

JOB ROLE –PLUMBER (GENERAL)

Sector – Plumbing
(Qualification Pack Code: PSC/Q0104)



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UNIT 5:PERFORMING VARIOUS PLUMBING RELATED OPERATIONS AND PROCEDURES

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Session Objectives

The student will be able to:

- Perform the plumbing repairing, cause of damage and procedure for repairing the pipeline,
- Describe the types and replacement of repair,
- Perform the site management,
- Demonstrate the repair of fixtures, stopcock and water supply fitting ,
- Describe the term cistern, water closet , toilet tank and tap & faucet,
- Illustrate the types of pipes and their methods of repair,
- Prepare the plan and schedule of routine maintenance, repairs and modifications.

Introduction

- A plumber must have knowledge about the various plumbing repairing , methods and their types.
- While carrying out plumbing repairs, it is important that the Plumber has sufficient knowledge of the cause of damage to the plumbing system.



Causes of damage to the pipeline and plumbing system

1. Defective jointing material.
2. Direct strike on the body of the pipe with any sharp edge, while jointing.
3. Slipping of jointing material, like rubber ring or lead.
4. Corrosive nature of soil, causing damage to the external surface of the pipe.
5. Loss of support or anchorage (horizontal or vertical), both in case of pipes embedded and those laid above the ground level.
6. Movement of soil due to filled soil, mining.

7. Movement of soil while work such as laying of pipes or cables, etc., is taken up.
8. Changes in soil moisture or water table conditions.
9. Expansion—severe compression, end crushing.
10. Contraction—pull out or separation of joint.
11. Pipe blockages and splits.
12. Excessive test pressure.
13. Pressure surge, water separation, vacuum.
14. Extending pipe connections without proper precautions.
15. Damage to the internal surface of pipe as well the lining material.

The following procedure should be followed for the repair of pipes:

1. Location and demarcation.
2. Repair planning.
3. Repair work — selection of most appropriate method for repair.
4. Testing of 'dry' repair.
5. Restoration.



Types of Repair

Repair of Small, Local Defects — ‘Wet Repair’

- For small local defects, such as pinholes, a single split collar or wrap around clamp may be all that is required.
- In case of ‘wet’ repair, care should be taken to maintain a steady, gentle flow so as not to dislodge the sealing elements.

Cut Out — ‘Dry Repair’

- For a more extensive damage, for instance, a longitudinal fracture, a section of pipe is cut out and replaced by the use of two appropriate couplers.
- In case of any doubt, the full length of the damaged pipe should be replaced.

Replacement Repair

1. Carry out correct measurements and give allowance for expansion. All cuts should be made clean and square.
2. In AC pipes, cuttings should be avoided.
3. All cut edges should be prepared to the manufacturer's recommendations.
4. Both exposed ends of the existing pipe should be treated similarly. Couplers should have their sealing rings lubricated.
5. Correct expansion gaps should be allowed.
6. Good alignment is essential, if narrow couplers are used.
7. All couplers and collars should be centralized.
8. Tighten all bolts evenly. Do not over tighten bolts or compression joints.
9. Restore any damaged coatings on the parent pipe.
10. Ensure full protection to the bolts and any exposed bare metal before burial.

Site Management

Record of Repair: While the repair is still visible, the details of repair should be recorded.

Site Cleanliness: During the repair work, the area should be kept as clean as possible.

Prevention of Contamination During Repair Work: Clean and spray with disinfectant, on all surfaces. After completing the repair, flush the main at the nearest hydrant to remove any dirt, etc.

Disinfection Procedure: For small repairs, which do not require the main to be cut, the fracture should be cleaned.

Clear Site: On completion of the work, all material and protective barriers should be removed from the site and the working area should be left clean and tidy. All records of repair should be completed and submitted.

Repair of Fixtures

Bibcock

- It is commonly referred to as the tap or faucet and it is the most frequently used water supply fitting.
- While repairing, it is also advisable to read the manufacturers' instructions.



Defects

1. Water drips from the tap even when it is tightly closed.
2. Water flows from around the spindle or stuffing box
3. Difficulty to turn on or off the tap.
4. The spindle slips continuously when the tap is turned on and off.
5. There is a lot of noise in the tap when turned on.

Causes

1. Worn out or defective washer.
2. Accumulation of grit (small, loose particles of stone or sand), dust or other foreign matter.
3. Defective seating.
4. Gland nut (a component of the tap or faucet) is loose.
5. The packing in the stuffing box is defective.
6. The packing in the stuffing box is dry.
7. The spindle is bent.
8. The spindle thread is worn out.

Repairs

1. Close the water supply to the water tap or bibcock.
2. With the help of a vice grip, hold the body of the bibcock.
3. Use the wrench to remove the head of the tap by simply tapping.
4. Check the spindle; if it is worn out, replace it.
5. Remove the old washer of the spindle.
6. Replace with a new washer.
7. Fit the head back to the body.
8. Open the water supply and check the leakage, if any.

Stopcock (Stop tap or Stop valve)

- It is similar in construction to a bibcock, except that it is placed in the pipeline instead of the outlet. The defects commonly encountered during the functioning of stopcock.



Defects

1. Water drips from the stopcock even after it is firmly closed.
2. Water flows from around the spindle or stuffing box screw.
3. It is difficult to turn on or turn off the stopcock.
4. The spindle slips down continuously when the stopcock is turned and the tap does not close.

Causes

1. Worn out or defective washer.
2. Accumulation of grit, dust, or other foreign matter.
3. Defective stopcock seat.
4. The gland nut is loose.
5. The packing in the stuffing box is defective.
6. The packing in the stuffing box is dry.
7. The spindle is bent.
8. The spindle thread is worn out.

Repairs

- First, we have to find exactly where the stop valve or tap is leaking.

(i) Compression nuts:

If water is leaking from one of the two compression nuts, then tighten the nuts and this should stop the leakage. Grip the body of the tap with water pump pliers and then tighten the nut by turning it clockwise, using a spanner.



Parts of a stop tap or a valve



Opening of a compression nut

(ii) Gland nut: If the leak is on the gland nut, first try tightening the gland nut with a spanner. This may stop the water from leaking. The gland nut can be removed and repacked without the water being isolated.



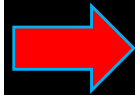
Tightening of a gland nut



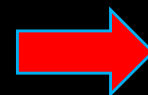
Removing bits from a gland nut

REPLACING STOP TAP WASHER

(a) Opening of a large nut



(b) Separating body of a tap

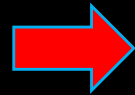


(c) Checking the washer

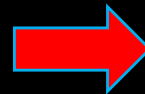


Conti...

(d) Removing the washer



(e) Replacing the rubber washer

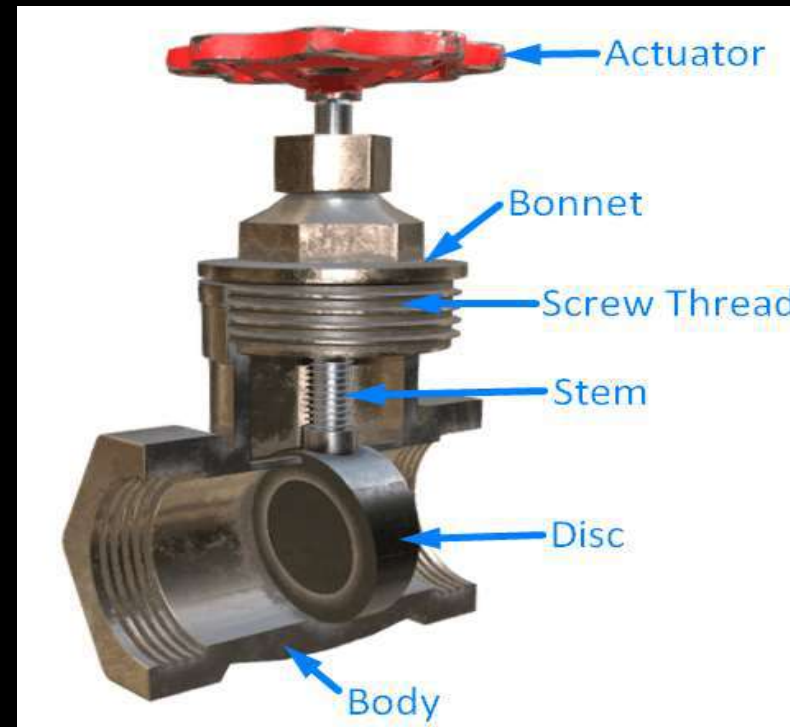


(f) Applying tape



Water Supply Fitting — Gate Valve

- Gate valve is one of the most common valves used in the main supply lines of a water supply system and pump-lines.



Defects

1. Water flows from around the stuffing box screw.
2. The valve is hard to turn on or turn off.
3. The spindle rotates continuously and the gate valve does not close.
4. These are used when there is a high chance of leakage in the joints.

Causes

1. The gland nut is loose.
2. The packing in the gland nut is defective.
3. The spindle is bent.
4. The spindle thread is worn out.

Repair

1. Tighten the dry gland nut.
2. Renew the defective packaging with asbestos hemp and water pump grease.
3. Replace the bent spindle with a fresh one.
4. Replace the worn-out spindle.



Cistern

Repair of cistern: As you know, water is stored in the cistern, and if there is leakage in the cistern, the following steps should be followed for repairing:

- (i) Inspect the toilet:** If water is not flushing, it means the flush is defective.
- (ii) Repair the handle:** Sometimes, in the toilet cistern, the flush handle is loose and not connected to the other part. It may be due to a worn out connector.
- (iii) Replace the toilet siphon:** If the toilet cistern flush handle is intact and working properly, the problem is likely to lie with the flush diaphragm, which is at the base of the toilet siphon.

Water Closets

- Most water closets are made of vitreous China, which might crack if exposed to extremely hot water. A plunger will normally handle simple toilet clogs.



Toilets Tanks

- It is a general complaint that water continues to leak into the closet bowl of the toilet tank. It may be due to failure of mechanism of toilet tanks.



Taps and Faucets

Washerless Taps and Faucets

- These can be either the single handle or two handle type. In these, the control of water flow is done by a replaceable cartridge or arrangement of seals that allows water flow when the holes or ports are lined up in a proper configuration.

Sink

- Sink bowls come in many different materials. Although enamelled cast iron remains an attractive and durable product, nowadays bowls are available in stainless steel, and other solid surface materials for their added durability and stain resistance.

Washbasin

- In our homes, washbasins and kitchen sinks get choked due to some obstruction from waste material or dirt. As a result, water can not flow smoothly.
- Thus, many small tools like plunger, auger, force cup and wire are used for clearing the obstruction.

Use of tools for removing clogs



Noises in the Plumbing System

- In an old plumbing system, different types of noise may be created due to some defect. These could include whistling, chattering or hammering. Noises can be checked with proper intervention.

Odours in the Plumbing System

- A well-designed and correctly installed plumbing system gives out no odour. In an incorrectly installed system, there is a possibility for odours to result from defects in the system, particularly if the fit is not properly vented.

Different types of pipes and methods of repair

| Material | | Cast Iron |
|---------------------|--|--|
| Burst | Action | Repair |
| Joint failure | Enclose joint Two couplers | Special joint clamp Two couplers and new section |
| Brittle failure | Remove section/joint Enclose failure | Two couplers and new section Repair collar or clamp |
| Corrosion | Remove section/joint Rehabilitation | Two couplers and new section Slipping, etc. Repair collar or clamp |
| Material | | Ductile Iron |
| Joint failure | Enclose joint Remove section/joint | Special joint clamp Two couplers and new section |
| Extensive pinholing | Rehabilitation technique Remove section/joint | Slipping, etc. Two couplers and new section |
| Ductile failure | Remove section/joint Enclose burst | Two couplers and new section Repair collar or clamp |
| Localized pinholing | Enclose burst | |

Conti...

| Material | | Steel |
|------------------------|---|--|
| Extensive pinholing | Rehabilitation technique Remove section/joint | Slip lining, etc. Two couplers and new section |
| Joint failure | Remove section/joint Enclose joint | Two couplers and new section Special joint clamp |
| Isolated pinholing | Enclose burst | Patch and weld Repair collar or clamp |
| Material | | Prestressed Concrete |
| Surface softening | Remove complete length/ joint or cracking | Two couplers and new pipe section |
| Joint failure | Remove complete length/ joint Enclose joint | Two couplers and new pipe section Special joint clamp |
| Material | | Polythylene/P.V.C |
| Fast crack propagation | Remove damaged section | Two couplers and new section |
| Brittle failure | Remove damaged section Enclose burst | Two couplers and new section Repair collar or clamp |
| Joint failure | Cut out joint | Two couplers and new section |

Prepare the plan and schedule of routine maintenance, repairs and modifications

1. As per the manufacturer's recommendation, check the need for repair, or replacement requirement of plumbing items.
2. Read the existing warranties and service agreements made by the user prior to start maintenance or repair work.
3. Prepare the estimate cost of the work to be done and collect a quotation if required.
4. Collect the written approval of the work to be carried out by the concerned person.
5. Detailed information of the site must be collected and check the requirement of access to the site.
6. Identify and select the labour, tools and machinery required for activities.

7. Qualification and skill experience of manpower should be properly checked.
8. Availability of labour should be scheduled as per need.
9. Availability of tools and equipment, machinery should be ensured as per work.
10. Prior approval from the concerned department should be taken so that there is no further disturbance during work.
11. Plan appropriate time for installation so that minimum disturbance of operation occurs.
12. Detailed information of weather should be collected so that contingency planning can be done.
13. Mention in detail about the schedules, jobs to be carried out in work order, etc.
14. Submit the bill and final report of execution of work to the customer.

Summary

- A plumber must also have knowledge of the various plumbing repairing, types of repairs, repair and fixtures, faucet, tap, water supply system, stop valve and different types of pipes and methods etc., where these should be used while carrying out the tasks.
- Proper fittings also help in checking leakage in the plumbing lines.

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