



MAINTENANCE GUIDE MAINTENANCE GUIDE

FOR

**SELF-HELP BASIC EDUCATION
PROJECTS**



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MAINTENANCE GUIDE

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FOR

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Chapter 1

What is maintenance?

- 1.2 Definitions
- 1.3 Types of Maintenance
- 1.4 Reasons for Maintenance
- 1.5 Maintenance Vs Rehabilitation

The seven Essentials for Good Maintenance

Definitions

Maintenance is actions, which keep an item in good condition, including cleaning.

Types of Maintenance

- a) Routine Maintenance: this is planned maintenance action carried out at regular intervals, routine clearing of drains and gutters, painting walls, etc.
- b) Preventative Maintenance: which are the actions to keep an item in good condition as a result of regular monitoring and observation, detection and prevention of failure.

This may include, for example tightening loose screw in a desk before it breaks, replacing door hinges before the door falls off, etc.

Reasons for Maintenance

- a) Your building or structure is an asset to the whole community and will serve you well, as long as it is in good condition.
- b) Your teacher cannot teach your children well in classrooms that leak, have broken desk and chairs, or wind and dust blowing through broken windowpanes.
- c) Maintenance keeps your assets in good repair and prevents the need for costly rehabilitation after many years of neglect. Now is always the time to maintain, not later, and every one can help.

note

**WORK TOGETHER TO MAINTAIN AND
SAFE GUARD YOUR ASSETS. THEY ARE
VALUABLE TO YOU, YOUR FAMILY AND
YOUR FRIENDS**

Maintenance Versus Rehabilitation

Rehabilitation is to restore or reinstate an item to its original condition, in order that it may be used for its intended purpose.

Rehabilitation is major work, which is required because maintenance has been neglected for a long time. Rehabilitation is expensive. Rehabilitation means that you can not use your building until it has been rehabilitated.

Constant on-going monitoring and maintenance will ensure that the work needed at one time is small and manageable and that expensive rehabilitation will not be necessary.

note:

**MAINTENANCE CAN BE
CARRIED OUT AT ANY TIME
WITH OUT CAUSING
INCONVENIENCE.**

1.3 The Seven Essentials for good Maintenance

There are Seven(7) things that you need for good maintenance.

1. Organisation and Teamwork

A maintenance committee manages the maintenance. The committee and community should always work together to carry out maintenance.

2. **Funds** must regularly be raised in advance, saved and managed well so that when money is needed for maintenance, it is already there. This is called maintenance fund and should be kept separate from other funds from the onset.
3. **Tools** : The right tools must be on hand to carry out the work. If your tools are well looked after, they will last a long time.
4. **Materials**: Good quality materials should be bought with your funds or collected from the community, to ensure that they are of good quality and that they will last a long time.
5. **Good Workmanship** is essential for proper maintenance.
6. **Cultivate good preventive Maintenance Habit**

The community school must agree what rules they are to put in force to protect their structures.

For example:-

- Do not lean bicycles against the wall; it will damage the plaster.
 - Do not throw rocks on the roof, it will crack the sheets.
 - Do not hammer nails into the wall.
 - Do not slam doors or windows, it will damage the lock and break the glass.
 - Do not force taps open and closed, it will damage the washers.
 - Do not squat or stand on the toilet pan, it will break.
 - Do not throw paper or debris down the toilet, it will become blocked.
 - Do not use the toilet if there is no water, it will become blocked.
 - Do not force the toilet chain or handle, it will break.
 - Do not permit urination on outside walls,
 - Keep animals and children away from wells,
 - Do not wash pots, clothes or children near the well.
 - Punish vandalism severely.
 - Do not throw rubbish around the premises.
7. Assign specific Maintenance Responsibilities to specific individuals who report to a maintenance coordinator or committee.

Chapter 2

2.0 Maintenance of Buildings

2.1 Introduction

2.2 General Maintenance and Rules

- a) Foundations
- b) Floors
- c) Walls
- d) Ceilings
- e) Roofs
- f) Windows and Doors

2.3 Water Supply and Plumbing

- a) Foul Sewerage
- b) Electrical
- c) Fixtures
- d) Roads

2.4 Ventilated Improved Pit Latrine

2.5 Fixtures

Chapter 2

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2.1

Introduction

The first step in maintenance is to recognize where and when maintenance is required. In order to achieve this the maintenance team must have a clear understanding of the purpose of each element that makes up the structure and how it works.

This Chapter lists most common defects for each element of a structure and discusses the problems, cause and solution for each defect. It is by no means fully comprehensive but should provide you with a useful guide to the technical aspect of maintenance.

2.1

General Maintenance and Rules

i. Cleanliness

- Wash and sweep the floors daily
- Wash dirty marks off the walls daily.
- Clean the windows weekly.
- Do not allow people to lean against the walls.
- Do not allow writing on the walls
- Collect and remove all debris and litter daily.
- Burn all flammable rubbish in the incinerator, and dispose of the rest in the rubbish pit.
- Clean out the drains, gullies and ditches monthly.
- Slash the grass weekly.
- Clean off all termites soil tunnels as soon as they appear on the building.
- Keep furniture away from the walls or fit bump rails.
- Check and sweep debris off the roof when necessary and do not allow crops to be stored or dried on the roof.
- Map the toilets and latrines clean daily and disinfect weekly.
- Clean the sinks and basins daily, where applicable.
- Assign specific Maintenance Responsibilities to specific individuals.

ii. Care and Consideration

- Do not lean objects, such as bicycles against the wall , it will damage the plaster.
- Do not throw stones or other objects on the roof, it will crack the sheets.
- Do not hammer nails into the wall, fit a timber-hanging rail.
- Do not slam doors or windows , it will damage the locks and break the glass
- Do not force taps open and closed, this will damage the washer
- Do not use water system toilet if there is no water, it will become block
- Do not force the toilet chain or handle, it will break.
- Do not permit urination on outside walls,
- Keep animals and children away from wells.
- Do not wash pots, clothes or children near the well, provide special washing areas.
- Punish vandalism severely
- Do not throw rubbish

External

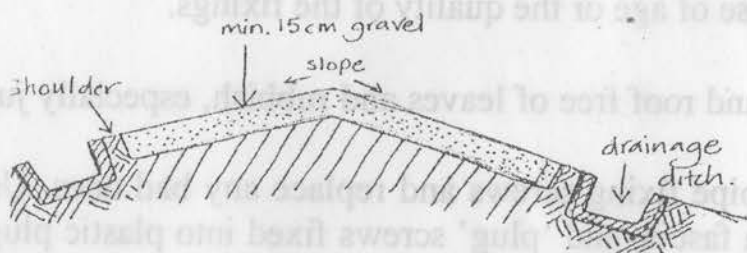
a). Storm Water Drainage

PROBLEM

EXTERNAL AREAS flooding

PROBLEM

STORM WATER DRAINAGE blocked OR TOO SMALL



Solution: Maintain the drains free of mud, debris and grass, especially just before the rainy season. Check all gullies and keep them free of leaves and rubbish. If the drains are too small then increase the size of the drains. Always use open drains as, they are easier to maintain.



Solution:
Maintain the ditches by the road, by keeping them free of mud debris and grass, especially just before the rainy season.

b). Roof Gutters and down Pipes

Problem

LEAKING OR OVERFLOWING GUTTERS, DAMAGE OR BROKEN GUTTERS AND DOWN PIPES

CAUSE:

The gutters and down pipes often become blocked due to leaves and rubbish collecting on the roof and being washed into the gutter.

Gutters and down pipes often become loose or damage due to the fixing becoming loose, either because of age or the quality of the fixings.

Solution : Keep the gutters and roof free of leaves and rubbish, especially just before the rainy season.

Check the gutter and down pipe fixing screws and replace any bad ones. Use large wood screws to fix to a fascia, and 'plug' screws fixed into plastic plugs driven into drilled hole to fix to a wall. Check the gutter and down pipe joints for leakage. Where leaks are found, they must be repaired as described in the section on gutters and valley linings (see page 32).

c). Grass and Trees

Problem

: Untidy surroundings, erosion, falling branches and leaves, and the possibility of snakes. Lack of shade, no trees.

Cause

: long unkempt grass areas make your surroundings look untidy and will attract snakes.

- Tall nearby trees will shed leaves and sometimes branches that may fall onto roofs causing damage and blocking the gutters or drains.
- Where there is no grass around buildings, rain water run off will erode the soil causing ruts and pot holes, and in bad cases often combined with sweeping, may expose the foundations which will weaken them.
- Trees are often cut down for firewood or building but they are not replaced. Leading to erosion and exposing the building to strong winds.

Solution: Cut the grass regularly to keep it short and tidy and cut back long and dead branches from the trees.

- Plant extra grass and flowers around buildings to help keep the soil from eroding. This will also be attractive.
- Trees should be planted to replace any that die or are chopped down.
- Make sure that the trees are planted at least 20 metres away from any structure or pipe line.

d). Refuse Collection and Disposal

Problem: rubbish and litter on the ground, dirty surroundings.

Cause: Poor refuse collection and disposal.

Solution; Provide large empty open drums for litter and rubbish to be put in at suitable places around the area. Make sure that the drums are emptied at regular times, say once a week.

The waste should be taken to the local council dump, or to a large open pit located safely away from your buildings. These pits must be marked 'OUT OF BOUNDS' and preferable fenced off behind a hedge or wire fence. Check with your local council if a special licence is required for dumping.

- Make a simple incinerator to dispose of all combustible waste, burn every thing you can. Take an old 200 litre drum and punch holes in the sides and base. Place it on top of a steel frame or dwarf block wall in a well-ventilated clear area.
- Place all paper, cardboard, plastic bags and bottles, and any other waste that will burn in the drum to half fill it. Set the waste on fire and then continue to feed in all flammable waste keeping the flames high.
- After burning the waste clean out the ashes and put them in the pit.

2.2b) Floors

i. Screed

Problem : With time the screed cracks peels from the slab, resulting in screed leaking with numerous hair line cracks or coming pot.

Cause: **Poor concrete mixes resulting in low strength and poor evaporation before laying the screed and inadequate curing resulting in early failure of the screed.**

Solution : By lightly tapping surface the with a hammer, it is easy to find the areas that have peeled. Listen to the hollow sound and identify the areas clearly. Hack all area of worn or loose bonded screed until only the good strong areas are left.

- Carefully prepare the surface of the exposed concrete slab by using a hammer and chisel until the whole area is roughened and you can clearly see the stones in the concrete surface. Wash the areas with clean water and a wire brush to remove all chips of concrete and dust.
- Mix wet cement slurry of 1 : 1 cement : river sand mix and brush this onto the prepared surface. Before this dries, mix the screed 1:4 cement: sand. Always use washed clean sharp sand.

Then Finish with wood float, applying as much pressure as possible, and finish the floor with a steel float as the screed dries. Cure properly by keeping the area damp for at least 3 days.

HINT *Do not throw cement onto the screed as you finish. This will cause fine crazing and dusting on the surface and does not make the screed strong.*

Finally, after about 3 hours when the cement has hardened, spray water over the new screed and cover it with a plastic sheet. Keep this up for three days, making sure that the screed is always damp. This is called "curing"

Then repaint the floor using two coats of good quality floor paint. Allow the paint to dry for 3 days and then polish the floor with a good floor polish. Polishing should be kept up as a routine weekly job to protect the floor.

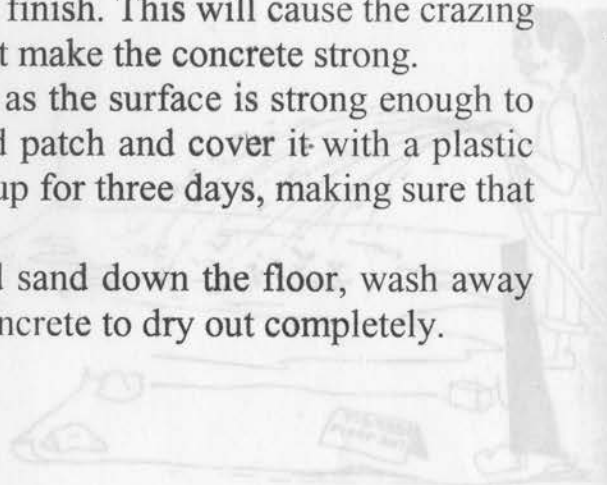
Solid Concrete floor.

Problem: Small cracks and potholes.

Cause: Small hairline cracks appear due to shrinkage of the concrete with the seasons. Holes are due to small areas of weaker concrete, which eventually open up and get worse.

Solution: Hack out the area around the damaged concrete into solid undamaged concrete. Always hack out a little more than you think necessary.

- Wash the areas with clean water to remove all chips of concrete and dust. Mix wet cement slurry of 1: 2 cement: river sharp sand mix and brush this onto the prepared surface.
- Mix concrete 1:1:2 cement: sand: stone. Use washed, clean sand and stone. The stone should be 10mm maximum size.
- Steel float the concrete, applying as much pressure as possible. Do not throw cement onto the concrete as you finish. This will cause the crazing and dusting on the surface and does not make the concrete strong.
- Finally after about 5 hours, or as soon as the surface is strong enough to walk on, spray water over the repaired patch and cover it with a plastic sheet (this is called curing). Keep this up for three days, making sure that the repair is always damp.
- After the repair is complete, clean and sand down the floor, wash away the dust and wait seven days for the concrete to dry out completely.



c) Walls

i) Foundation Walls

Problem: Moisture penetration, erosion, Plaster cracks.

Cause: Poor drainage and erosion around buildings allow the natural ground level to be washed away, exposing the foundation walls below the protective external plaster and lets moisture into the walls. This is often made worse by constant sweeping around the building that in time reduces the ground levels, in some cases down to the foundation concrete. The damp causes the plaster to peel-off and crack.

Solution: damaged plaster should be hacked out, the bricks or blocks cleaned and the mortar joints' raked or roughened to form a key for the new plaster.



Apply 20mm thick 1:4 cement sand and finish with a wood float finish.

Fine crazing and dusting on the surface does not make the concrete strong.

Finally after about 5 hours, or as soon as the surface is strong enough to walk on, spray water over the repaired patch and cover it with a plastic sheet (this is called curing). Keep this up for three days, making sure that the repair is always damp.

The soil that protects the foundations must then be replaced. The first layers

should be laterite, with a final layer of topsoil if grass is to be planted, or cement stabilized laterite for a hardwearing soil surface.

The last layer can be made more durable by mixing 1:6 cement: dry laterite. When the laterite is watered and finally compacted the cement will harden this layer. Alternatively build a fresh short wall around the building above the original ground level but not exceeding the slab level as protective wall around the building.

ii) Face Brick & Block Wall

Problem: Weak and crumbling mortar joints, combined with moisture penetration, damp internal plaster and in some cases peeling paint.

Cause: In time, after years of being exposed to wind and rain, the mortar joints between the unplastered external blocks become weak and begin to wear away or spill. The mortar is washed out and the joints become deeper, allowing water to cling to and seep into the wall, which in turn will damage the internal plaster and paint.

Solution: The mortar joints must be repaired and protected. Rake out the damaged joint until strong mortar is found, to a minimum depth of 20mm. Then re-point the joints with 1:4 cement: sand mortar and finish with a **Weathered Joint**, formed by drawing the point of the trowel at a slight angle along the course. This encourages the rainwater to flow quickly down and off the wall.

To further protect the face brick or block, apply good quality external wall gloss paint or apply cem wash. Cem wash is cement, slurry paint, made using cement mixed with water (1kg cement to 10 litres of water).

ii) Plastered Walls

Problem Hairline crazing or plaster peeling.

Cause The plaster used in construction in recent times tends to be cement : sand plaster that should be mixed 1 : 5 using sieved, washed, well graded fine sand. The mix is critical and if this is not correct the plaster will be weak and tend to crack and peel. The cement and sand should have been measured accurately in gauge boxes usually 300mm X 300mm x 800mm.

- Another major cause is the use of muddy soil in the place of clean soft sand.
- Remember, where gauge boxes are not available, headpans can be used carefully for the measurement of sand and cement.

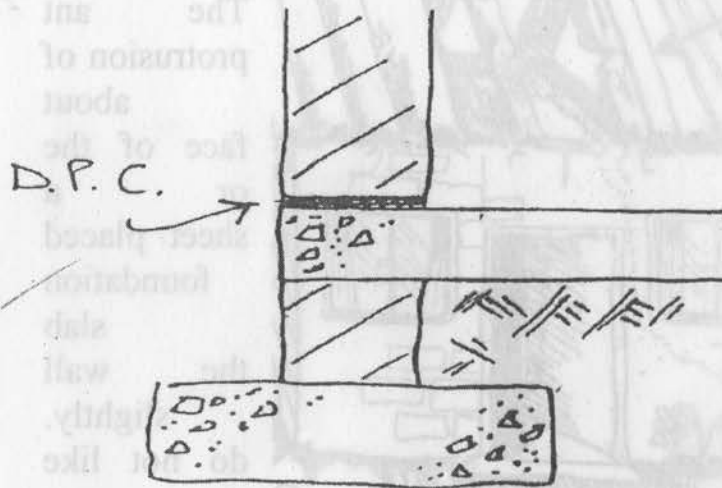
Solution: Areas that show signs of minor hair line crazing should be sanded down, the crack filled using a good quality “Putty” filler, and the painted with good quality paint.

- For areas with severe hair line cracks, peeling, crumbling plaster or loose hollow sounding (when tapped with a big screwdriver handle) the plaster should be hacked out and re-plastered.
- Once the plaster has been hacked out, all exposed mortar joints should be raked out to a depth of 20mm to form a good key for the new plaster to adhere or catch well. Before applying the plaster, the blocks should be lightly dampened. Trowel the plaster onto the wall. Leave the wall to dry out completely, 7 days minimum and then finish with good quality paint.
- There are many good paints now available in the country. Look out for known trade names.
- Always read the manufacturers instructions on how to use the paint and prepare the surfaces carefully and follow them.

iv) Damp Proof Course

Problem: Walls are liable to become damp in the rainy season by moisture rising up the walls from the ground. This is undesirable and will damage the plaster and paint.

Cause: inadequate or no Damp Proof course (DPC) will allow moisture to be absorbed into the plaster and blocks from the ground by capillary action.



Solution : Check that the DPC is at least 150mm above ground level. If it is not, dig the ground level down around the building until it is.

Check the DPC to ensure that no plaster covers it. This will stop moisture climbing up the wall in the plaster. If it is, form a wide v-joint at the DPC to ensure that no plaster covers it. This will stop moisture climbing up the wall in the plaster.

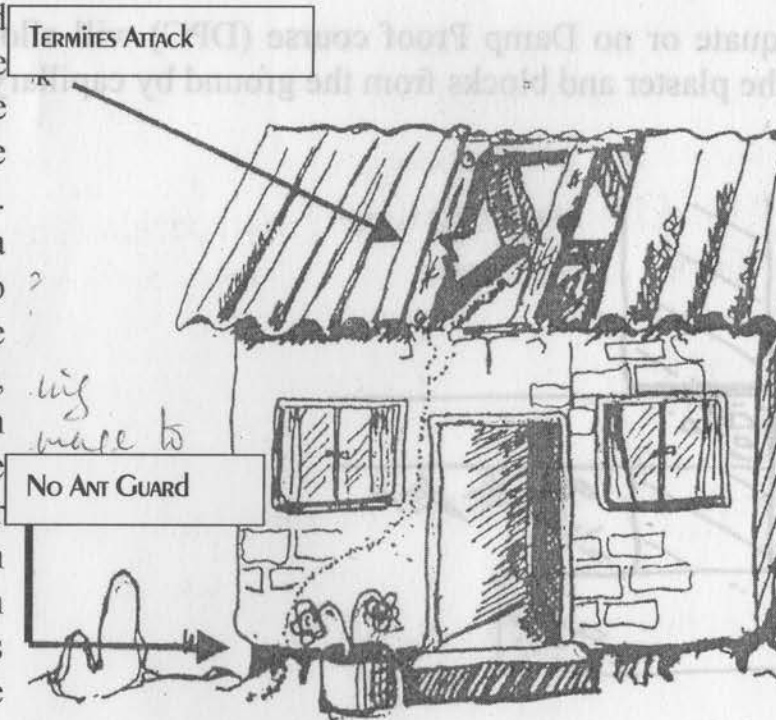
If there is no DPC, one should be installed in sections all around the outside walls. This however is a specialist job and a contractor should be engaged to carry out the work.

v) Ants and Termites

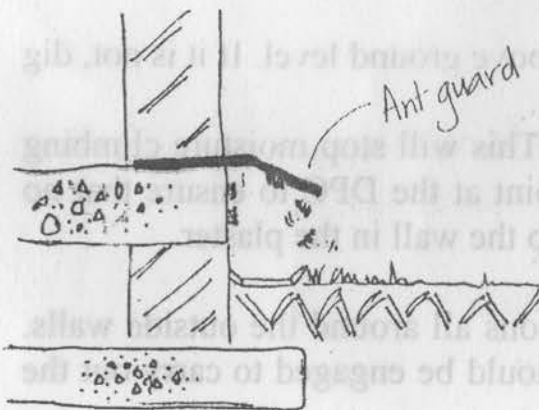
Problem:

Ants and termites climbing up the walls and into the roof timbers, causing damage to the building.

Cause: Ants and termites get into the walls if there is no guard installed. The guard is either a 100mm wide galvanized iron sheet placed between the floor slab and the wall protruding from about 100mm. Ants and termites will turn back with this guard.



termites will building by outside of is no ant The ant protrusion of about face of the or a sheet placed foundation slab the wall slightly. do not like down and when faced



Solution: if there is an ant guard, check all around the building to make sure that the ant guard has not been damaged or pushed down to touch the ground or wall, allowing a way on to the wall or past the guard. They only need one way in. Repair the ant guard as necessary. Floor slab guards should be reformed with plaster, and iron ant guards should be carefully bent into shape and joints should be soldered tightly together.

If there is no ant guard, one should be installed in section all around the outside walls. This however is a specialist job and a contractor should be engaged to carry out the work.

To further prevent ants and termites, Dioldrex 20 anti-termite solution can be sprayed onto the ground outside the building.

Dioldrex 20 is available in building hardware shops, and care should be taken in handling it.



Solution for moisture in the wall, first you must remedy the cause. Refer to the section on damp proof course (see page 20). Strip the paint completely back to the plaster, ensure that the area is completely dried out, and repaint as follows. First apply one coat of good quality undercoat, followed by a minimum of two coats of good quality gloss or emulsion paint as required.

Always read the manufacturer's instructions on how to use the paint and prepare the surfaces carefully and follow them.

vi) Painting

Problem: Dirty, Peeling, Blistering or flaking.

Cause: Wear and tear, loss of adhesion because of moisture in the wall and plaster, mild chemical attack by lime in the cement due to painting before the plaster is completely dried, poor preparation of the walls before painting, and poor quality paint.



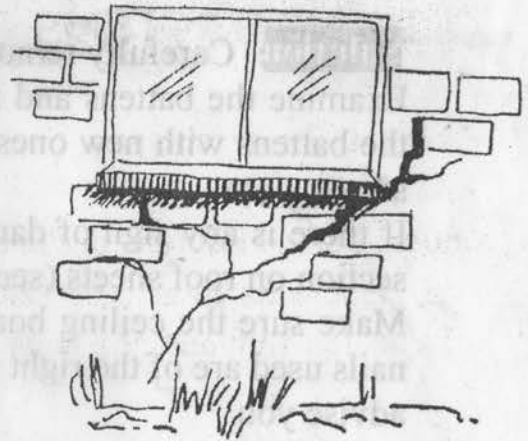
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Always read the manufacturers instructions on how to use the paint and prepare the surfaces carefully and follow them.

vii) Major Cracks

Problem: Severe cracks in the walls, diagonal or vertical, and large at the top, tapering down to hairline at the bottom.

Cause: Movement in the foundation caused by movement of the soil and or inadequate foundations for the type of soil. This is often worsened by poor drainage around the building for surface rainwater run off.



Solution: Refer to the section on foundations and underpinning (see page 17).

c) Ceilings

i) Ceiling battens

Problem: CEILING SAGGING

Cause: Ceiling battens or "Cover strips" have become loose due to old age, or damage caused by termites or damp rot, or the ceiling boards may be too thin and the nails too small.

Solution: Carefully remove the cover strips and then the ceiling boards. Examine the battens and remove all loose or damaged battens. Replace the battens with new ones and then replace the ceiling boards and cover strips.

If there is any sign of damp rot and moisture in the ceiling, refer to the section on roof sheets (see page 30).

Make sure the ceiling boards are strong enough for the job and that the nails used are of the right size. This varies but a competent carpenter will advise you.

ii) Ceiling Board

Problem : SAGGING OR DAMAGED CEILING BOARDS

Cause: The ceiling may become damaged due to rain leaking through the roof sheets and dripping onto the ceiling board causing it to rot quickly. Another reason may be poor quality of wood, inadequate sizes & spacing of noggins.

Solution: Remove the damaged ceiling boards and carefully examine the roof sheets for leakage. Repair the leaks as described in the section on roof sheets (see page 30) and then replace the damaged ceiling boards using at least 8mm thick ceiling boards and paint.

Where the problem is from the noggin remove and replace with correct size and quality.

iii) Painting

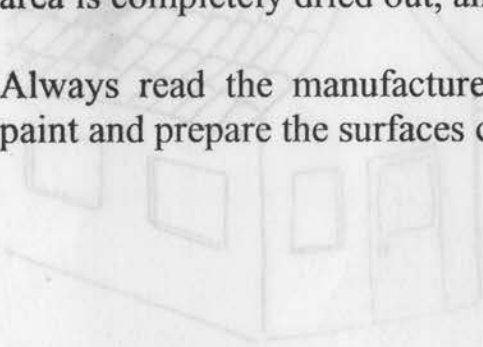
Problem: Dirty, peeling, blistering or flaking.

Cause: Age, loss of adhesion because of moisture in the ceiling or poor preparation for painting, and poor quality paint.

Solution: For moisture in the ceiling remedy the cause, refer to the section on roof sheets.

Strip the paint completely back to the ceiling board, ensure that the area is completely dried out, and repaint with good quality paint.

Always read the manufacturers instructions on how to use the paint and prepare the surfaces carefully and follow them.

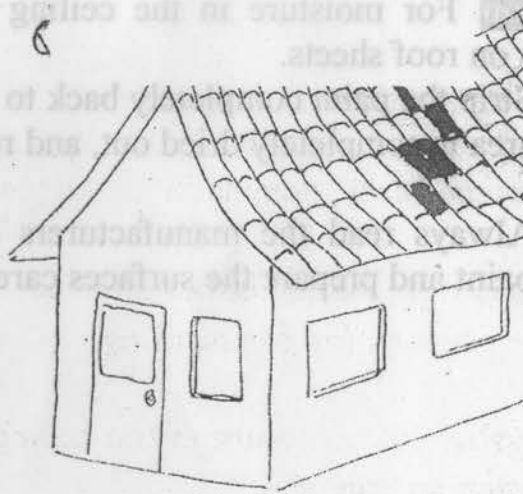


d) Roofs

i) Roof Trusses

Problem : Sagging or damaged roof timbers.

Cause: Poor roof construction or damage caused by damp rot or termites



Solution:

Carefully inspect the roof timbers for damp, rot or termites. If damp rot or termites are

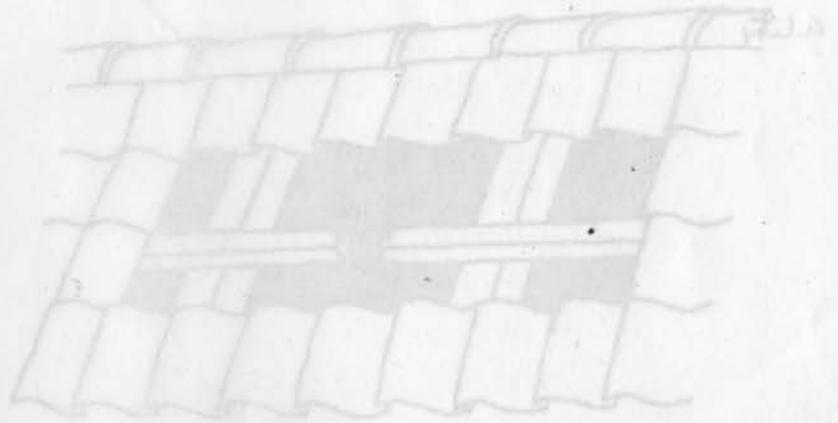
the cause of the problem refer to the sections on roof sheets or treatment and termite ingress.

- In severe cases the roof may have to be taken down and reconstructed as new.
- Where the timbers remain in good condition but the truss joints have failed due to poor construction, it may be possible to jack up the truss using props. Then strengthen the joints.
- Weakened joints may be strengthened by introducing splices across the joints, carefully nailed in place on either side of the original joint using similar sized timber at least 600mm long.
- All the joints must be carefully inspected and nails checked. Any loose nails should be hammered home and additional nails hammered in to provide a minimum of 6 nails per joint.
- Areas of damp rot or termite damage must be removed completely. The affected truss must first be supported by props.

NOTE

A Technical supervisor must supervise this kind of work. Always put SAFETY first.

Once the truss is securely supported, the affected timber may be cut out and a new piece spliced into place.

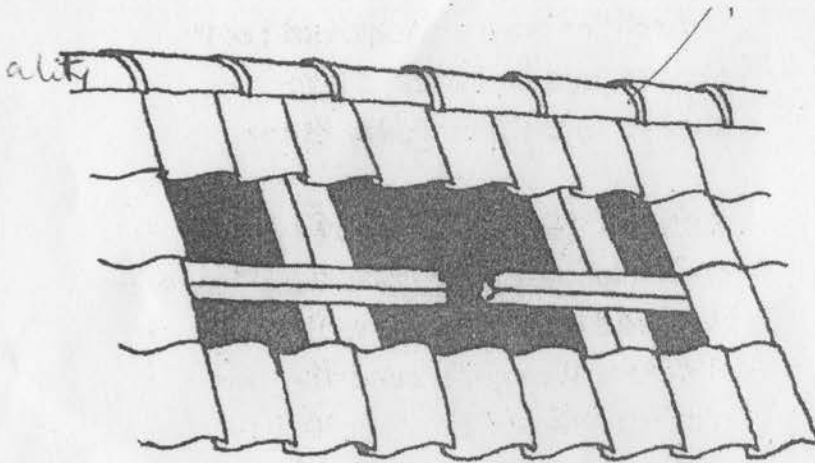


Warning: Carefully inspect the purlins to find out why the deflection is there. Purlins that are damaged or too small or interior should be identified, removed and replaced with new purlins of appropriate size. Then replace the roof using new roofing nails with rubber and felt washers to make sure the nail holes are sealed well. The cause of the problem should then be solved. If damp rot or termites are the cause of the problem refer to the sections on roof sheets or on treatment and termites ingress.

ii) Purlins

Problem: Roof sheets sagging between trusses.

Cause : This is usually due to the purlins deflecting, either because of age, due to damp rot, termite attack, or because the timbers used are too small for the job or of inferior quality.

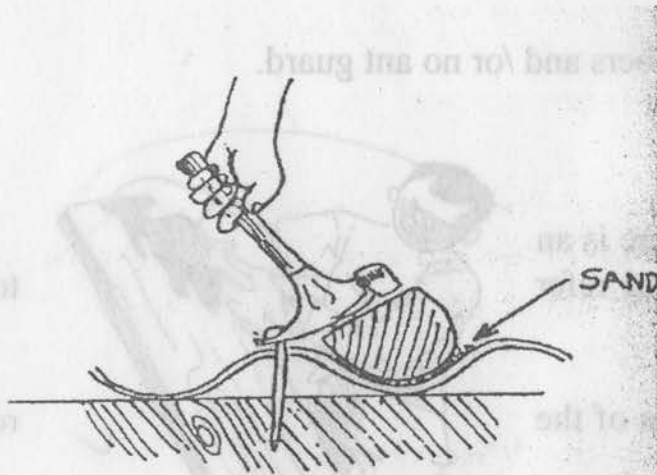


Solution: Carefully, inspect the purlins to find out why the deflection is there. Purlins that are damaged or too small or inferior should be identified, removed and replaced with new purlins of appropriate size. Then replace the roof using new roofing nails with rubber and felt washers to make sure the nail holes are sealed well. The cause of the problem should then be solved. If damp rot or termites are the cause of the problem refer to the sections on roof sheets or on treatment and termite ingress.

iii) Roof Sheets

Problem: Leaking roof

Cause: Cracked or damaged roofing sheets, age and wear allowing iron sheets to rust in the rain.



Solution : Damaged roof sheets should be removed and replaced with new sheets of the same size and type. If the sheets are in good condition and the leak is coming through the roofing nail positions, carefully remove the nails and replace them with new roofing nails with rubber and felt washers. Other holes can be sealed, using Roofing Compound, bitumen or silicone sealant.

Note

Painting the sheets with good quality roof paint may lengthen the life of iron sheets. Firstly the sheets should be thoroughly cleaned and sanded to provide a good surface, then apply one coat of priming paint and two coats of roof paint.

iv) Timber Treatment & termite attack.

Problem: Ant and termite ingress and attack

Cause: Untreated roofing timbers and /or no ant guard.

Solution: Firstly, check if there is an ant guard. If there is no ant guard refer section on ant guards.

Next, locate the affected areas of the repair as described earlier.

- The timber should now be thoroughly treated to prevent any further attack.
- A good treatment for all roofing timbers is to apply solignum, or any similar approved timber preservative. These chemicals can be very expensive but you can mix the preservative with used engine oil in the ratio 1:5 i.e 1 measure of solignum : 5 measures of used oil.



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v) Gutters and Valley Linings

Problem : Blocked AND LEAKING GUTTERS OR VALLEY LININGS.

Cause: Gutters will leak when they become full of leaves and debris blown on to the roof from nearby trees, when the gutter joint fails through age and rusting, or if the gutter is too small.



Solution : Keep the gutters clear of leaves and debris all year round. Check all the gutter joints for leaks and rust.

- The gutter must be thoroughly cleaned, all rust removed and then allowed to dry out completely. The joint can then be soldered closed and tested to make sure the repair has been successful.
- Badly rusted and leaky gutters should be removed and replaced with new gutters. Gutters that are too small to take heavy rainfall should be replaced with larger ones. Small leak may be sealed with silicone sealant.

vi) Flashing

Problem LEAKAGE THROUGH THE FLASHING

Cause The flashing may have come away from the wall allowing rain water to run down the wall and under the roof sheets, or the joints between the flashing sheets may have failed through age and rusting.

Solution: Carefully inspect the flashing; if the plaster that holds the flashing tight to the the wall has cracked and come away, remove all the damaged plaster, carefully push the flashing back into its original position tucked into the face of the wall and re-plaster the flashing into place using a 1:4 cement : sand mix. At the positions of the joints between each sheet apply a silicone seal to ensure that moisture does not seep in between them

vii) Fascia

Problem : THE TIMBER FASCIA BOARD BECOMES DAMAGED, LOOSE AND ROTTEN.

Cause: Damp rot, age, termite attack, poor paint quality or no initial painting may all cause the fascia to fail.

Solution: The damage fascia boards should be removed and replaced by new, treated and painted timber fascia or asbestos fascia which will not be affected by damp or termites.

f) Windows and Doors

i) Doors and Door frames

Problem: Rotten or damaged doors; rotten, rusted, damaged or broken door frames.

Cause: Weathering, ants, heavy daily wear and tear & vandalism, or poor quality.



Solution: rotten doors should be replaced with solid timber doors or metal door. Avoid flush plywood doors as most available in the market are not durable. Rusted metal frames should be scraped and sand papered, then touch up areas of exposed steel with red oxide primer and two fresh coats of good quality gloss paint.

Rotten wooden frames should be removed completely and replaced with new hardwood treated frames or steel frames.

Paint doors and frames periodically for protection. Fittings should be removed before painting, cleaned and re-fixed after the paint is dry.

Note

The durability of doors also depend on the quality of the door, locks, handle and use.

ii) Windows and Window frames

Problem ROTTEN, RUSTED, DAMAGED OR BROKEN WINDOW FRAMES.

Cause Poor quality, heavy daily wear and tear, vandalism or theft, water.

Solution Windows stays, hinges and handles should be constantly monitored to make sure that all screws are tight. Missing or poor quality stays hinges and handles should be replaced or welded.

Rotten windows should be replaced with good quality treated ones or steel windows.

Rusty frames should be scraped and sand prepared, then touch up exposed steel with red oxide primer and two fresh coats of good quality gloss paint.

Rotten wooden frames should be removed completely and replaced with new hardwood treated frames or steel frames.



replaced or steel

scraped up areas of primer and gloss paint.

be replaced

iii) Locks and hinges

Problem : LOOSE, BROKEN, MISSING OR JAMMING

Cause : Poor quality, heavy daily wear and tear, vandalism or theft.

Solution: door hinges, locks, stops, striking plates etc. must be securely fastened.

Always use wood screws and not nails for fixing hinges and locks.

Make sure the hinges have all the screws in place and that they are slightly screwed in place. Replace any loose or poorly fitting screws.

Locks that are broken should be replaced with good quality 3 lever mortise locks. Beware of cheap locks as they will be poor quality and will not last long. Remember that not all mortise locks are good and durable.

NOTES

Check the trade name carefully, there are many cheap copies using similar sounding names. One example is UNION LOCK which are good quality, and ONION LOCKS which are weak and of poor quality.

They sound similar and it would be easy to make a mistake and buy the bad one.

Oil the locks and hinges regularly to avoid jamming. If mortise lock can be avoidable, use a simple staple hasp and heavy padlock instead.

iv) Glazing

Problem BROKEN, DIRTY OR MISSING PANES

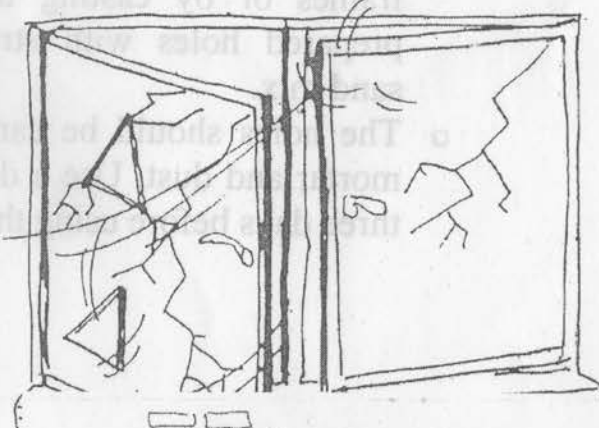
Cause: Broken stays and handles allow the windows to swing in the wind and cause the windows panes to break. Poor quality or old putty cracks and falls out, poor cleaning and vandalism.

Solution : Poor quality stays and handles should be replaced with good quality ones. Broken stays and windowpanes must be replaced immediately.

Keep your windows clean at all times. Replace old cracked putty and only use good quality putty. Do not use cement.

Note:

If your windowpanes are large, you can have them divided into smaller panes by a good welder to avoid costly large window replacements or use 4mm glass instead of 3mm for these large panes.



v) Burglar Bars

Problem : rusty, peeling paint, loose, broken

Cause : Poor painting, age , wear and tear

Solution : the bars should be scraped and sand papered, then touch up areas of exposed steel with red oxide primer and two fresh coats of good quality gloss paint.

- Loose bars should be removed completely, and re fitted either by welding to the windows or door frames or by casting the bars into prepared holes with strong cement: sand mix.
- The holes should be carefully prepared by removing all loose bricks mortar and dust. Use a dry mix and ensure the bars are left for at least three days before using the windows or door.



Solution : Poor quality stays and handles should be replaced with good quality ones. Broken stays and windowpanes must be replaced immediately.

Keep your windows clean at all times. Replace old cracked putty and only use good quality putty. Do not use cement.

Note:

If your windowpanes are large, you can have them divided into smaller panes by a good welder to avoid costly large window replacements or use 4mm glass instead of 3mm for these large panes.

2.3 Water Supply

a) Wells and Windlasses

Problem: Contamination, missing chains and buckets.

Cause: Poor maintenance, management and vandalism



Solution: Your well must be maintained daily to ensure that it works well and is clean. The well head cover should be fixed securely in place and kept closed when the well is not being used.

- If anything falls into the well, remove it immediately. This should be done by an adult, lowered using safety ropes and must be well supervised. Check the chain and bucket every day. These must be fixed securely to the windlass so they do not fall into the well.
- Do not allow other buckets to be used for drawing water. Do not wash clothes or children near the well and keep livestock away from the area.
- Keep the windlass well greased and in good condition. Timber ones may be treated with oil and replaced when necessary.
- Make sure that there is a well-drained hard surface around the well so that split water flows away easily, preventing the area becoming muddy and dirty.

b) Water Tanks

Problem : OVER FLOWING OR LEAKING

Cause : The ball valve that stops the water flowing may be struck open or broken. Steel tanks will rust and eventually spring leaks around the bottom. Concrete tanks will leak through shrinkage cracks.

Solution: Check the ball valve, make sure that it works properly and check the ball float in the tank, it should float high and will stop the water when the tank is full. If the float has water in it, replace it.

c) Bore holes and Pumps

Problem : THE BOREHOLE MAY BECOME DRY OR PRODUCE VERY MUDDY WATER AND THE PUMP MIGHT DEVELOP A PROBLEM OR BREAK DOWN.

Cause : the water in the bore-hole may not be enough to cope with the demand causing the pump to run dry or the lower end of the bore hole may have collapsed or fallen below the lined mud to be pumped up.

Solution: if the water in the bore-hole is inadequate, the only solution is to deepen the borehole. Unfortunately this is expensive and will have to be done by a drilling contractor.



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If the pump is not working, it must be raised carefully and repaired. Seek advice from a specialist.

If the water has become muddy, the borehole pump must be raised above the bottom of the lining to pump clear water or the lining will have to be extended. Make sure that someone on the maintenance committee is trained to do this.

If the yield of the borehole is poor, the borehole may need to be deepened. If this does not improve the yield, a new borehole may be necessary. Ensure that a new site is properly investigated by the borehole company before agreeing to go ahead. Boreholes are expensive.

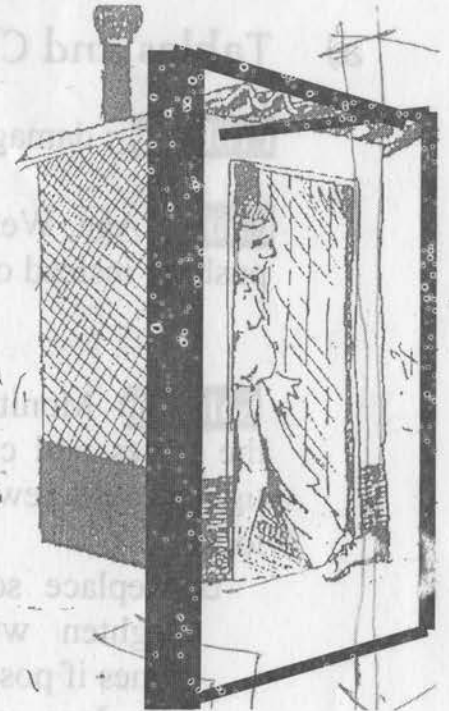
2.4 Ventilated Improved Pit Latrines

Problem: Foul smelling, dirty or overflowing

Cause: Inadequate cleaning and disinfecting or the latrine may be full.

Solution: Ensure that these basic rules are followed:

- Do not permit urination on the outside of the wall
- Keep the squat hole covered
- Keep the concrete slab washed and disinfected.
- The foul smell is as a result of the sludge becoming acidic. Add a bucket of potash (ash) into the pit. It is an alkali. It will kill the smell and deposit the sludge at the bottom of the pit while water will float and get absorbed into the soil.
- Flush water into the pit each week.
- Check the level of the pit every 6 months and if the level is higher than one third of the pit depth, then remove the sludge. This can be done using bucket or if possible a 'sludge' pump. The council and some private operators can be contacted on this.



2.5 Fixtures

a) Tables and Chairs

Problem : damaged and broken.

Cause: Age, Wear and tear, poor quality, children playing on them, pulling or pushing instead of lifting them, adults use of children's furniture.

Solution: Monitor the condition of the tables and chairs regularly, and tighten all screws and bolts that are loose.

- Replace screws that will not tighten with larger stronger ones if possible.
- Replace any broken timber parts of the table or chair immediately they become damaged. Poor quality tables will tend to break often. A qualified carpenter with joinery skills will be able to strengthen them, but eventually you will have to replace them with good quality, well-made tables and chairs.
- Make sure new tables and chairs are made with proper joints. These will be made with timber dowels or pins, wood screw and wood glue. Never accept a table or chair that has been put together with nails. It will not last. Lift chairs to move them, and prevent children or adults misusing them.



b) ChalkBoards (BlackBoards)

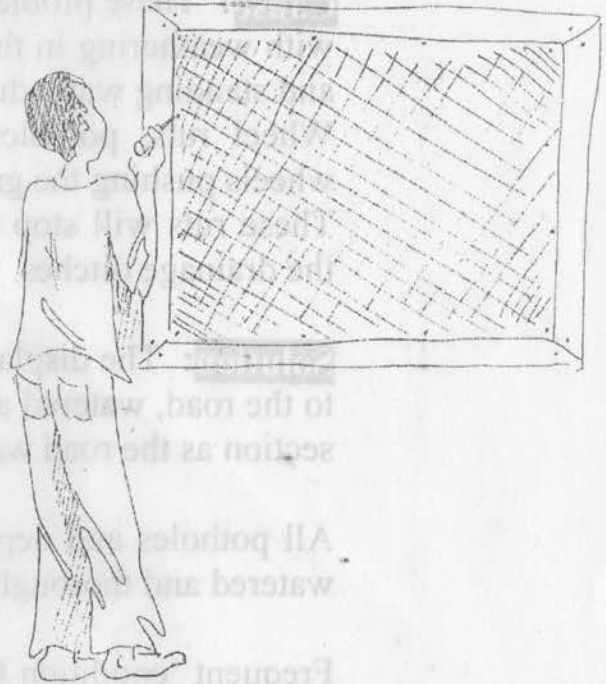
Problem: Poor blackboard paint, scratchy surface, difficult to write on clearly, loose or cracked boards.

Cause: Poor quality blackboard paint, old worn surface being used, loose fitting screws, cracked plaster.

Solution : Use good quality chalkboard paint, do not use gloss black.

Cement: sand plasterboards should be re-plastered when necessary to provide a smooth even surface to write on.

Plywood boards should be replaced when necessary with new ones, and fixed securely to the wall with expanding wall screws or strong timber pin plugs with ordinary screws. Existing screws should be checked and tightened as needed.



2.6) Roads

a) Gravel and Earth Roads

Problem : Loss of shape, potholes, wheel ruts and corrugations or erosion gullies appearing on the road and loss of camber.

Cause: These problems are caused by normal use by vehicles combined with weathering in the rain and wind, rain water running off the surface and standing water due to poor drainage.

Wheel ruts, potholes and depressions formed after time by vehicle wheels pushing the gravel outwards.

These ruts will stop the rainwater from going off the road surface into the drainage ditches.

Solution: The displaced gravel or laterite should be dug up and returned to the road, watered and thoroughly compacted to form a cambered cross section as the road was originally made.

All potholes and depressions should be filled in with gravel or laterite, watered and thoroughly compacted.

Frequent 'condition based monitoring' should be carried out to identify areas of the road that may be becoming damaged early on, and repairs carried out as soon as possible.

b) Drainage

Problem: Standing water and blocked drainage ditches.

Cause: either side of the road should have a drain which takes surface water off and away from the road down mitre drains at intervals along its length. When these drains become blocked with mud or vegetation the water can not flow away and this will damage the road.

Solution: Maintain the ditches by the road, by keeping them free of mud debris and grass, especially just before the rainy season.

c) Culverts

Problem: Flooding

Cause: culverts allow water to pass under the road and may become blocked with mud or vegetation, causing rain water run off to back up against the culvert, flooding the surrounding area and sometimes even the road.

Solution: maintain the culverts under the road by keeping the approach to the culverts and the pipes free of mud debris and grass, especially just before the rainy season.



2.7) **Tools**

These are the main tools needed for building and maintenance. It will not always be possible to have a complete set, but the more tools available the easier it will be to maintain and repair quickly.

Building Tools.

Cold Chisel 25mm
Lump Hammer
Brick Hammer
Spirit level 1.2m long
Building line
Brick trowel
Plaster trowel
Pointing trowel
Wood float
Steel float
Steel square
5m Tape measure
Inside corner
Outside corner
Wheelbarrow
Shovel
Pick axe
Bucket
Steel Rammer
Plumb
Headpan

External & Roads

Wheel barrow
Shovel
Pick axe
Hoe
Bucket
Rake
Matchet
Bow saw
Stiff broom
Cutlass

Carpentry & Roofing

Claw hammer
Wood plane
Handsaw
Tennon saw
wood chisels 6,12,20, and 25mm
Set of crewdrivers
3m Tape measure
Steel square
Spirit level
Glass cutter

a) Importance of Tools

Without the right tools, you will not be able to carry out maintenance and repairs.

With the right tools available, you will be able to maintain and repair.

b) Care and Storage of Tools

These tools are for the maintenance of your buildings and surroundings, and must therefore, be looked after carefully and stored away safely when not in use, and be recorded on a tools inventory list.

Any tools with moving parts, wheel barrows, clamps and braces, etc. should be cleaned and oiled before being stored away. All hand tools must be cleaned and stored neatly, preferably hanging up on marked hooks on the walls.

This way you will see the tools that are out or missing easily.

A special tool store with a strong door and padlock is the best security, overseen by a maintenance committee member who alone would be responsible for the care and safety of the tools.

ITEM	PROBLEM	CAUSE	SOLUTION
Foundations	Cracks in walls	Inadequate	Underpinning walls
Trees and roots		Roots under building	Remove from a safe distance
Drainage	Local flooding	Blocked drains	Clear drains
Storm water Drainage	Flooding	Blocked drains	Keep the drains clear, take the drains
Blocked pipes	Overflowing	Blocked	Clean regularly
Gates	Hinges and latches broken peeling paint	Age, wear and tear	Repair or replace Fittings Repaint
Refuse Collection	Floor collection and disposal	Floor system	Provide drums, collect and dispose of regularly.
Floor screed	Cracks De-bonding	Floor cement sand mix Floor preparation	Jack out and re-screed Jack out and re-screed
Tiles	Cracks Peeling off	Age, wear and tear Excessive water when cleaning	Replace tiles Replace tiles

MAINTENANCE TROUBLE SHOOTING CHECK LIST.

ITEM	PROBLEM	CAUSE	SOLUTION
Foundations	Cracks in walls	Inadequate foundations poor drainage	Underpinning seek advice from a technical expert
Trees and roots	Cracks in walls Damaged sewers	Roots under building Roots pushing pipes	Cut back roots Build cut off wall
Drainage	Local flooding	Poor drainage	Improve drainage
Storm water Drainage	Flooding	Blockage	Keep the drains clean. rake the drains
Gutters and down pipes	Leaking Overflowing	Age, damage Blocked	Repair leaks with solder or silicone clean regularly
Gates	Hinges and latches broken peeling paint	Age, wear and tear Age, wear and tear	Repair or replace Fittings Repaint
Refuse Collection	Poor collection And disposal	Poor system	Provide drums, collect and dispose of regularly.
Floor screed	Cracks De-bonding	Poor cement sand mix Poor preparation	Jack out and re screed Jack out and re screed
Tiles	Cracks Peeling off	Age, wear and tear Excessive water when cleaning	Replace tiles Replace tiles