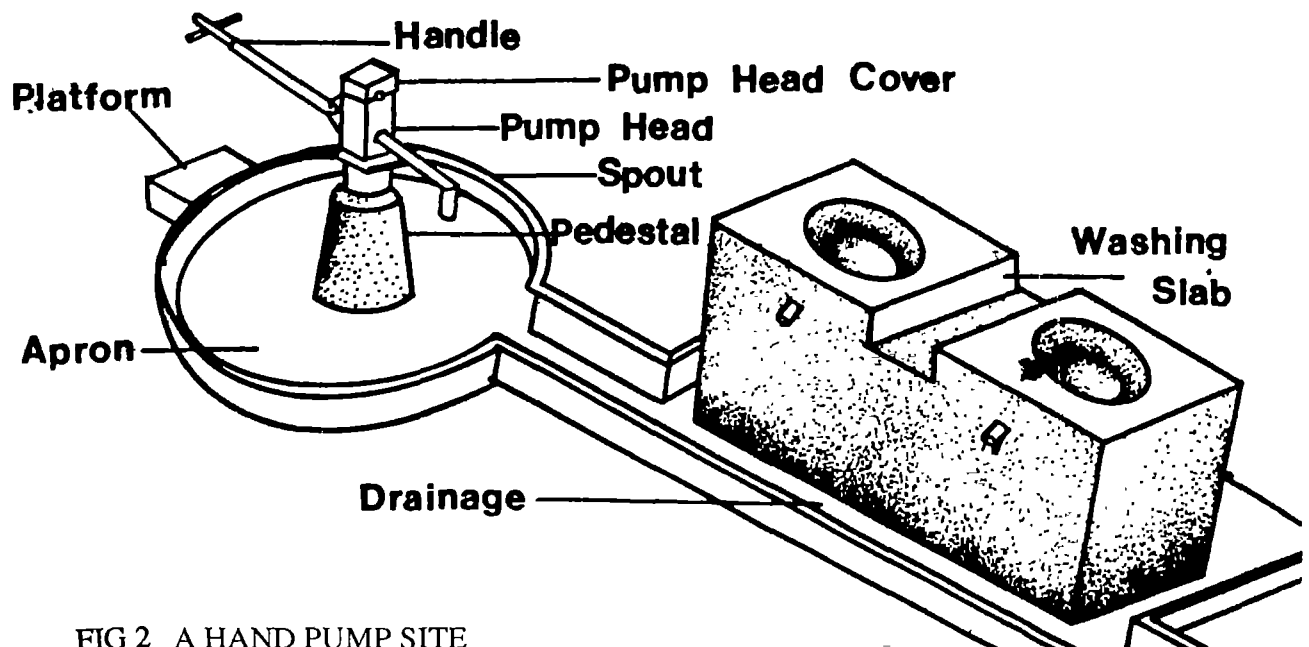


FIG 2 A HAND PUMP SITE

(i) **Pumphead Cover** - a cover / lid for preventing contamination of water.

It is also used as a toolbox for safe keeping of smaller components removed from the pump during servicing and repairs.

- | | | |
|--------|------------------------------|--|
| (ii) | Pumphead: | Head of the pump |
| (iii) | Pedastal: (Pumpstand) | Concrete pump support above the ground. |
| (iv) | Handle | Used for pumping water. |
| (v) | Platform. | Where one stands while pumping water. |
| (vi) | Spout | Outlet for water from the pump. |
| (vii) | Apron | A concrete floor surrounding the pump. |
| (viii) | Bucket Stand | Support stand before lifting the bucket. |
| (ix) | Drain | Open channel for water from the apron. |
| (x) | Washing slab: | A place for washing clothes |

b) TOOLS USED: See figure 3 below

i Spanner - for loosening and tightening nuts.

- for supporting all the rods at hanger eye when removing the handle and the hanger bearing (see Fig, 5) On Maintance Card appended

ii Fishing tool - For fishing out the foot valve during repairs - see lesson 4.

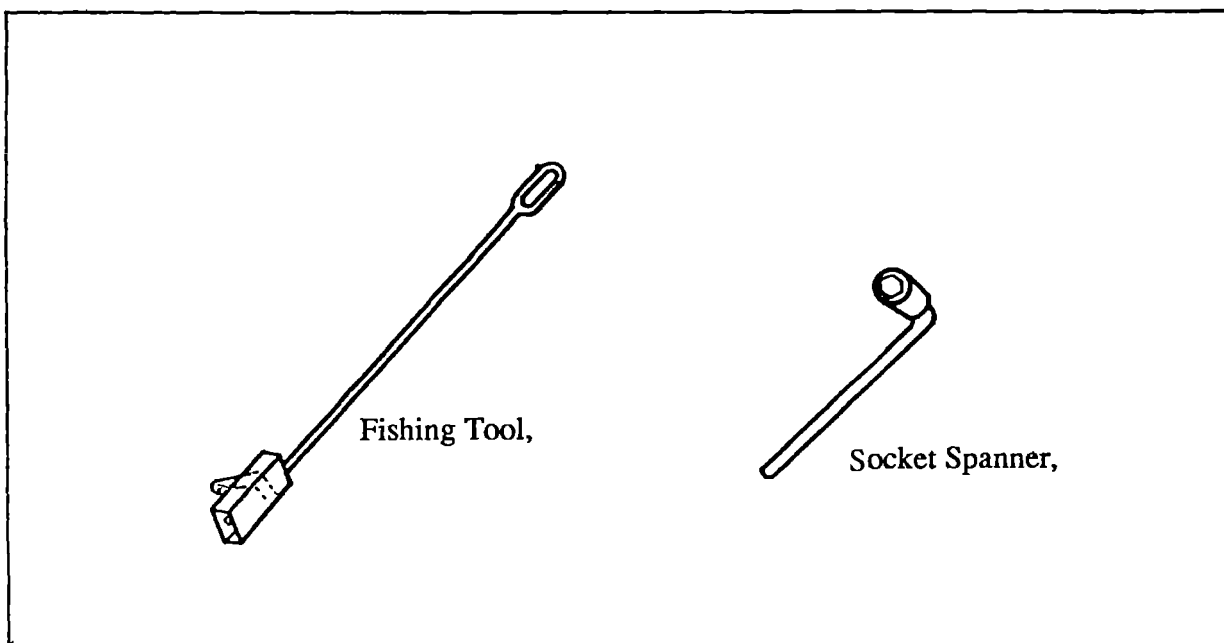


FIG. 3 - Tools used for carrying out maintenance.

After the lesson, the trainer has to do revision until everyone has understood, the names and basic description of these parts. Then find out if they still have problems with the lesson; if not summarise the lesson and give dates for the next session.

LESSON 2: THE FULCRUM AND HANGER BEARINGS AND THEIR FUNCTION

The trainer calls names from attendance register to find out how many are present and how many were not present in the previous session.

Lesson one should be revised for the benefit of new trainees.

NB. Individual assessment is done for lesson one, if it was not clearly understood, then repeat lesson one. If understood, proceed to lesson 2. At this stage, the trainer should note both quick/slow learners and device a method for accommodating both groups in the process.

Introduce Lesson Two as:- The fulcrum bearing and hanger bearing.

a) Use the spanner to open the pumphead covers, then loosen both the spanner through the hanger bolts and push the spanner through the hanger eye so as to support all the pumprods. Remove the handle before removing both the fulcrum and hanger bearings

(See step 1 - 8 of maintenance Card appended)

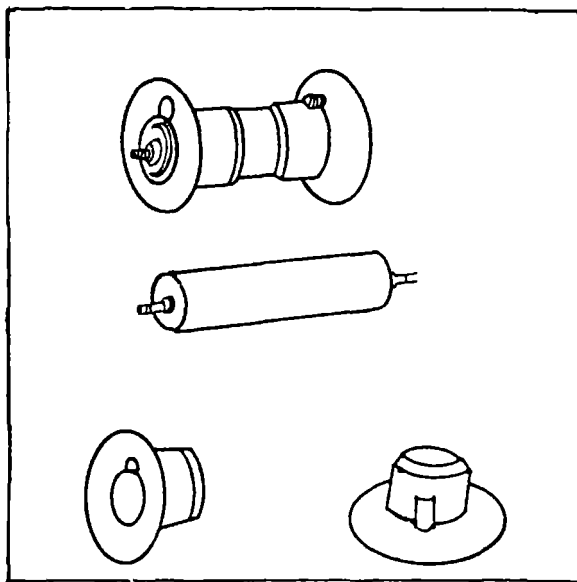


FIG 4 (I) FULCRUM BEARING ASSEMBLY

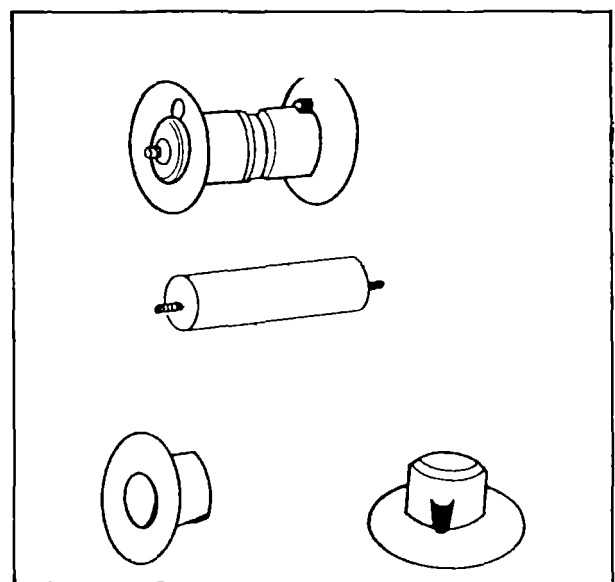


FIG 4 (II) HANGER BEARING ASSEMBLY

b) **Fulcrum Bearing assemble:** It comprises the fulcrum pin and fulcum bushes. All these are housed at the fulcrum housing. (The housing accomodates the whole assembly). (see figure 4 i)

Functions:

- (i) **Fulcrum Pin** - Holds the handle and the pumphead.
- (ii) **Fulcrum Bushes:** Prevents friction between the pin and housing.

c. **Hanger Bearing Assembly:** It comprises the hanger pin and bushes. All these are housed at the hanger housing. The housing accomodates the whole assembly. (see figure 4 (II))

Functions:

- (i) **Hanger Pin:** Joins the handle to the pumprods at the hanger, Together with the handle, it supports the weight of the pump rods
- (ii) **Hanger Bushes:** prevent friction between the pin and the housing.

The difference between the fulcrum pin and hanger pin is that the fulcrum pin is longer than the hanger pin. (Demonstrate).

When trainees have understood, make a quick revision summary of both lesson one and two. If trainees have not understood repeat the whole lesson.

Finally reassemble the pump as shown in the maintenance card. (See Card appended)

LESSON 3: THE RISING MAIN, PUMPRODS CENTRALISERS, TOP SLEEVE RUBBER AND METAL CONES:

The trainer calls names from attendance register, takes note of absentees and seeks reasons for their absence.

Both lesson 1 and 2 are revised before Proceeding to lesson 3

Introduce lesson 3 (the rising main, pumprods, centraliser).

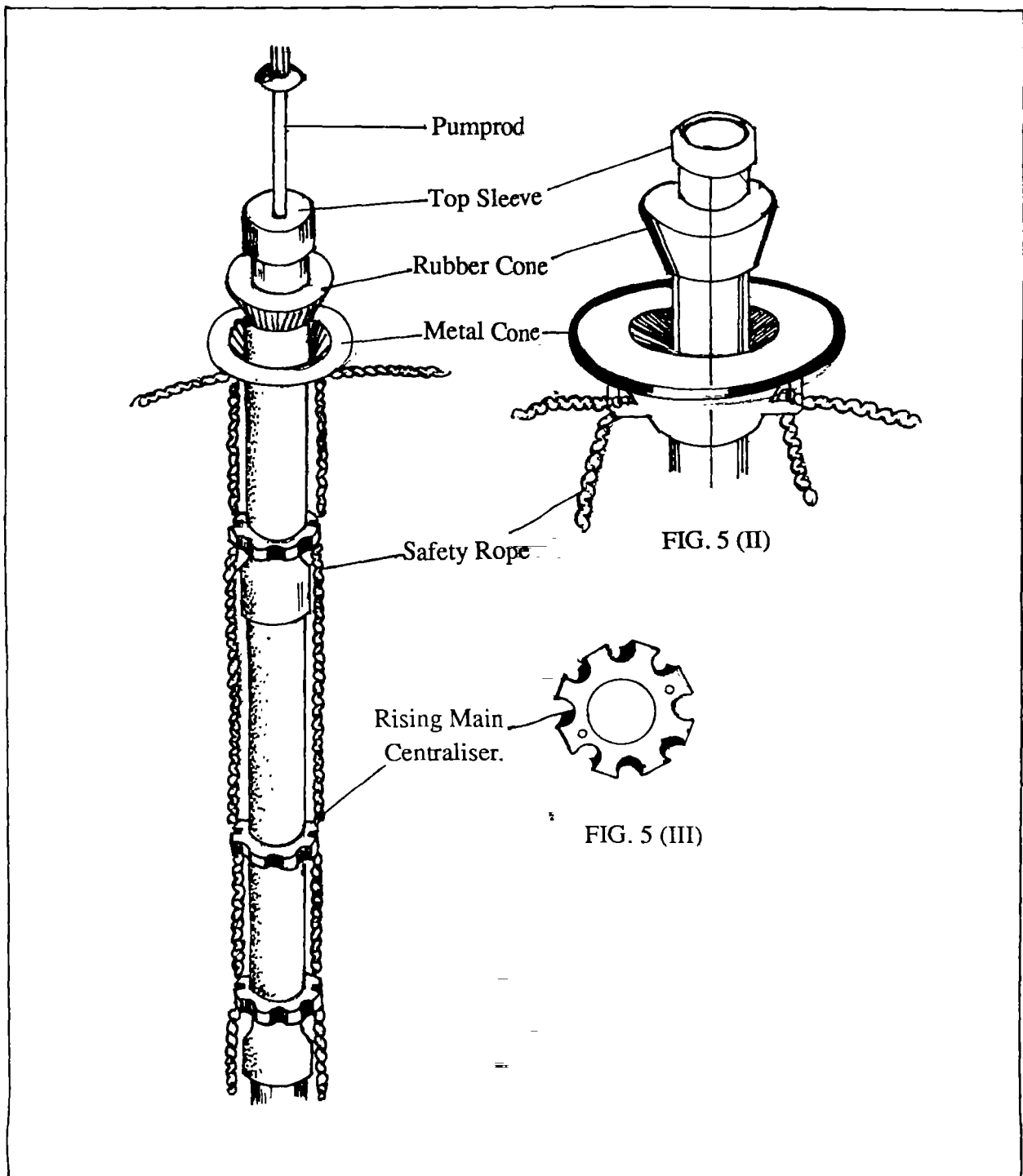


FIG 5 (i) (ii) and (iii) THE RISING MAIN, PUMPRODS, AND CENTRALISERS

i. Rising Mains: (fig 5. (ii)).

This is a column through which the suspended water ascending from the cylinder passes through. The rising mains are made of PVC material with bell sockets at one end which can be fitted onto the flat end of another piece of pipe.

ii. Pumprod Centralisers:

They are round rubber components fitted at the pumprod hook joint.

Functions:-

- i. Stabilize the vertical play of the pumprods during pumping.
- ii. Prevent friction between the rising main inner walls and the pumprods during pumping. (See fig 6)

iii. PVC Top Sleeve:

It is a round piece of PVC fitted at the top of the top most PVC rising main (Using solvent cement). It rests onto the conical rubber and restrains the rising main, from downward slipping. (See fig 5. (ii)).

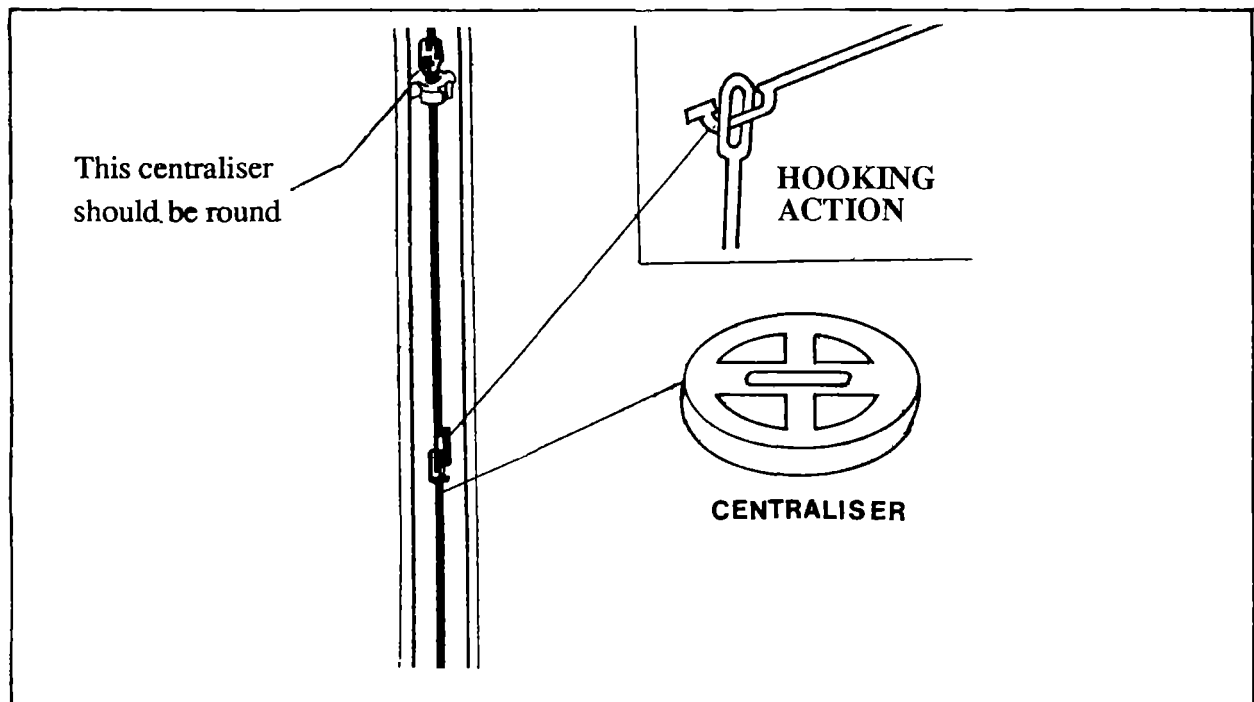


FIG 6 PUMPROD AND CENTRALISER

iv. Rubber and Metal Cones:

Both help to anchor or hold the rising mains between the pumphead and the pedestal plates. (See fig 5 (ii))

v. Rising Main Centralizers (Stabilizers) (See fig 5. (iii))

These are ring-like rubber pieces that prevent the rising main from swaying during pumping.

They also prevent contact between the rising mains and the permanent casings.

vi. Pumprods:

- These are hooked linings' connecting the hanger to the plunger.
- they are made of either galvanised or stainless steel
- the hooked design is for ease dismantling and assembling during both repairs and service. (See fig 6)

The rubber cone contracts and grips on the PVC rising main top end; as the pumphead is tightened to the pedestal plate using the anchor bolts.

The rubber cone also acts as a gasket between the pumphead and the pedestal plate.

LESSON 4: THE CYLINDER ASSEMBLY:

The trainer calls names from attendance register, takes note of absentees and seeks reasons for absence. The trainer revises lessons 1,2, 3 , before proceeding to lesson 4.

Introduce Lesson 4 (Cylinder,Plunger, Footvalve and the Sunction Pipe)

A CYLINDER: This is a PVC pipe with a stainless steel or copper lining on its inner surface. It forms the pumping unit of the whole pump. It houses both the plunger and the footvalve.

It is connected to the bottom of the rising main. (see fig 8 (i) and (ii))

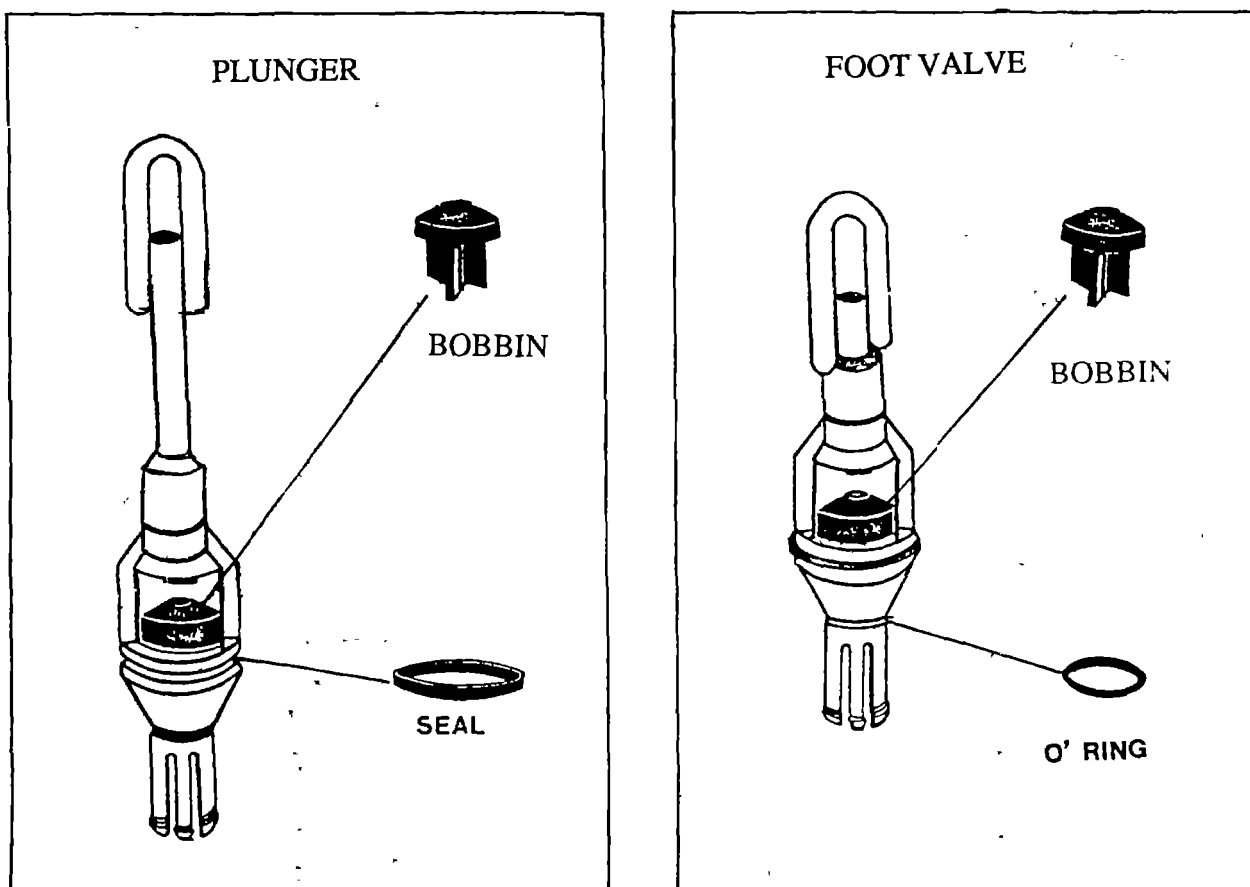


FIG 7: PLUNGER AND FOOTVALVE

The Plunger: Its main function is to pull out water with the help of the pump rods.

It has two rubbers:-

- a. Plunger seal or rubber seal or U-seal. (See Fig 7 (i))
- b. Bobbin or valve.

The plunger seal creates compression in the cylinder wall during pumping. The plunger bobbin opens and closes during the down and up stroke respectively so as to allow pumped water to rise up.

ii. **The Footvalve:-** It allows water into the cylinder and stops it from going back to the borehole.

- the footvalve is able to carry out the above function because it has a bobbin/valve and an 'O' ring (see fig 7 (ii))
- The valve opens to allow water into the cylinder and closes to stop water from going back to the borehole through the sides of the footvalve.

iii. **The Footvalve receiver:**

This is where the footvalve rests

It receives the footvalve and the four legs of the footvalve grip and lock automatically

The following processes take place during pumping:-

(a) **DOWN STROKE:**

The handle goes up, the plunger goes down, with its bobbin/valve open; the footvalve bobbin closes to prevent movement of water down into the borehole (see fig 8 (i))

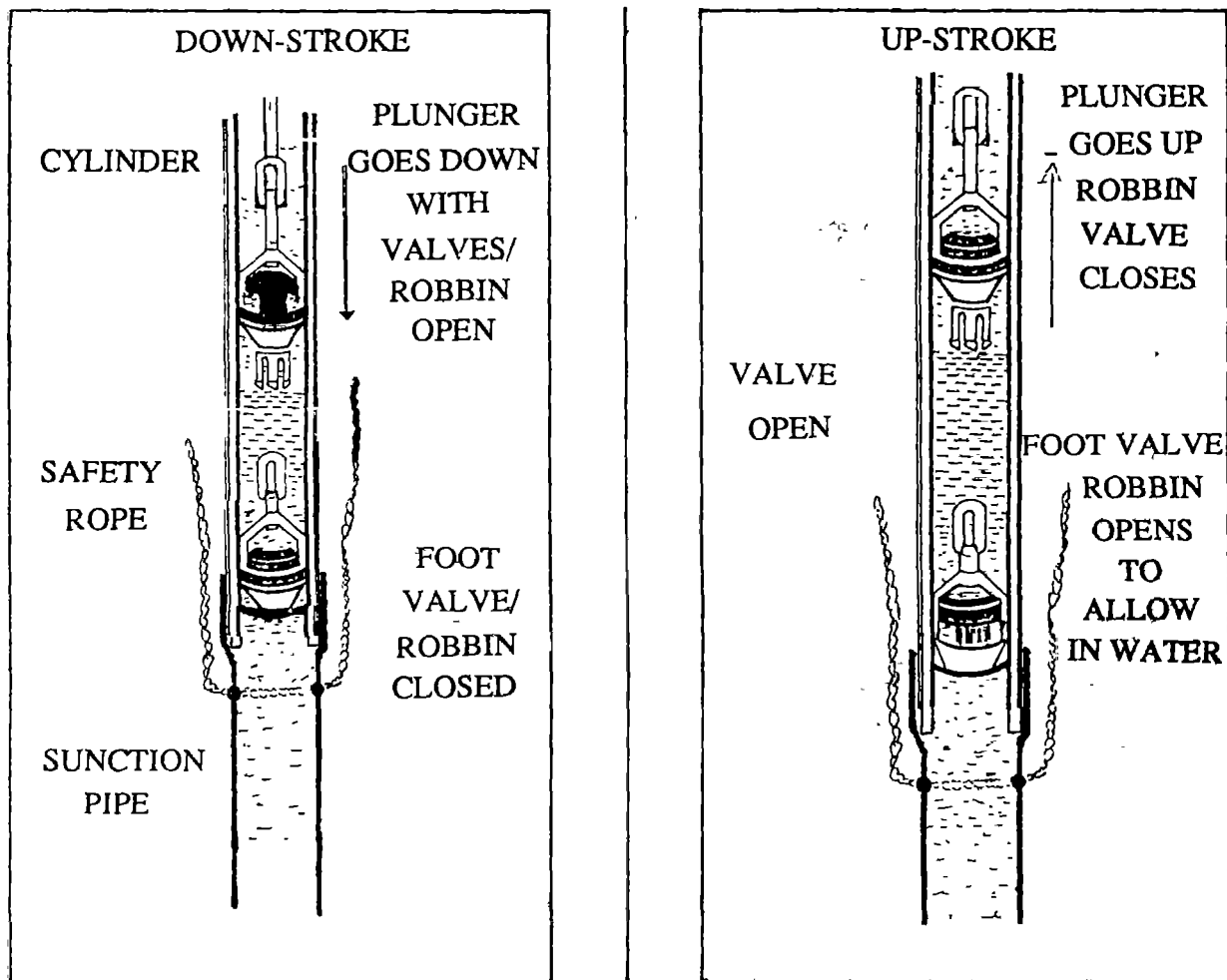


FIG 8. SUNCTION PIPE

(b) **UPSTROKE:**

The handle goes down, plunger moves up after collecting water from the cylinder with its valve closed to prevent water from going back to the cylinder. (see fig 8 (ii))

The process continues until the water flows out through the spout.

The number of strokes depend on the depth to the water level, and the efficiency of the plunger seal and valve.

B SUNCTION PIPE. (see 8 (i) & 8 (ii))

This is connected to the lower part of the cylinder. It acts as a filter for water and sand. It has two holes where the safety rope passes through upto the metal cone above the ground.

The rope is used for pulling out the raising main repairs.

It also prevents the rising main from stretching during drought periods so as to maintain its diameter constant.

LESSON 5: SYMPTOMS AND NATURE OF BREAKDOWN:

Call names from attendance register

Teaching aids: Worn out parts.

Step 1 Revision of previous lessons by the trainees (lesson 1,2,3, and 4).

Step 2 Assist the trainees to understand better by revising parts in the previous lesson which were not properly understood.

Step 3 Introduction of Lesson 5 (Nature and signs of breakdown).

Objective:- To enable the trainees at the end of the lesson to be able to detect natures and signs of breakdowns of the pump. (without dismantling the pump)

Lesson Contents (Worn out parts and signs of breakdown)

(a) **Fulcrum bushes:-** When worn out the pump produces a hissing sound and handle becomes loose with an easy sideways movement.

(b) **Hanger bushes, -** When worn out the pump produces a pounding sound (at pump head pumping).

(c) **Pumprods** When broken no water comes out through the spout. The handle lies at the lower end and is heavy when lifted. When lifted up and let free, it falls back at a relatively high speed.

(d) **Centralisers** No signs when worn out. It is recommended that a regular check up should be undertaken to detect signs of wearing out. This should be carried out as advised but this depends on the pump usage

(e) **Plungerseal/U- seal/Rubber seal**

When worn out, the handle becomes loose and only a little amount of the water comes out of the spout. When raised, it slowly falls to the lower position.

(f) **Bobbin/Valve of Plunger** When worn out, water comes out through the ventilation holes; some through the joint between the pedestal and pump head and relatively little amount of water comes out through spout.

(g) **Bobbin/Valve of the footvalve and 'O' ring**

When worn out it takes longer than normal for the water to flow out, but once the water fills the rising main, the flow becomes normal.

NB. If bobbin is completely worn out no water comes out of the spout.

- (h) **Rising main** When it cracks no water comes out through the spout. This can be detected by:-
 ensuring that all wearing parts are in proper working condition.
 Removing all pumprods; the rods above the crack have no signs of water.
- (i) **Replace** all worn out parts with new ones incase of any malfunction.

LESSON 6 BROKEN PUMPRODS AND RISING MAIN REPAIRS

Call names from attendance register.

Assess every trainee individually from lesson 1-5, if found competent, introduce lesson 6.

Introduction of Lesson 6

(Broken pumprods /Rising main repair)

(i) Broken pumprods

Design a tool on site to suit the fishing of the pumprod, (depending on the nature of the "fish"). It is advisable to use a broken pumprod to design a simple hooked tool.

(ii) Rising main repair

(In this exercise, a minimum of 8 people are needed for a standard borehole depth (of less than 40 m)

-Pull out the pumprods, plunger and footvalve

-Use a nearby tree, or house and in the absence of the two, make a raised temporary structure before pulling out the rising main

-Pull out the rising main with the help of safety ropes (at the metal cone), carefully in one piece and identify the location of the crack before making any cuts. (see fig 9 below)

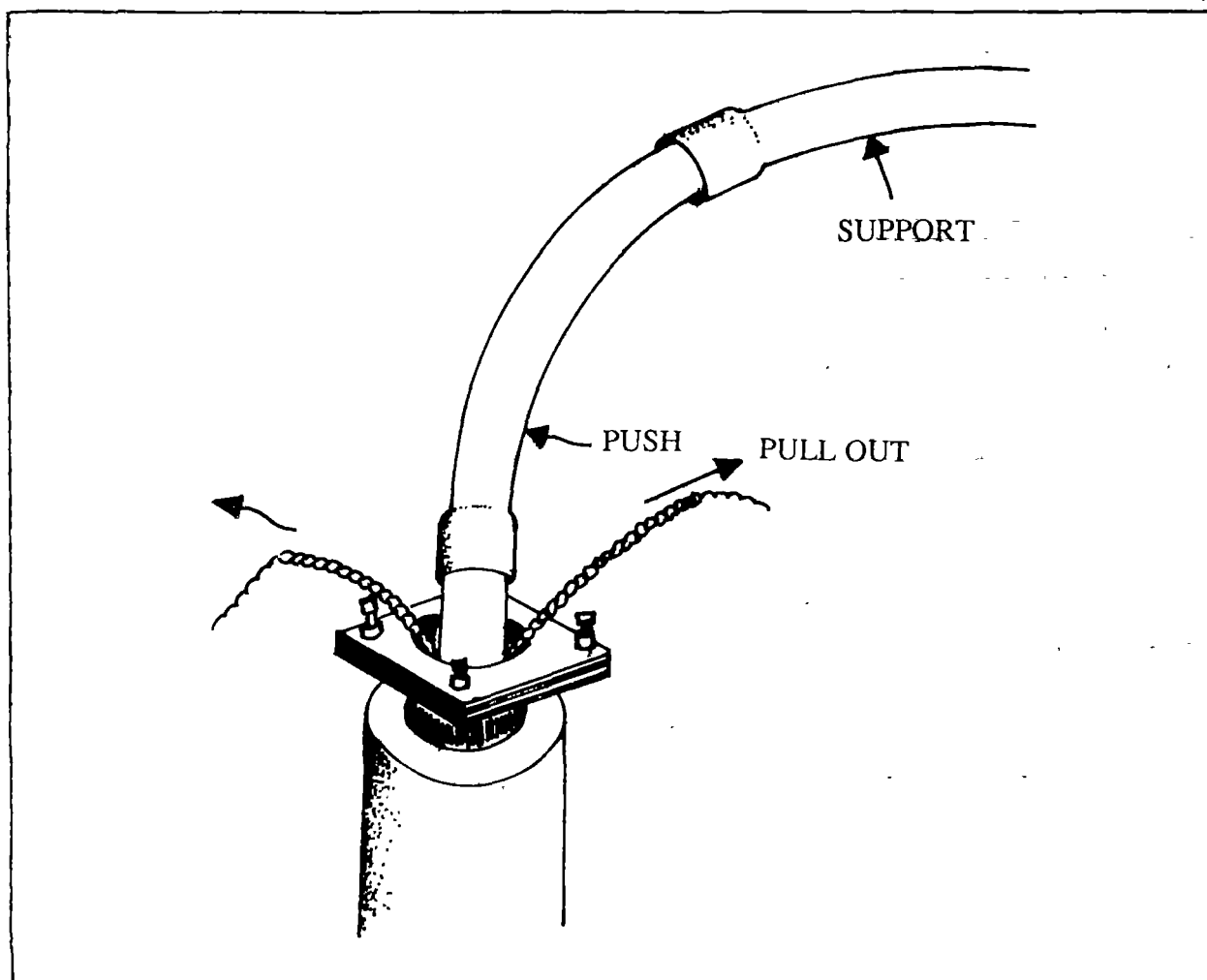


FIG 9. PULLING OUT THE RISING MAIN FOR REPAIR.

- Fabricate double socket PVC pipe to connect the two parts. (1M length Double socketted PVC pieces also available)
- After removing the crack areas, ensure that the length of the removed parts should be exactly the same as the double socketted piece. (1m length Double socketted PVC Pieces also available)

Precautions Measurements should be exact.

If longer:- pumprods will be shorter.

If shorter: the pumprods will be longer.

materials used

- Firewood / fire for heating the PVC ends to make sockets.
- Tangit gum for connecting new PVC pipes.
- Tape measure for measuring part to be replaced.
- Clean cloth / cotton waste.
- Cutting saw (hark saw)
- Sand paper

STEPS AND MEASURES UNDERTAKEN WHEN MAKING SOCKETS.

1. Lay down the whole rising main
2. Measure 1m from the cracked areas of the rising main and remove the piece,
3. The replacement piece should be 1 m 6 inches long.
4. Melt, expand and make 3 inches socket at both ends of the replacement piece.
5. Roughen the surfaces (for both the pieces and rising main) with sand paper. ready for connection. (see figure 10 below)
6. Clean the roughened surface with clean cloth soaked with PVC
 - (a) On the outside for pieces of original rising main.
 - b. On the inside of the sockets on the replacement piece.

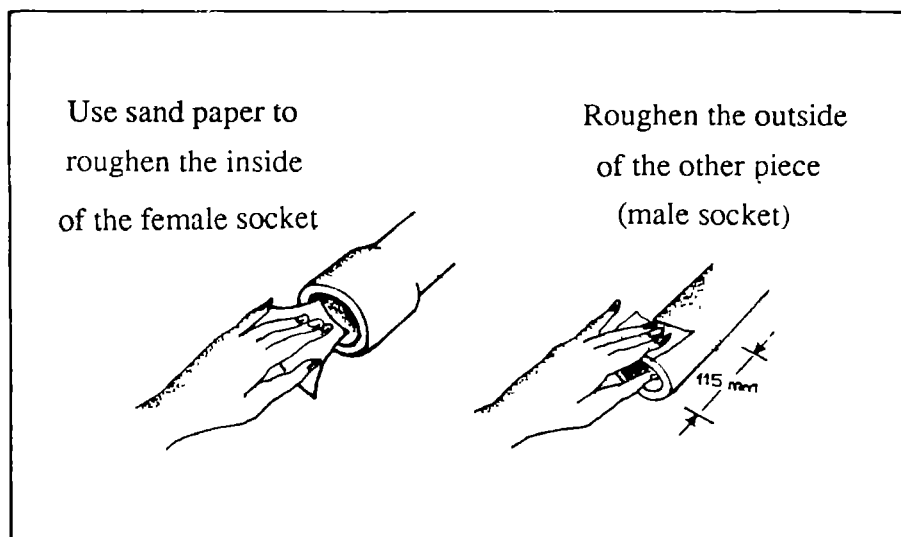


FIG 10. SOCKET MAKING.

7. Apply solvent gum on both surfaces that are ready for assembling
8. Quickly assemble the two parts and wait for about 5 minutes for the gum to work. (See fig. 11)

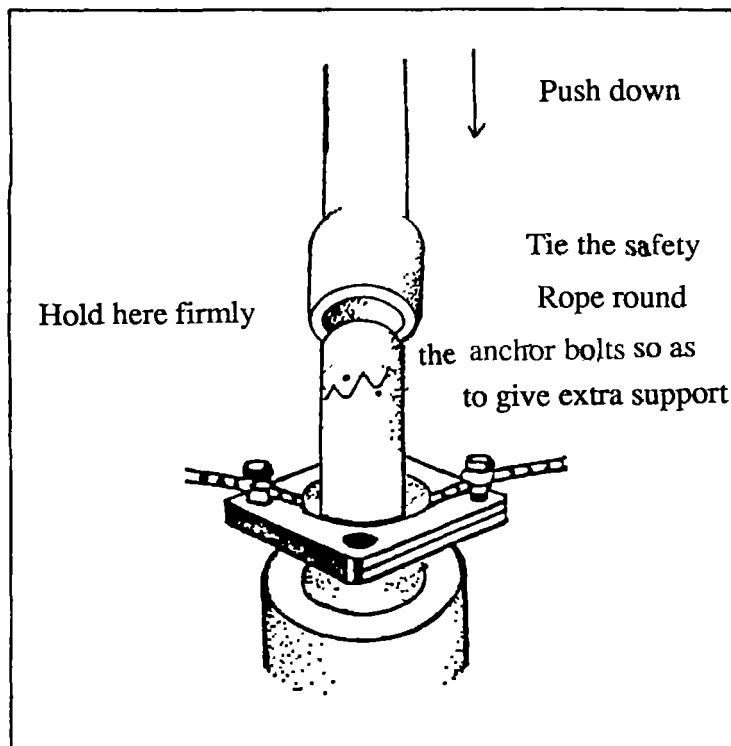


FIG 11. FIXING THE RISING MAIN.

9. Lower the assembled rising main down the well carefully.
10. Then tie the rope on the metal cane tightly and carefully.
11. Fix back the pumphead assembly.
12. Install back the internal components i.e. footvalve, plunger, pumprods etc.
13. Push in the footvalve into the receiver and finally assemble both the hanger and fulcrum bearing. Now begin pumping

NB During pumping water takes long to pour out because the whole water column will have fallen back to the water rest level

At the end of lesson 6 quizzes, practical repairs of rising main, and broken pumprods are done. The exercises are conducted in areas with broken down pumps or in areas where new pump installations are in progress.

Final assessment is then organised to take place in the next training season.

LESSON 7 ASSESSMENT

Two types of assessments are done:-

1. After every lesson.
2. Final assessment.

a. Assessment done at the end of every lesson.

The assessment is done by the trainer and this will determine when and who will proceed to the next lesson.

The trainees are individually asked to explain all parts covered as at that time. This is part of the training and the trainees are not notified in advance. The trainer records all mistakes made by each trainee during the exercise. This will show whether the trainees understood the previous lesson. This will also form a basis for revision before the lesson that follows.

b) Final assessment (Lesson 7)

Trainees are asked individually all the different lesson learned. The trainer looks at the following:-

- i Can the trainees explain the general operation of the pump either in vernacular, Kiswahili or English?
- ii Can trainees (practically) dismantle and reassemble the pump?
- iii Are they aware of their expected roles in the community after being trained?
- iv Can they identify natures / symptoms of breakdowns and can they attend to the breakdown?

GRADING

To determine the level of competence, the following counts:-

1. for the very qualified one should be good at both theory and practicals
2. For average - the trainee is good, in say practicals fair in theory, or vice-versa.
3. Fail-Neither good in theory nor in practical.

EXCHANGE, QUIZES AND COMPETITIONS:

(This is part of assessment too)

Theory: Trainees, from two different centres are asked questions in turns and awarded points for each correct answer. The winning group is then chosen.

Practicals: Trainees from two centres can compete how to make the best sockets, how to design pumprods fishing tools etc.

Duration of Training

According to the Kwale Water and Sanitation Project experience:-

- i. training everyday (3 hrs per session) for a group of 12 people takes one month.
(level of education std. 5 - form 4).(days of preparation not included)
- ii In Majoreni it also took one month for people ranging from no formal education to Std. 7 level of education.

In summary training can last 36 mandays or more

Pre-training preparations - 10 days in areas where mobilization/organization activities have been going on.

In the absence of such activities, the duration increases.

Lesson one	3 days	
Lesson two	3 days	
Lesson three	3 days	(Man days)
Lesson four	6 days	
Lesson five	4 days	
Lesson six	6 days	
lesson seven	1 days	
TOTAL	26 days	

Finally the training assistants looked at some of the common problems they face during training for operation and maintenance.

These are grouped into two:-

A. Those that are trainee oriented:-

- i. Poor attendance (seasonal)
- ii. Frequent drop-outs.
- iii. Problems of pronunciation in some areas.
- iv. Illiteracy.
- v. Old age
- vi. Unemployment.
- vii. Reluctance of caretakers to repair pumps after being trained hence they also demand payment
- viii. Misplaced aspirations that they will get employment after the training.

B. Those that are Trainer-oriented.

- i. Lack of transport which leads to long walking distances between training centres.
- ii. Lack of safety wear.
- iii. Carrying of teaching aids in 'Matatus' and on foot is also a big problem due to lack of transport.
- iv. Allocation of other duties while in training e.g. attending to visitors e.t.c.

SUMMARY TABLE SHOWING LESSON OBJECTIVES, TEACHING MATERIALS AND HEALTH MESSAGES FOR EACH LESSON.

LESSON	LESSON OBJECTIVE(S)	PHYSICAL PARTS	ILLUSTRATIONS	HEALTH EDUCATION MESSAGES.
ONE Names of outer parts and their functions.	By end of lesson the trainees should be able to:- I. name and identify the outer parts of the pump.	-spanner -Fishing tool Actual pump on site.	-Drawings for spanner and fishing tool. -Drawing of all outer parts of the pump plus names.	Hygiene maintenance of the surrounding compound e.g. Apron, Washing slab the drain.
TWO Hanger and fulcrum bearing assembles.	By end of lesson the trainees should be able to:- i. Identify these components, their function and location. ii. Differentiate the hanger bearing from fulcrum bearing. iii. Dismantle and assemble the bearing.	Spanner actual bearings from pump. -Bucket and soap.	i. The upper part of pump and the removal process. ii. The bearings and components.	-hygiene handling to avoid surface contamination in the process of dismantling and reassembling.
THREE The rising mains, pumprods, centralisers, topsleeve, rubber and metal cones.	By end of lesson the trainees should be able to:- i. Pull out and return the pump rods, centralizers and the plunger. ii. name and identify the different function of these components and their locations.	-spanner and components from actual pump. i.e.- pumprods - pumprod centralizers - top sleeve - rubber cone - metal cone - Rising main centralizers.	Spanner , pumprods centralizers, plunger Rising main, (show process of removal and hooking action).	Provision of enough water to ensure hygienic handling of components during the process. Ensure surface they are going to lie on is clean

LESSON	OBJECTIVE(S) OF LESSON	PHYSICAL PARTS	ILLUSTRATIONS	HEALTH EDUCATION MESSAGES.
<p>FOUR. Types of pipes i.e Rising main, cylinder sunction pipe and permanent casting, plunger footvalve, rubber and metal cone, safety rope and top sleeve. Cylinder assembly.</p>	<p>By the end of the lesson the trainees should be able to:-</p> <ol style="list-style-type: none"> i. Identify the footvalve, rubber, metal cone and their functions. ii. Identify and differentiate the types of pipes and their functions. iii. State how the plunger and footvalve function. iv. State how the plunger bobbin and footvalve bobbin function during pumping. 	<p>Cylinder, sunction pipe and rope Footvalve,plunger, spanner and fishing tool,rubber cone, top-sleeve, Bucket of water.</p>	<p>Drawing of the various parts when assembled, then when put apart. Separate drawings for the up and down strokes showing positions of plunger and valve movement. Bucket, cylinder and sunction pipe for demonstration.</p>	<p>As in previous lesson Precaution: If the foot valve is removed from pump,on returning it dirty water will come out during pumping. This should be pumped until it clears up before being used.</p>
<p>FIVE Nature and signs of breakdowns and repairs (Scheduled maintenance).</p>	<p>By the end of lesson, the trainees should be able to:-</p> <ol style="list-style-type: none"> i. detect nature and signs of breakdowns without dismantling. ii. Identify wearing out parts by name and carry out scheduled maintenance. 	<p>Worn out parts, bushes, centralisers "O"-ring, plunger seal and bobbins Good parts too.</p>	<p>-worn out parts against good parts for all parts. Bucket cylinder, sunction pipe for demonstration with the worn out parts.</p>	<p>Provide enough water for hand washing. -clean pump components -hygiene handling of pump components in the process of dismantling. - make sure that removed components are kept on clean places. After reassembling pump water until it clears up.</p>

TEACHING MATERIALS

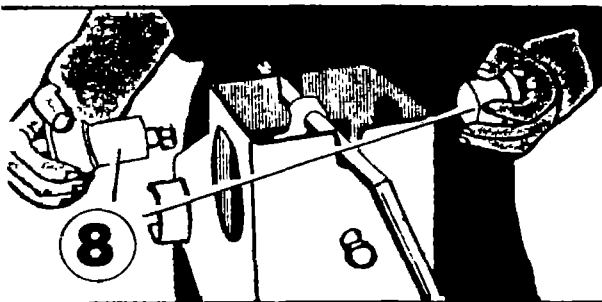
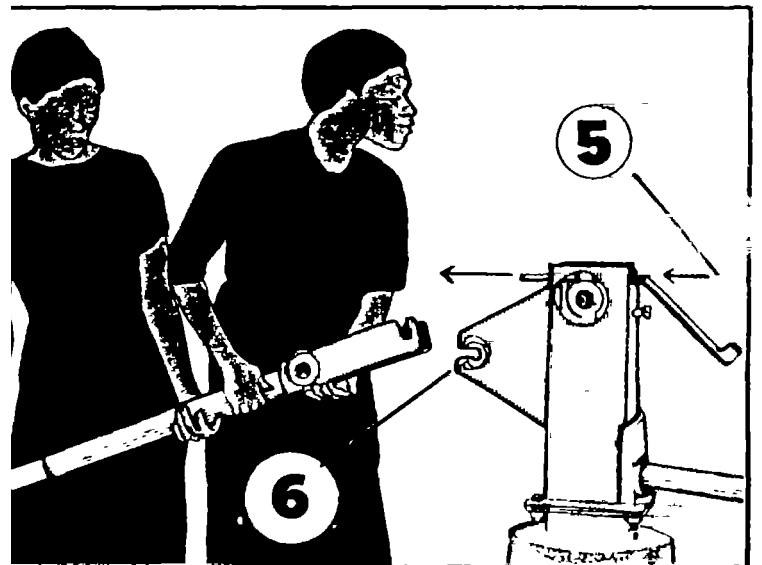
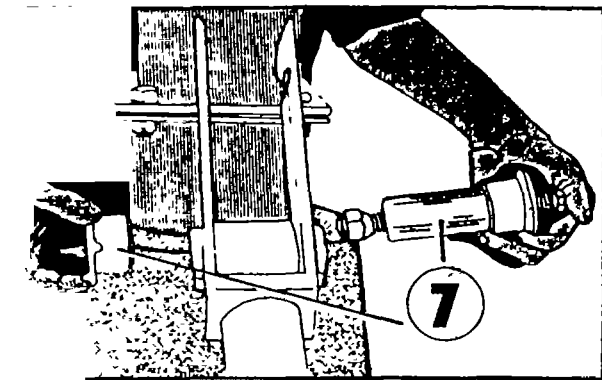
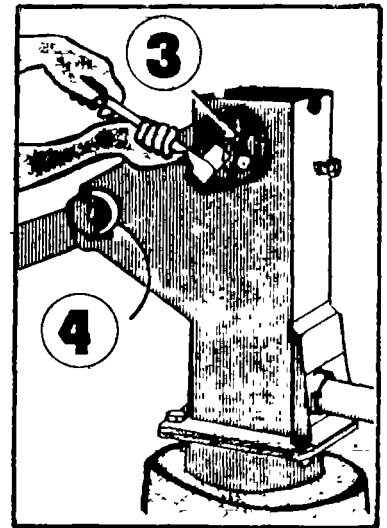
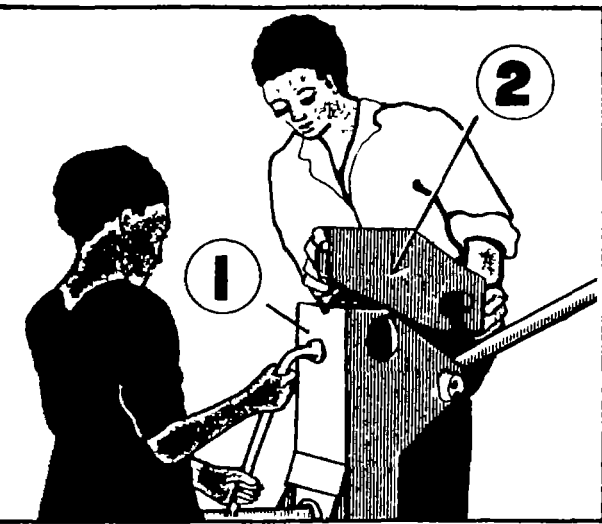
LESSON	LESSON OBJECTIVE(S).	PHYSICAL PARTS	ILLUSTRATIONS	HEALTH EDUCATION MESSAGES.
<p>SIX Broken pumprods rising main repair.</p>	<p>By end of the lesson, the trainees should be able to:-</p> <ol style="list-style-type: none"> i. design tools for fishing broken pumprods. ii. Fish broken pumprods using designed tools. iii. Make correct measurements of pipes and sockets to replace broken part of rising main. iv. Pull out and lower back rising main correctly and carefully. v. Assemble back components in the correct order. vi. Identify a crack on the rising main. vii. Pull out and lower back rising main correctly and carefully. viii. Assemble back components in the correct order. ix. Identify a crack on the rising main. 	<p>(Tools)</p> <ul style="list-style-type: none"> -pieces of PVC pipes -tangit gum tape measure, PVC cleaner, cutting saw clean cloth, sand paper, fire, spanner fishing tool and new pumprod (remember raised platform) 	<ul style="list-style-type: none"> -show broken pump rod and how to make the hook. -how to fish the broken pumprod out. -pulling out of rising main. -cutting out of cracked piece. -making correct measurements -Making sockets using fire. -roughening and application of tangit gum on both surfaces. - connecting process of socket to rest of rising main. - lowering of rising main back into well. - pushing of footvalve into position. 	<p>Provide enough water for both hand washing and washing of pump components.</p> <ul style="list-style-type: none"> -clean pumprods with suitable materials. -wipe whole length of rising main with suitable cleaning material.

The Afridev Handpump. Scheduled Maintenance

Scheduled Maintenance should be carried out at least once a year to ensure long life for the Handpump.

Before starting, remember to keep clean water for washing parts.

1. Loosen pumphead cover bolt.
2. Take off cover.
3. Loosen both hanger nuts.
4. Loosen both fulcrum nuts.
5. Put spanner through hanger eye.
6. Raise and withdraw handle.

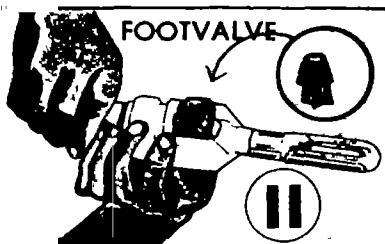


All rods and pins should be washed before replacing.

7. Remove fulcrum bearings and pin.
8. Remove hanger bearings and pin. Pull up rods and plunger.

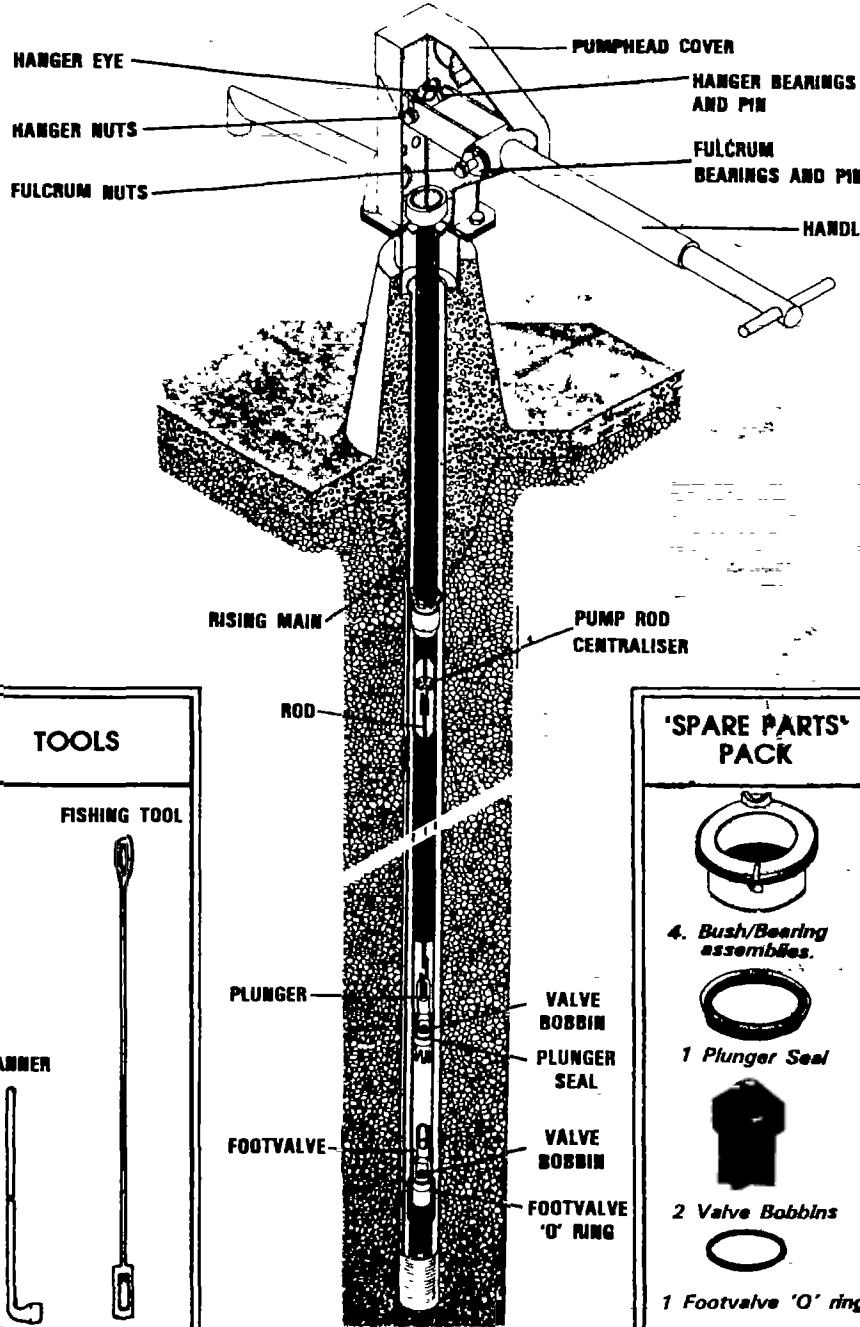
Join rods to fishing tool and lower down the well to pick up footvalve.

FOOTVALVE: Replace old bobbin with new.

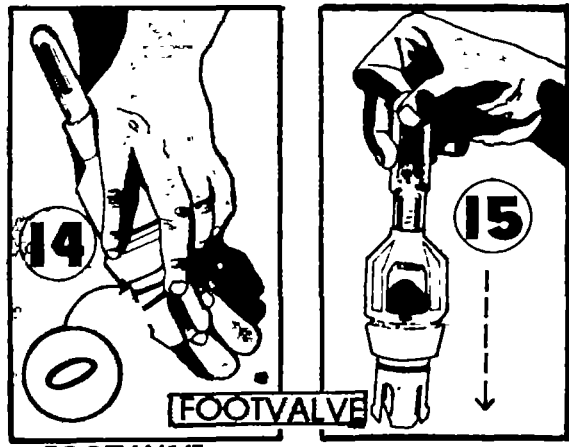


Keep all parts clean by storing in pumphead cover while repairing pump.

THE AFRIDEV HANDPUMP.

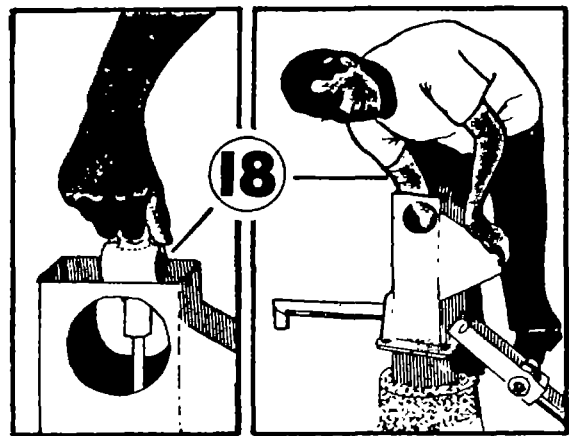


- 12. Replace old bobbin with new.
- 13. Replace old seal with new.

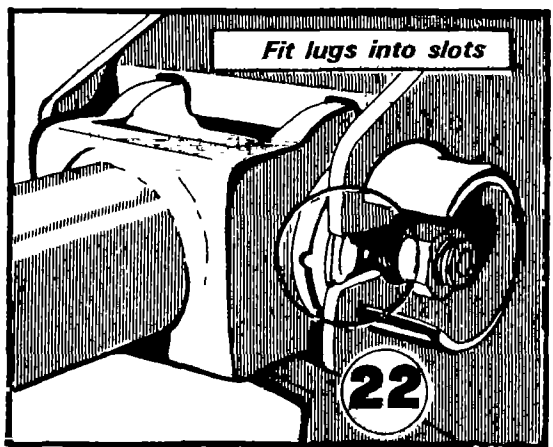
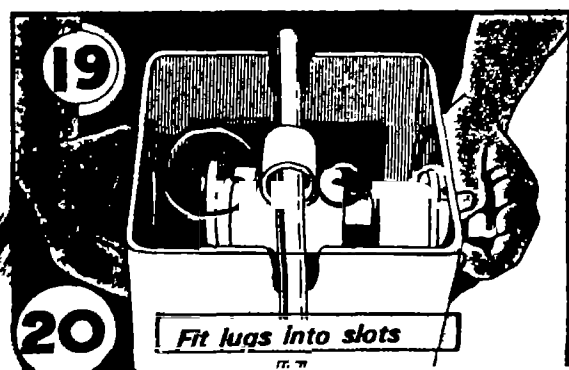


FOOTVALVE:

- 14. Replace old 'O' ring with new.
- 15. Drop footvalve down the well.
- 16. Put back plunger on rods.
(See No. 9)
- 17. Join rods while lowering down the well.



- 8. Make sure that footvalve is in place by pushing the rods at arms length down the well.



- 22. Put back handle to support the hanger.
- 23. Remove spanner and tighten all nuts.
- 24. Put back cover and tighten bolt.
- 25. Pump until clear water comes before drinking.

- 19. Put spanner through hanger eye to support rods.
- 20. Put back hanger pin with new bearings.
- 21. Put back fulcrum pin with new bearings. (See No. 7)

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