Task-2

a) Method of internal water supply in building and the system you propose for the building with suitable sketches.

Water supply system

Water supply

Water supply is the process of self-provision or provision by third parties of water of various qualities to different users. Irrigation is covered separately**.**

Clean drinking water (fig-1)

Mains Water to Buildings

Water mains can be divided into three categories:

(1) Trunk mains: these carry water from a source of supply (reservoir, pumping station etc.) to a district without supplying consumers en route.

(2) Secondary mains: the distribution mains, fed from a trunk main and supplying the consumers' connections in the district.

(3) Service pipes: the branch supplies from the secondary mains that serve individual premises.

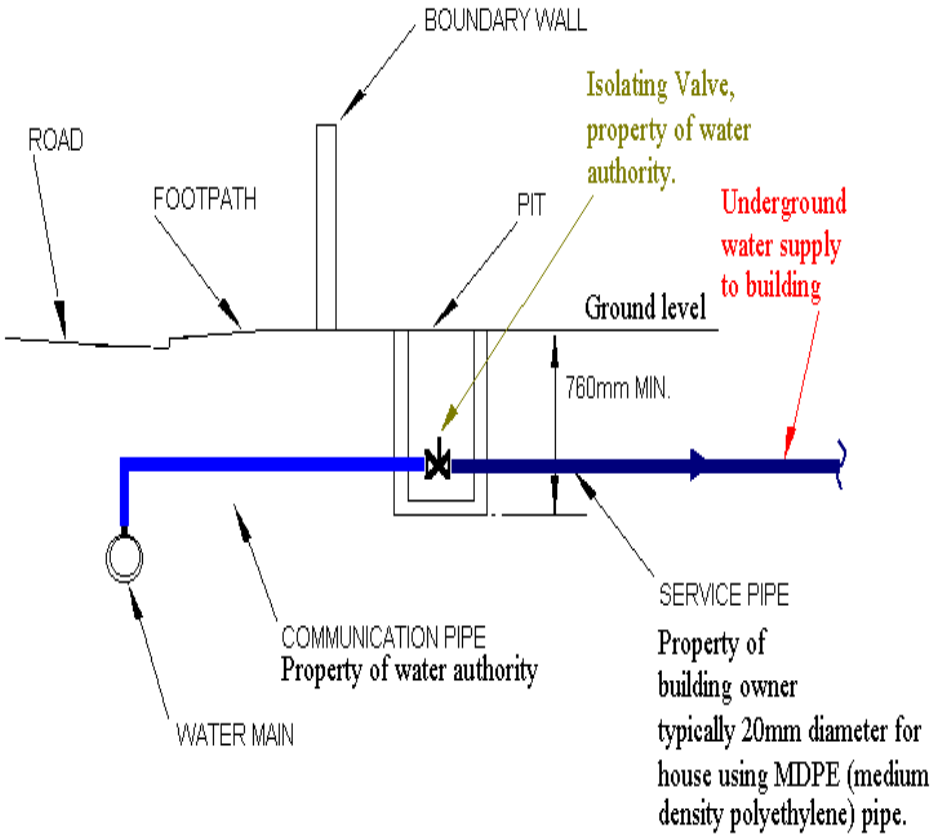
Mains connections

Connections to a trunk or secondary main are normally only carried out by the water supply company.
It is not normal practice to allow a service pipe to be connected to a trunk main.
Connections to secondary mains may be made under pressure to connect pipes of 50 mm diameter and below, whereas for larger pipes a shutdown of the main is required.

Service pipes are fitted by the water supply company from the main up to the boundary of the premises to be supplied. At this point a stop valve is provided to enable the premises' water system to be isolated from the mains

The drawing below shows a typical mains water connection to a domestic or industrial user.

It is often normal to have a meter installed so that water suppliers will be able to charge all customers on how much water is used.



(Fig-2)

Technical overview

Water supply systems get water from a variety of locations, including groundwater (aquifers), surface water (lakes and rivers), conservation and the sea through desalination. The water is then, in most cases, purified, disinfected through chlorination and sometimes fluoridated. Treated water then either flows by gravity or is pumped to reservoirs, which can be elevated such as water towers or on the ground (for indicators related to the efficiency of drinking water distribution see non-revenue water). Once water is used, wastewater is typically discharged in a sewer system and treated in a wastewater treatment plant before being discharged into a river, lake or the sea or reused for landscaping, irrigation or industrial use.

Water quality

Drinking water quality has a micro-biological and a physico-chemical dimension. There are thousands of parameters of water quality. In public water supply systems water should, at a minimum, be disinfected - previously through chlorination, now using ultra violet light - or it may need to undergo treatment, especially in the case of surface water. For more details please see the separate entries on water quality, water treatment and drinking water.

Water pressure

Water pressures vary in different locations of a distribution system. Water mains below the street may operate at higher pressures, with a pressure reducer located at each point where the water enters a building or a house. In poorly managed systems, water pressure can be so low as to result only in a trickle of water or so high that it leads to damage to plumbing fixtures and waste of water. Pressure in an urban water system is typically maintained either by a pressurized water tank serving an urban area, by pumping the water up into a tower and relying on gravity to maintain a constant pressure in the system or solely by pumps at the water treatment plant and repeater pumping stations.

Water supply network

A water supply network is a system of engineered hydrologic and hydraulic components, including:

- The Watershed or geographic area that collects the water
- A raw water reservoir where the water gathers, such as a lake, a river, or groundwater from an underground aquifer
- A means for delivery from the source to a point of treatment, such as piping
- Water purification, such as a water plant
- Transmission from treatment, through pipes to treated water storage, that may be either elevated or ground level
- Distribution through piping / water mains from storage to consumption (at house, fire hydrants, industrial use points, etc.)
-

Reservoir

A reservoir refers to an artificial lake, used to store water for various uses. Reservoirs are created first by building a sturdy dam, usually out of cement, earth, rock, or a mixture. Once the dam is completed, a stream is allowed to flow behind it and eventually fill it to capacity. A raw water reservior doesn't simply hold water until it is needed. It is the first part of yhe water treatment process. The time the water is held for before it is released is known as the retention time, and is a design feather that allows larger particles and silts to settle out as time for the biological treatment of algae and bacteria by plankton-like. Creatures that naturally live within the water.

Water Intake and pump house

Water will be pumped from reservoir at the intake.

Raw water Transmission main

Raw water will be transmitted to the treatment plant through transmission main. DI or UPVC pipes will be used for this purpose.

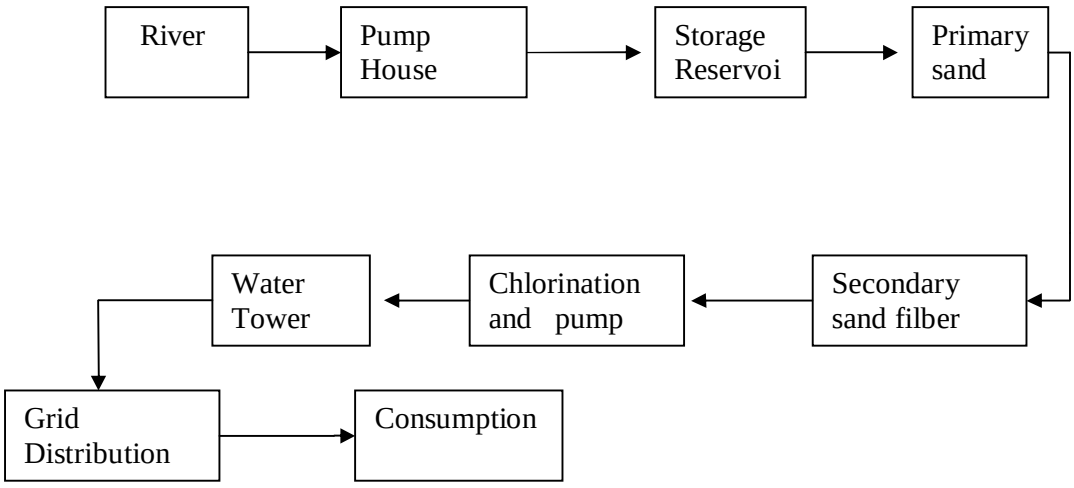
Treatment Plant

Traditional surface water treatment plants generally consist of three steps:

1. Clarification
2. Filtration
3. Disinfection

Clarification refers to the separation of particles (dirt, organic, matter, etc.) From the water stream. Chemical addition (i.e. alum, ferric chloride) destabilizes the particle charges and prepares them for clarification either by settling or floating out of the water stream. Sand, anthracite or activated carbon filters refine the water stream, removing smaller particulate matter. While other methods of disinfection exist, the preferred method is via chlorine addition. Chlorine effectively kills bacteria and most viruses and maintains a residual to protect the water supply network.

The energy that the system needs to deliver the water is called pressure. That energy is transferred to the water, therefore becoming water pressure, in a number of ways; by a pump, by gravity feed from water source at a higher elevation or in smaller systems, by compressed air.



Water tower

A water tower, watershed, or elevated water tower is a very large elevated tower that is constructed for the purpose of holding a supply of water at a height sufficient to pressurize a water supply distribution system. Pressurization occurs through the elevation of water: for every 2.34 feet of elevation 1 PSI (pounds of pressure per square inch) is produced. 100 feet of elevation produces 42.6 PSI of pressure, which is enough pressure to operate and provide for must domestic water pressure and distribution system requirements. A variety of materials are used to construct the typical water tower; steel and reinforced or prestressed concrete are the most often utilized.

The height of the tower provides the hydrostatic pressure for the water supply system, and it may be supplemented with a pump. The volume of the reservoir and diameter of the piping provide and sustain flow rate. The feed from these pumps and a water tower first go to a Hydro pneumatic pressure vessel. This pressure vassel is an air over water device, used to produce a consistent pressure with either a force (PSI) generated by pump or the water towr's hydrostatic force in combination with a trapped volume of air; this is where the water meets the citizens' demand for a constantly varying output pressure water supply. The water tower reduces the need for electrical consumption of cycling pumps and thus the need for an expensive pump control system, as this system would have to be sized sufficiently to give the same pressure at high flow rates. To maintain the safety of the water supply.

Distribution of water

These systems are usually owned and maintained by local governments, such as cities, or other public entities etc. water supply networks are part of the master planning of communities, counties and municipalities. The planning and design requires the expertise of city planners and civil engineers, who must consider many factors, such as location, current demand, future growth, leakage, pressure, pipe size, pressure loss, fire fighting flows, etc. PVC pipes are used to distribution of water. The diameter of the pipes will depend on requirements of water.

Maintance of a biologically safe drinking water is another goal in water distribution. Typically, a chlorine based disinfectant, such as sodium hypochlorite or monochloramine is added to the water as it leaves the treatment plant. Booster stations can be placed within the distribution system to ensure that all areas of the distribution system have adequate sustained levels of disinfection.

Flow controls

Taps

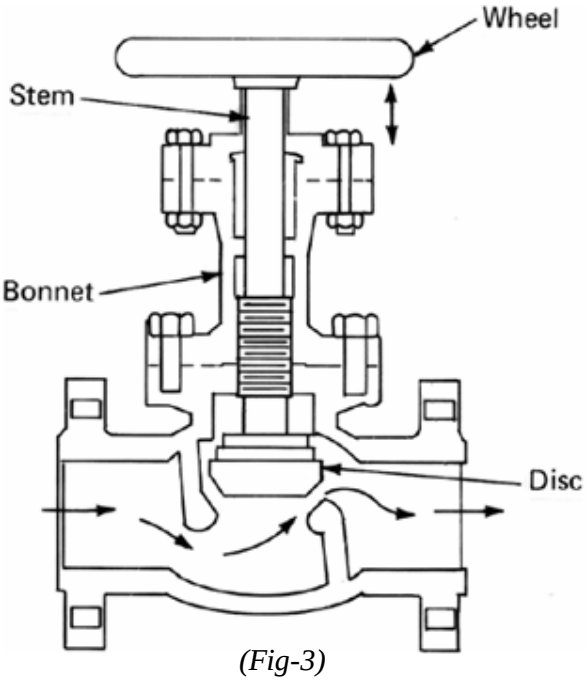
There is a wide variety of taps available such as

- Screw-down bib tap
- Screw-down pillar tap
- Self-closing taps
- Spray taps

Valves

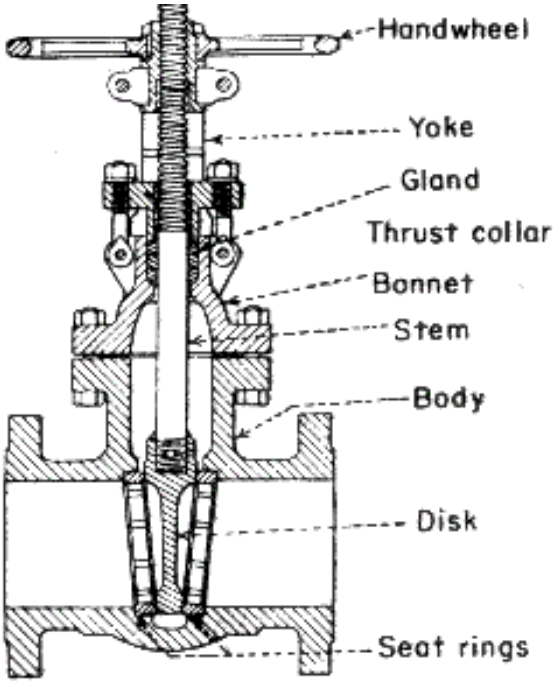
- Screw-down stop valve
- Gate valve
- Non-retyrn valve
- Mixing valves

1. *Globe valve*



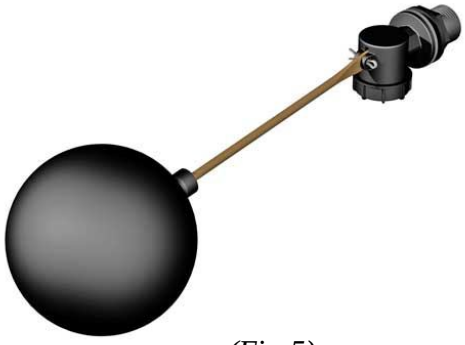
(Fig-3)

2. Gate valve



(Fig-4)

3. *Float valve*



(Fig-5)

Taps and stop cock

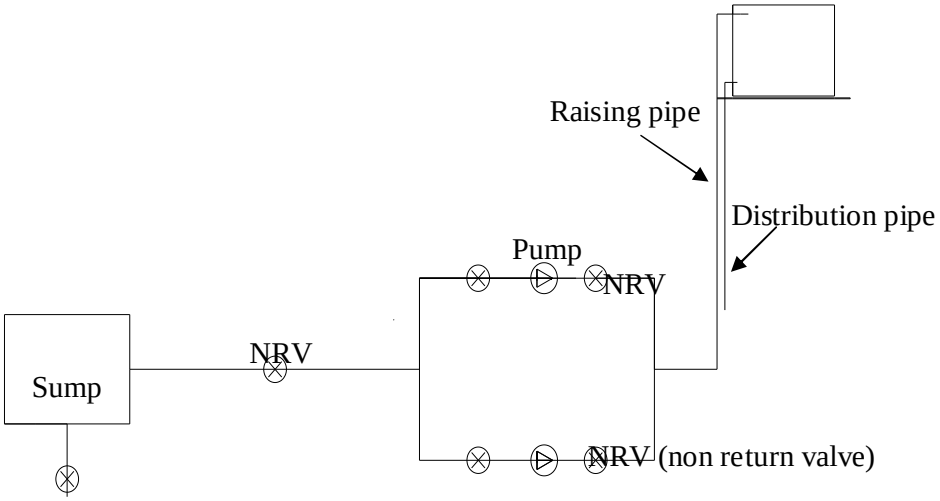
(Fig-6)

(Fig-7)

Water supply systems are two categories those are

- Direct boosting system
- Indirect boosting system

For this building we selected indirect boosting system. In this system main incoming supply is directly connected to sump and sump connected to over head storage tank. Then the water is pump to over head storage tank from the sump. The distribution pipes were connected with over head storage tank. And all houses get the water from that distribution pipes. This project is a new four-storey residential building. And first, second and third floors consist of ten identical houses. So while pump the water enough pressure should maintain so in this system we can provide enough pressure so we select Indirect boosting system



In the proposed residential building is situated in Hanguranketha.water is usually pumped up to an elevated storage tank from where it is distributed in the building. The commonly used connection from the municipal street main to the building. The inlet services pipe is nowadays made of plastic so that it does not corrode when buried in the earth.
But here, pressure is not enough and too low. So a sump (water tank below the ground level) has to be provided within the building property, preferably as near to the street water mains as possible. The inlet to the sump should be at sufficient depth so that water from the municipal supply line can flow in to the tank.

Water is pumped from this sump at regular intervals to an over head tank from where the water is distributed to various part of the building. (Ex: - kitchen and bathroom with toilet) the capacity of the over head storage tank will depend on the Number of persons using it. It is usually varies liters. In this case uses more than 9000 liters for the building. The tank is 3 types of uses. These are brick, concrete, ready made PVC tanks. Here uses of brick tanks. And it is out let pipe is fixed at 50 to 75mm above the bottom of the tank.

SIZE OF DISTRIBUTION SYSTEM

Here, consider for each house where there will be 5 teps, sink, WC and washing bashing. The pipes of minimum nominal size 20mm.when water closet flushes are directly operated from the over head tanks; a 25mm size is uses. The recommended size of water supply pipes given in table 1.1A for the building.

Detail of pipe	Size of pipe (mm)	Size of pipe (inch)
Service pipe	20	3/4
Bath tube & shower	12	1/2
Toilet	10	3/8
Water closet	10	3/8
WC valve type	25	1
Kitchen sink	12	1/2

pipe size

WATER SUPPLY FITTINGS & FIXTURES

These are many types of fitting which are to be used for water supply. Some important ones are given here,

- Gate valve
- Float valve
- Stop valve
- pip tap
- Pillar tap

And different from pipe fittings such as,

- Equal tee
- Reducing tee
- Faucet tee
- EL bow
- Faucet EL bow
- Equal socket
- Faucet socket
- Valve socket
- Reducing socket
- End cap

b) Stack systems that can be used in providing internal sewerage and drainage and the system you proposed for the building with justification of selected method.

Drainage and sewerage disposal system

1. **Internal disposal system**

2. **External disposal system**

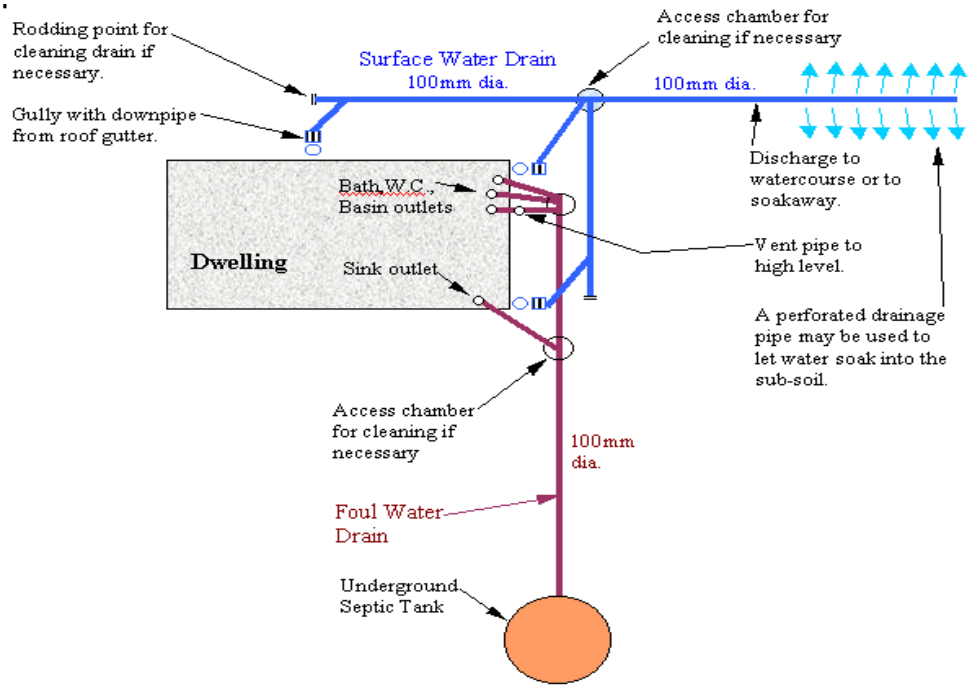
- **Sewerage disposal**

  Dispose water (sewage / soil water) with particles from toilets

- **Drainage disposal**

  Dispose water with (foul water) particles from
  - ✓ Bathroom
  - ✓ Kitchen
  - ✓ Washroom

The diagram below shows a typical arrangement for a small rural dwelling



DRAINAGE SYSTEM FOR SMALL DWELLING IN RURAL AREA

(Fig-8)

Designing of toilets and bat rooms

Appliances
Kitchen: - kitchen sink
Toilet and bat room: - water closet, wash basin, bath tab, shower, cleaners sink

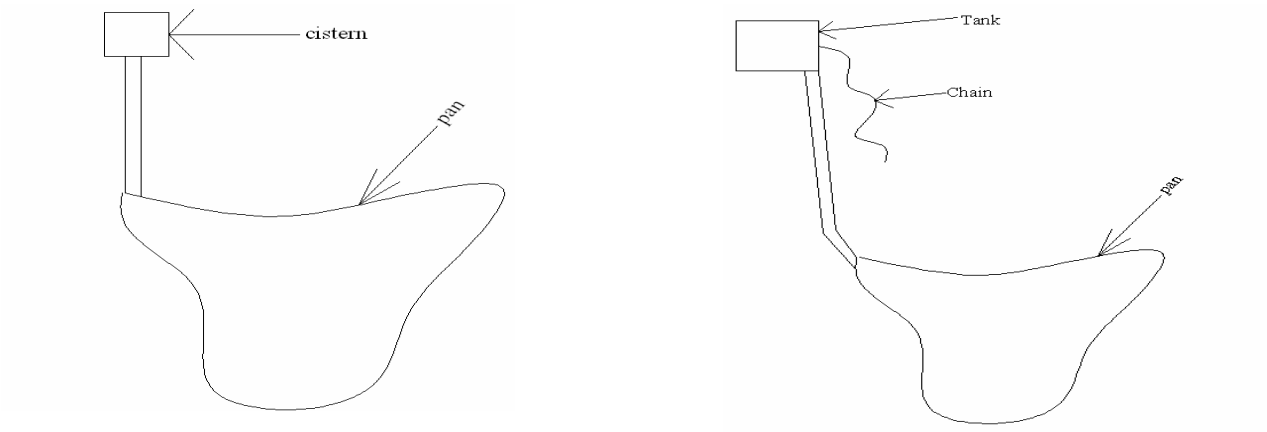
Water closet

Material:- china glazed fire clay, plastic
Component: - cistern, squatting pan, flushing method, Ball valve

Types

High level, low level

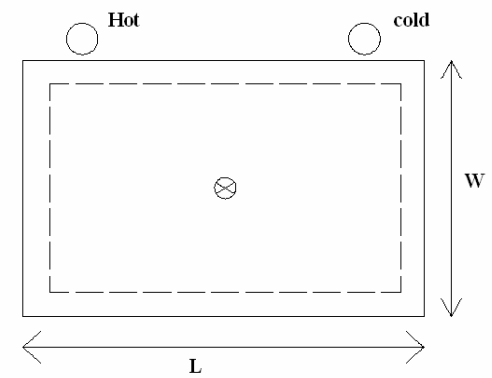
Low level **High level**



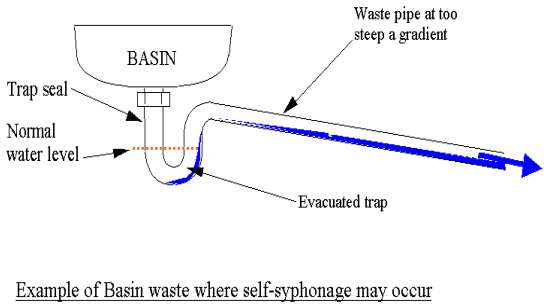
(Fig-9)

Wash basin

Made out with china clay
Sizes 22” X 16”
Height 2’7”



(Fig-10)

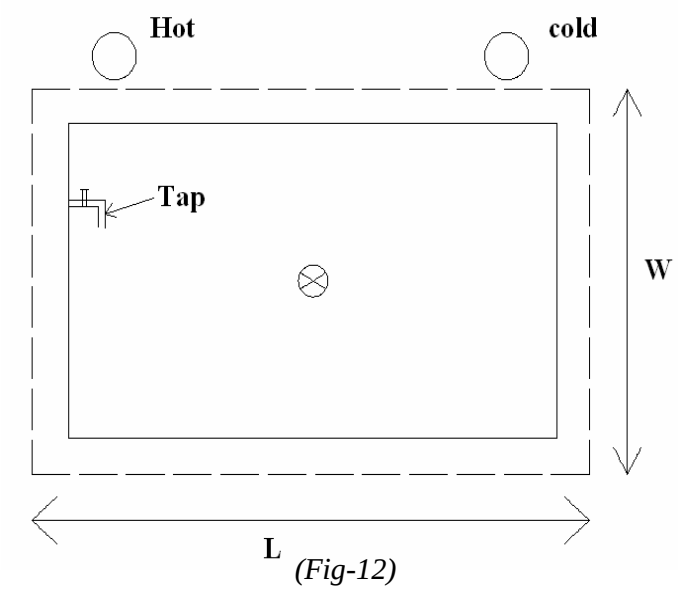


Example of Basin waste where self-syphonage may occur

(Fig-11)

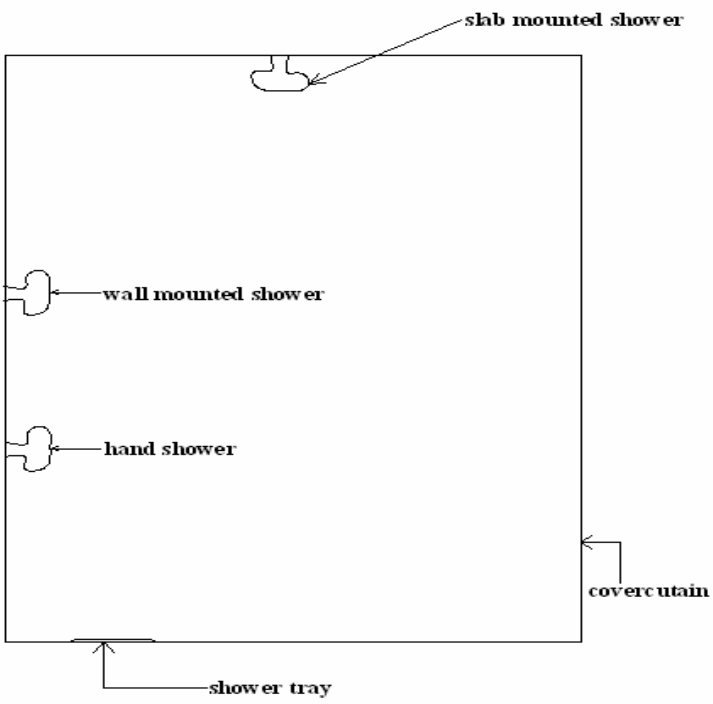
Bath tub

Materials – class iron, fiber glass
Commonly used in hotels luxury apartment
Size
Length 5’ – 6’
Length 28’ – 34’
Length 18’



(Fig-12)

Shower



(Fig-13)

Design of toilets and bathroom

Arranging appliances inside the toilets
Domestic toilets or toilets in apartments with bathroom
Types of toilets – attached to bedroom

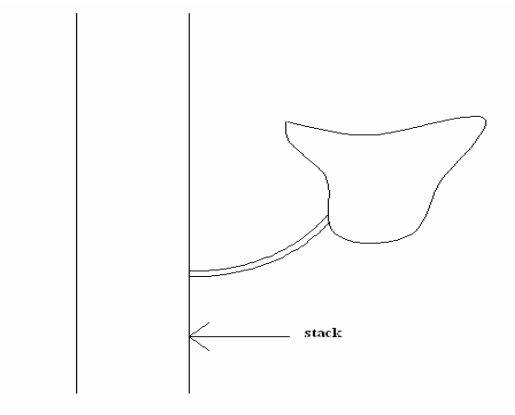
None attached to bedroom

Number of appliances
Water closet 1
Was basin 1
Bath tap 1
Shower set 1

The place stack pipe. Keep we as near as the stack
The plate of window. Keep we as near as the window
Try to save space in toilets as free space

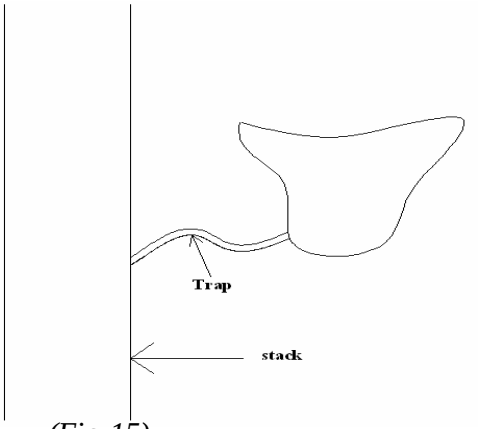
Trap seal (water seal)

Direct connection



(Fig-14)

Water seal connection

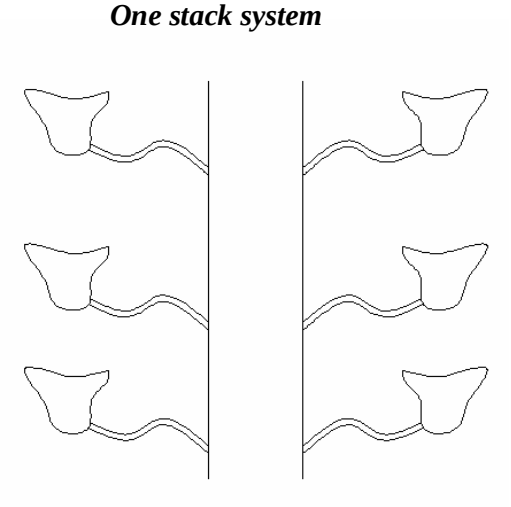


(Fig-15)

Sanitary appliances can not be connected directly to the stacks. Because trough these connection foul gases can come out, to avoid this trap seal connection foul gases can come out. To avoid this trap seal connation are used and these seals are sealed with water.

Internal disposal system

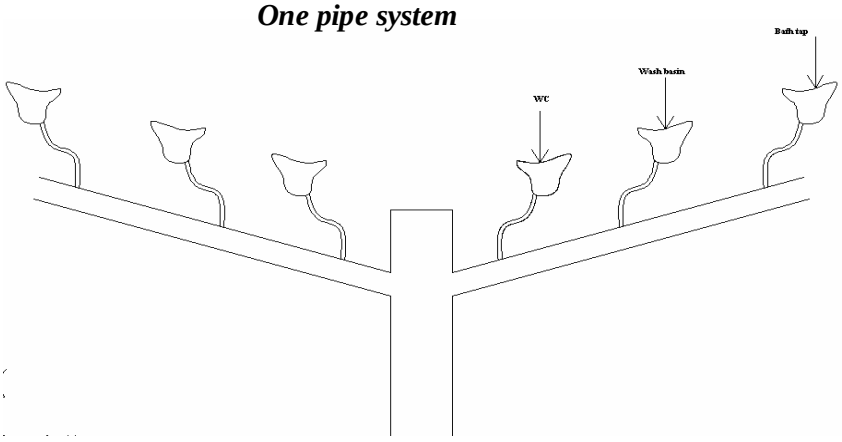
One stack system



(Fig-16)

- All the appliences an directly connect to the stack.
- Normally the stack is placed out side of the building.
- Maximum distance available for each appliances (1m)
- Normally one stack per one toilets
- Very simple system, therefore suitable for smaller residential buildings

One pipe system

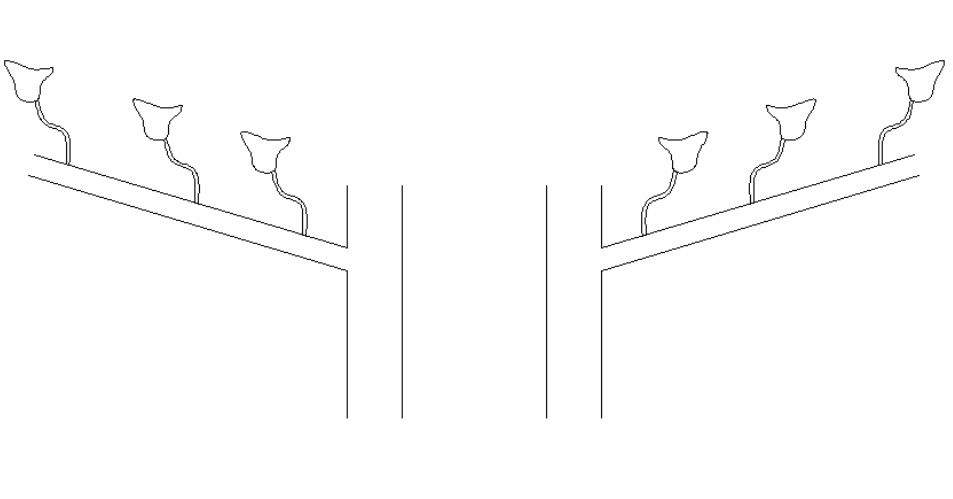


(Fig-17)

- All the appliances can be connected to the sub pipes. One sub pipe for each toilets and bathroom and placed in the ceiling.

- All sub pipes are connected to the main pipes
- Main pipe is placed within the service area
- The flow through the main pipe is higher, therefore frequent maintain is required.

Two pipes system



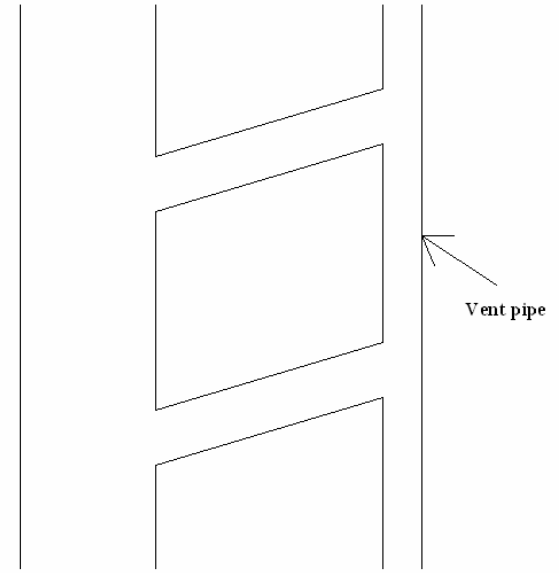
(Fig-18)

- Two separate pipes are used.

- Pipes are placed in service area.
- But usage is limited to external disposal system.
- Very suitable for multi storey hotels buildings due to less maintenance.

Ventilation pipes

- Any sewerage disposal should be provided with vent pipe to eliminate all the foul gases.



(Fig-19)

- Vent pipe is connected to main pipe or stack at different location.
- Pure air and foul gases can be transferred through the connection. The vent pipe should be over projected from the roof level.

External disposal system

As this is a big construction, I think more road disposal system is suitable for external disposal system.

Road disposal system

This can be classified into two types based on the methodology of disposal condition. Those types are combined system and Separate system

Combined system

All the sewerage and drain water dispose through one network of pipe system.

Advantage

Low initial cost
Disadvantage
Flow through the pipe is higher
Larger diameter pipe
Frequently maintain

Separate system

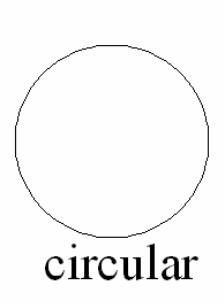
Two separate networks for sewerage disposal drain water disposal

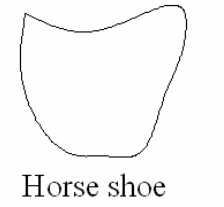
Advantages

Flow is slower
Smaller diameter pipe
Open drain can be used
Less maintain

Disadvantage

Higher initial cost
Good road network
Sewerage line
Use close pipe system

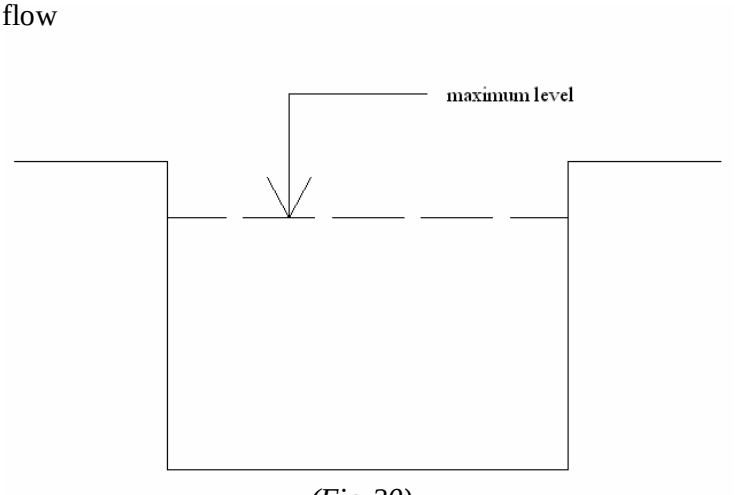




Use gravity flow
Velocities
Maximum velocities – to control the pressure 7m/s
Minimum velocities – to control the pressure 0.7m/s
Control the velocities by changing the slope of pipes.

Drain

Open canal flow



(Fig-20)

Materials – concrete masonry work with concrete lining

- Design a maximum level of flow to over come over flow of lines.
- In designing of drain allow for maximum rain flow
- Maintain specially self cleansing velocity to over come the blockage

Ultimate disposal

Dispose to the sea directly – this is limited

Purification with plants

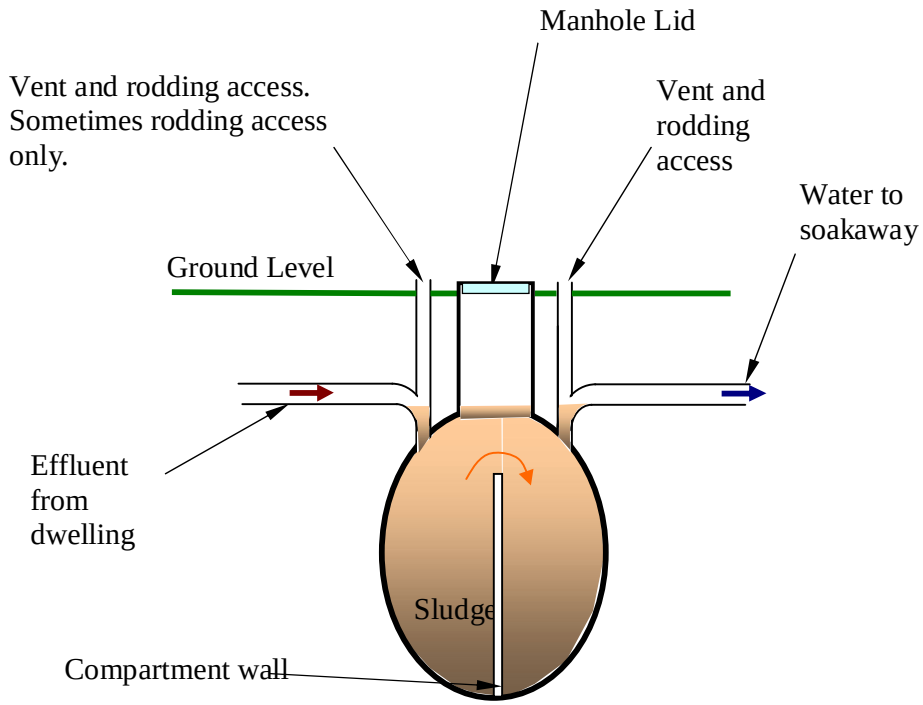
Sewerage ⟶ ⟶ solid organic fertilizer

Drainage ⟶ ⟶ liquid ⟶ add Cl_2 dispose to nearly water course

c) Septic tank and soakage system

Septic tanks

Septic tanks are acceptable method for foul water containment and treatment where main sewers are not available. Septic tank is a small scale sewage processing plant, which operates principally by the decomposition of solids by anaerobic bacterial activity in the absence of dissolved oxygen. The tanks are produced in reinforced plastic materials for convenient location in prepared excavations.
In the septic tank aerobic and anaerobic bacteria will decay the solid waste over a period of time. The excess s water is diverted to soakage pit as a by product of decaying process methane, hydrogen sulphide gases will be produced. The liquid from the septic tank passed through a system of subsoil should be porous and at a level above that of the water table in winter.



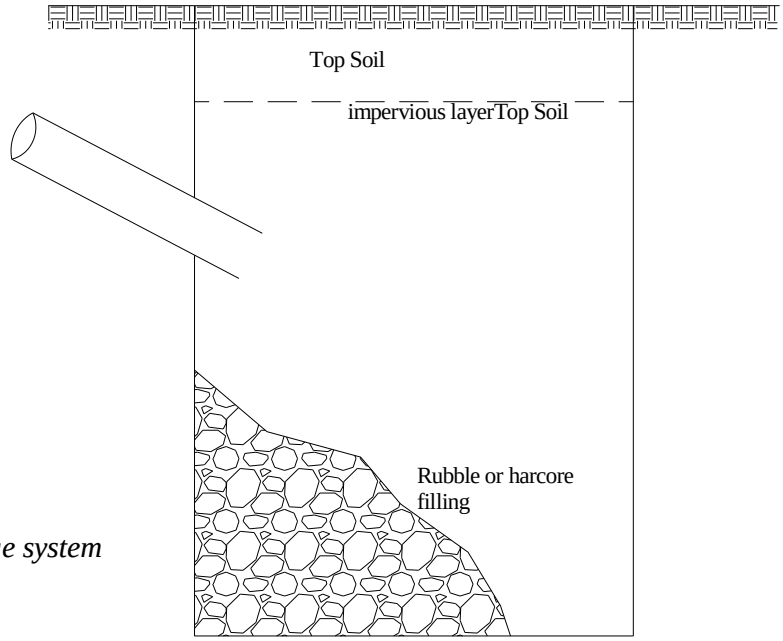
Septic Tank

(Fig-21)

Septic tank and soakage system for building

Soakage system

A soakage is shown in its simlest form in figure. It is a pit fiied with coarse rubble for collection and storage of storm-water for subsequent dispersal into the subsoil. They are only acceptable in granular free draining subsoil and must be on land lower than the building to be drained and not closer than 5 m to the building. This acknowledges that water concentrations could undermine foundations. Capacities and volumes for excavation can be determined from soil percolation tests and graphical analysis but the following empirical formula provides sufficient guidance for soakage serving small buildings.



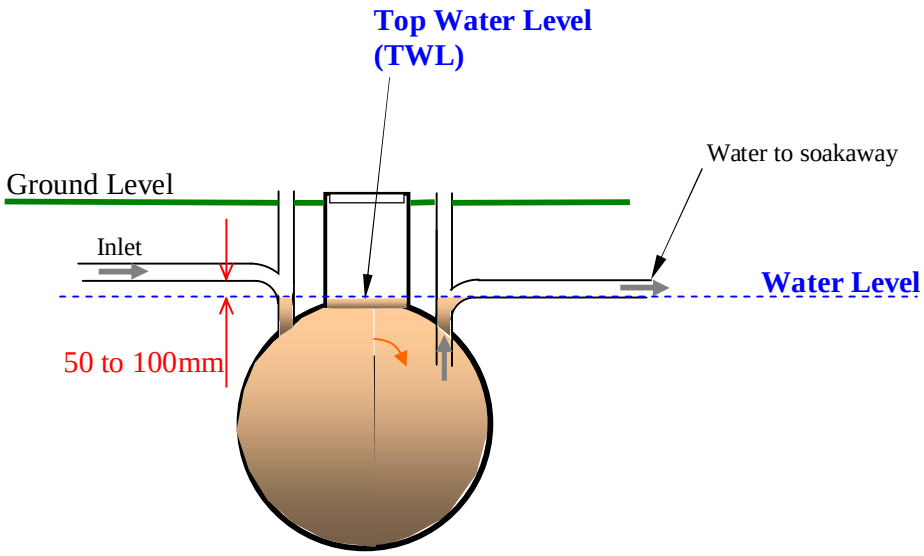
Soakage system

(Fig-22)

Levels

The level of the invert of the outlet pipe fixes the TWL (top water level) of the tank. When the water reaches that level, the tank is full to capacity, and it will overflow by discharge through the outlet.

In order that the inlet pipe does not become full, the inlet should be slightly higher than the outlet (say 50 - 100mm). This means that there will be a slight cascade into the tank.



Septic Tank Levels

(Fig-23)

To ensure that the scum on top of the liquid neither impedes influent nor escapes as effluent, both inlet and outlet pipes should be fitted with a tee as shown above.

d)

HVAC SYSTEMS AVAILABLE AND THE SYSTEM THAT YOU PROPOSE FOR THE BUILDING.

HVAC system

Recommended rates of ventilation

One basis for estimating the rate of air renewal is the number of times in an hour that the air content of the building should be replaced by fresh air. The procedure is to calculate the total interior space in cubic meters and multiply that by the number of times per hour the air content should be changed. This gives the rate of air movement required in cubic meters per hour which is divided by sixty to give cubic meters per minute. The latter is the customary unit for calculating the volume flow of air.

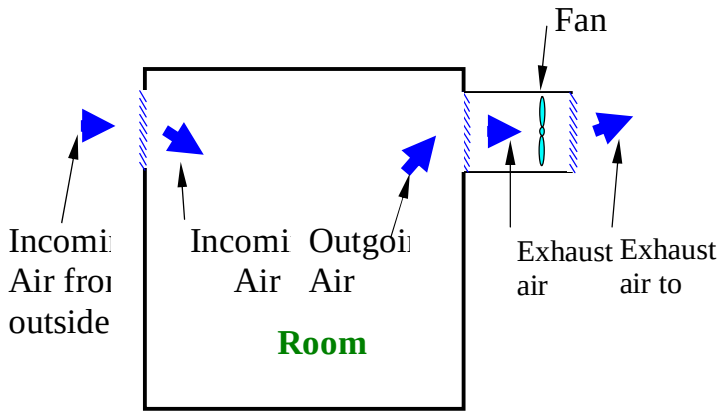
Another method is to provide a minimum fresh air supply of 28.5 cu m per person per hour. This does not provide for removing pollution due to smoking or industrial contaminants. Nor does it provide for removing heat. Where smoking occurs, ventilation should be doubled. This basis is commonly used for schools, cinemas, theatres and public assembly halls

Type of building	**Air changes per hour**
Assembly halls	4-6
Bakeries	20-30
Banks	2-4
Boiler house	20-30
Churches	½-1
Cinemas	10-15
Hospital	4-6
Kitchens	10-15
Office	4-6
School classroom	2-3
Residences	1-2

Ventilation System

Controlled ventilation requires the use of fans. This applies to must industrial and commercial buildings, especially when the number of occupants is large or where heat or steam must be removed. A natural supply of fresh air depends on the wind and on the difference between the inside and outside temperatures. Fresh air will not flow naturally into a building unless a breeze is blowing in the right direction. Even then is distribution through an occupied space is a matter of change there different system may be employed

- Exhaustion of air,
- Supply of air
- Combination of exhaustion and supply



(Fig-24)

➢ **Exhaustion of air,**

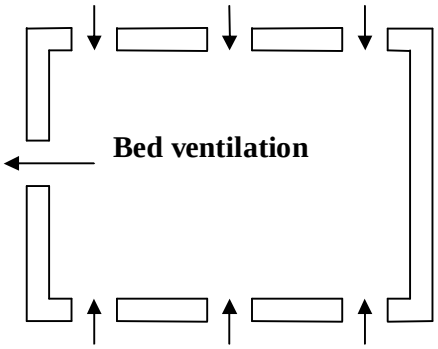
The exhaust system is most widely used. The interior air is renewed by exhaustion from the occupied space, which causes fresh outside air to enter. An exhaust fan creates an area of low pressure adjacent to it and air from outside flow in through any available aperture to fill the depression within.

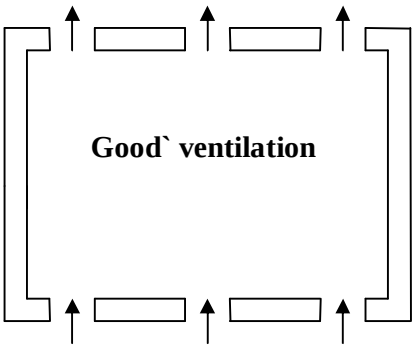
➢ **Supply of air**

Air supply system is the direct opposite of the exhaustion method. Fresh air is blown in to an occupied space by means of fans, and with a plain supply system the interior air flows out through any available outside. The advantages of air supply system are that fresh air is introduced in to the occupied space in a positive manner by means of fans and reasonable control can be maintained over it is distribution, volume and velocity.

- **Combination of exhaustion and supply**

The fullest control of ventilation is achieved by using both supply and exhaust fans. A uniform distribution of fresh air can then be ensured. Fresh air can be introduced where it is required and it is distribution throughout the occupied space can be governed by a positive flow between supply inlets and exhaust outlets. The input fans should be selected to give about 20% more volume than the exhaust fans. This keeps the air in the building at a higher pressure than outside and so reduces the likelihood of droughts. It also prevents the infiltration of dust and other airborne contaminants.





e)

SANITARY AND KITCHIN APPLIANCES WITH THEIR LAYOUT

Sanitary and Kitchen appliances their layout

The fittings or appliance used for collection and discharge of soil or waster matter is termed as sanitary fittings. Different types of sanitary fittings are required in building to perform different type of functions. Sanitary fittings are normally made of ceramics, glazed fire clay, glazed earthen ware or glazed chinaware. The fittings are so designed and shaped that they have non absorbent surface which can be cleaned easily. The different type sanitary fittings normally used in buildings are as under.

- Wash basin
- Sink
- Bath tub
- Urinal
- W.C

Wash basin

A wash basin is used for washing hands, face etc. It is made of porcelain vitreous enameled steel or plastic and is available in various pattern and sizes. The type of wash basin normally used in a house has an oval shaped bowl with an overflow slot at top. The wash basin has a flat back and has provision for making holes for installing one, two or even there taps. Normally two pillar taps are provided one for cold water and the other for hot water. It has a circular waste hole for draining out waste water from the basin. A metallic strainer is provided in the waste hole which is connected to a waste pipe either directly or through a bottle traps for discharge of waste water in to the floor trap. The basin is normally mounted on 2 angle irons fixed in the wall. The top of the waste basin should be kept at a height of about 75 to 80 cm from floor level.

Sink

Sink is commonly used in kitchen, hospital and laboratories. Sink is made of glazed, fire clay, stainless steel, plastic, marble and R.C.C. Sink may be made with or without overflow arrangement. In hospitals and laboratories only vitreous sinks are preferred. It has a circular waste hole for fixing the metallic strainer to which the waste pipe is attached for conveying the discharge from sink to the floor trap. The kitchen sink is invariably provided with a drain board.

(Fig-25)

Bath tub

A shower is considered to be more efficient and hygienic means of taking bath and as such is widely used in bath rooms by most of the people. However, some people prefer to use bath tub as they find it to be more comfortable and relaxing. Use of bath tub is restricted to certain class of hotels and private residences. Bath tubs are made of enameled steel, get coated fiber glass, reinforcement resign, enameled porcelain, reinforced concrete finished with terra cotta or marble finishes etc. bath tubs are provision for over flow and waste water pipes. The length of bath tubs varies from 1.75 m to 1.85 m, width varies between 0.7 m to 0.75 m and its depth near the waste pipe varies between 0.43 to 0.45 m

(Fig-26)

Urinal

Urinals fall under the category of soil appliance and as such the discharge from urinals is connected to soil pipe either directly or through a trap provided with gun metal or bass domed shaped removable gaiting. From hygienic consideration is desirable to provide glazed tiles on walls of urinal preferably up to door height.

(Fig-27)

f)

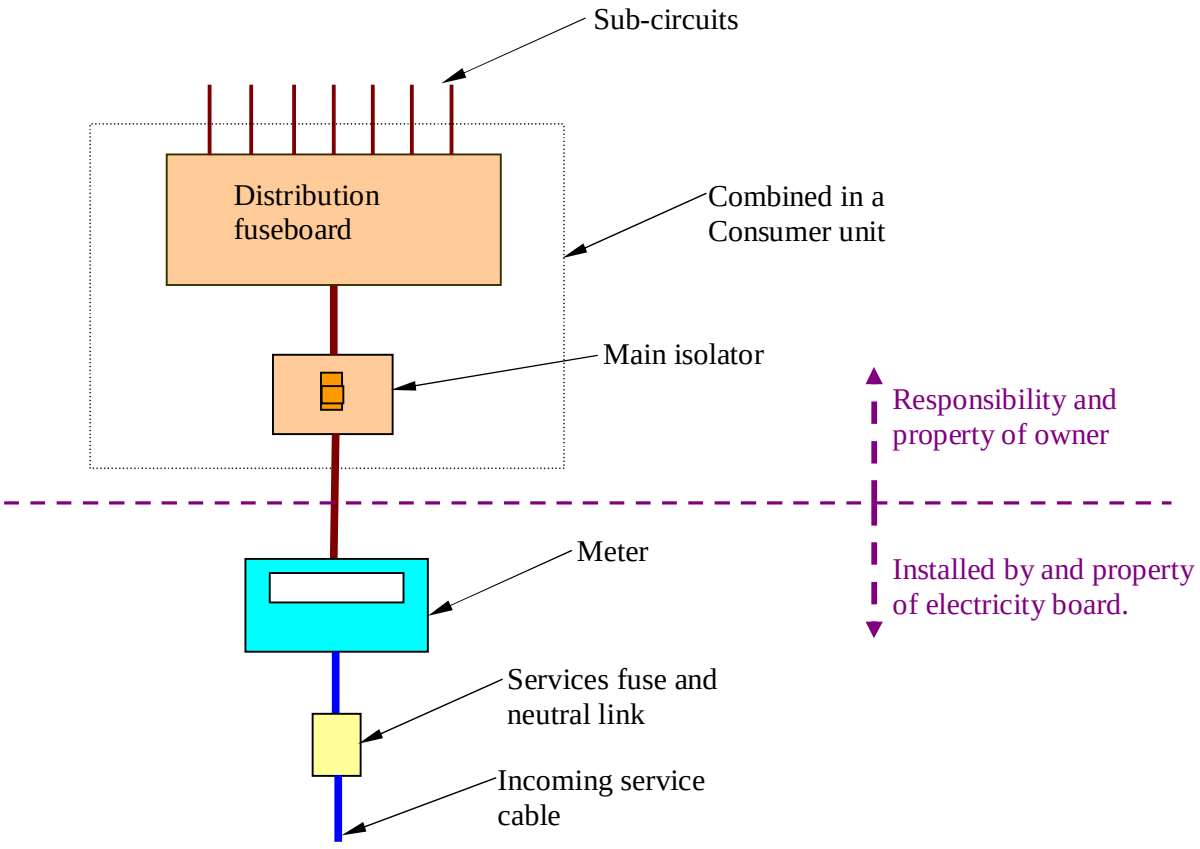
Electrical layout and wiring regulations.

ELECTRICAL SUPPLY

INTRODUCTION

The Institution of Electrical Engineers (lEE) guide (BS 7671) is used to assist in design and installation of electrical services. Engineers follow the guide closely to provide safe and efficient electrical systems in buildings.

Most domestic premises receive a single-phase supply of electricity from an area electricity board at a rating of 240 volts and frequency of 50 hertz.
The area electricity board's cable, from which the domestic supply is taken, consists of four lines, three lines each carrying a 240 volt supply and the fourth is the common return line or neutral which is connected to earth at the transformer or substation as a safety precaution should a fault occur on the electrical appliance. Each line or phase is tapped in turn together with the neutral to provide the single-phase 240 V supply.



SCHEMATIC DIAGRAM OF DOMESTIC INCOMING ELECTRICAL SERVICE

The electrical supply is uses for the purpose Lighting and Energy sources.
The electric wire color codes are,

Positive (phase) wire	---	Red or Brown
Neutral wire	---	Blue
Earth wire	---	Green or Yellow

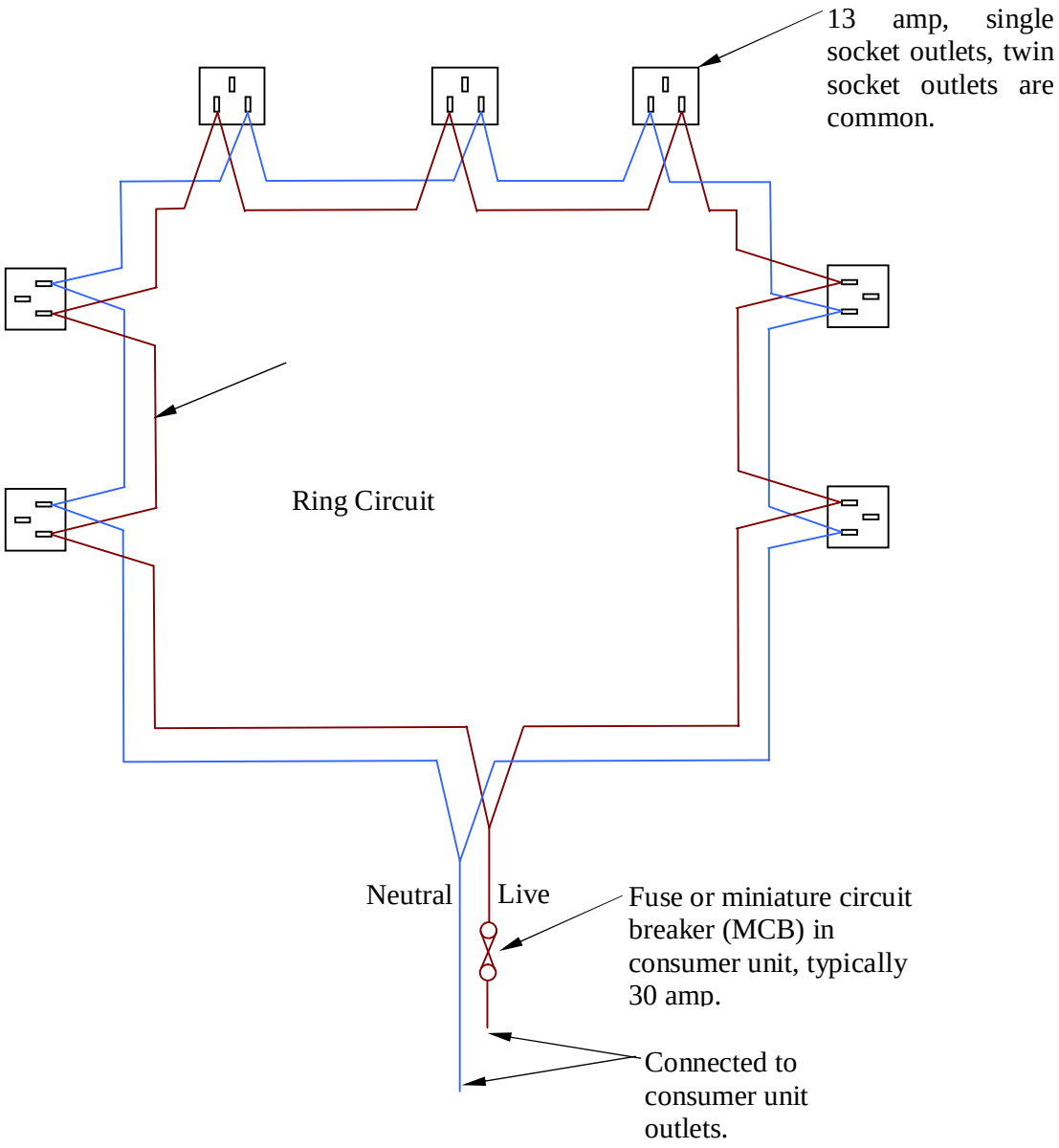
MINIATURE CIRCUTE BREAKER (MCB) AND EARTH LEAKAGE CIRCUIT BREAKER (ELCB)

In older times, fuses were incorporated in the electrical circuits so that when a fault occurs, heavy current will flow through the circuit and the fuse will blow out. Nowadays, instead of fuses, MCB (miniature circuit breakers) are used. The MCB will switch off if there is excess flow of current in the circuit.
Leakage of current to any metal work of equipment can occur if the wires are displaced or insulation is frayed. It can occur if the switches or other electric points on a wall get damped or moist from rains or other means. These can produce shock to other means. These can produce shock to the user this can be avoided by earthing the equipment and using an earth leakage circuit breaker (ELCB).

POWER CIRCUITS

When deciding on the number of circuits for a house, a useful rule is; one power circuit for every $100m^2$ of floor area. In larger houses this means that two circuits can be used for power socket outlets, in a two-storey house this would be one circuit for upstairs and one for downstairs. In some larger houses a separate power circuit is also installed for the garage / utility area.
In all domestic installations a separate power circuit is required for the cooker since the electrical demand is likely to be high. The immersion heater in the hot water cylinder can also be supplied from a separate circuit since a 3kW load is quite high.

Ring circuits are used as a safe and economic method of distribution of electricity to socket outlets. Many consumer unit manufacturers produce 8 way and 12 way units.


13 amp, single socket outlets, twin socket outlets are common.
Ring Circuit
Neutral
Live
Fuse or miniature circuit breaker (MCB) in consumer unit, typically 30 amp.
Connected to consumer unit outlets.

(Fig-29)

Electrical Switches

Single pole (sp) switches. A single pole switch is an ordinary switch which connects the two ends of a phase in the 'on' position and disconnects them in he 'off' position. This various types of single pole switches available in the market with different architectural designs but doing the same faction. It is very important that the switch is connected to the phase.

Double pole (DP) switches.

A double pole switch connects or disconnects both the line and the neutral from a circuit. Such type of switch is usually used for heavy currents and as the main switch for the electric installation or large electric appliances such as electric cookers, household pumps, etc. to completely isolate them, if necessary, from the circuit.
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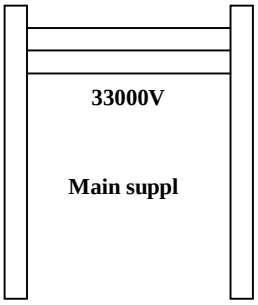
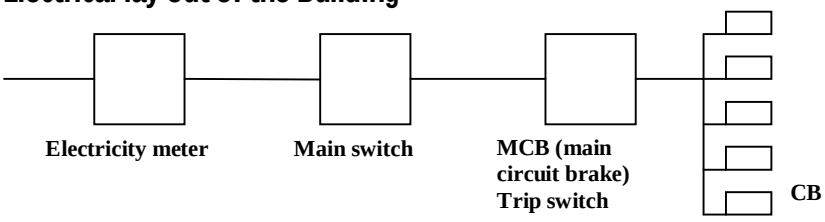


Main supply → House hold supply
(33000V) Transformer (230V)

Electricity meter
1 unit – 1kw hr

Electrical lay out of the Building



(Fig-30)

* Main switch:-
  To switch off (control) the power supply of the building.
* MCB:-
  To power off suddenly when there are short circuit over current, lighting.
* CB (Circuit Brake):-
  To switch off the part of the supply of the building (Loop)

Electrical lay out should be design by the architected or interior designer we should contain the numbers and location of lights, switchers, plugs etc. According to that electrician can prepare or arrange wiring lay out

IEE Regulations (International Electrical engineers regulations)

Any building should be warred according to the world recognize regulation system

* To give easiness for the checking of authorities before get the approval of electricity supply
* To keep the continuity if technicians are absent permanently / temporary.

Bedrooms

The light should be so positioned that we will not be looking at the glaring light when lying in bed. This is particularly important as we may have to switch the light the light on suddenly in the middle of the night in the room where more then one person may be sleeping and the switching on should not disturb other. Bulbs need not be stronger then 100W. One strong light and another weak one will be ideal. Lamps fitted for reading should be used to conceal the lighting. For adequate light over the dressing table, two lamps mounted on either side or one lamp above the mirror will be the best. And Ceiling fans and extraction fans are the two types of fans generally fixed in buildings. Table fans and pedestal fans can be moved from place to place.

Kitchen

Kitchen is normally a hot place and hence, cool lighting is the best. Tube light (fluorescent lamp) will be ideal for general lighting. It should be so placed that it is easily accessible for being cleaned regularly. A 60 w bulb fitted directly over the cooking place will also be helpful.

Bathroom

Here the light should be of uniform level throughout. A simple ceiling mounted fitting is not suitable. The bathroom mirror needs special lighting and for this purpose, we can use a matching wall bracket fitting or a small tube light over the mirror

EARTHING SYSTEMS

These have been designated in the IEE Regulations using the letters: T, N, C and S. These letters stand for:

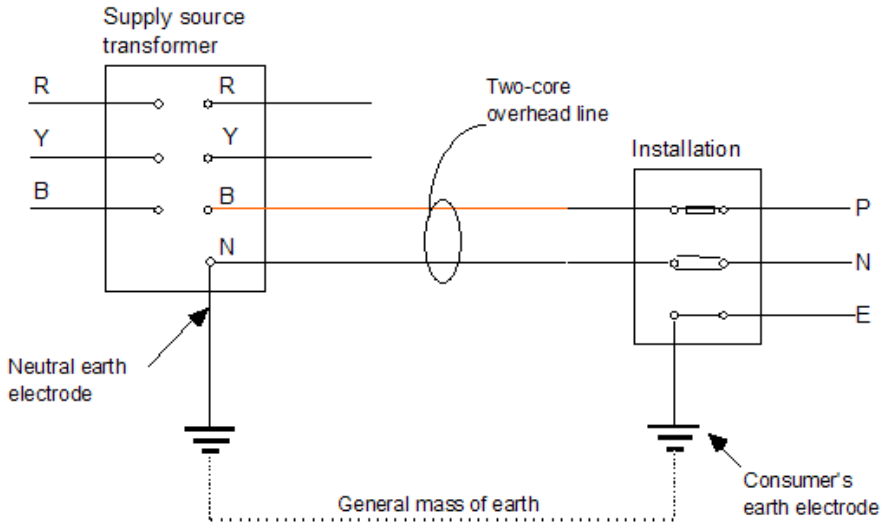
T - terre (French for earth) and meaning a direct connection to earth.
N - neutral
C - combined
S - separate.

When these letters are grouped, they form the classification of a type of system.
The first letter denotes how the supply source is earthed.

The second denotes how the metalwork of an installation is earthed. The third and fourth indicate the functions of neutral and protective conductors.

TT SYSTEM

A TT system has a direct connection to the supply source to earth and a direct connection of the installation metalwork to earth. An example is an overhead line supply with earth electrodes, and the mass of earth as a return path as shown below.

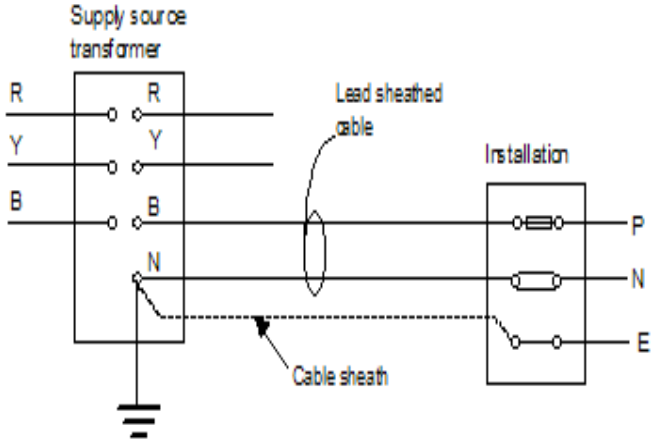


TT SYSTEM

(Fig-31)

TN-S SYSTEM

A TN-S system has the supply source directly connected to earth, the installation metalwork connected to the neutral of the supply source via the lead sheath of the supply cable, and the neutral and protective conductors throughout the whole system performing separate functions.



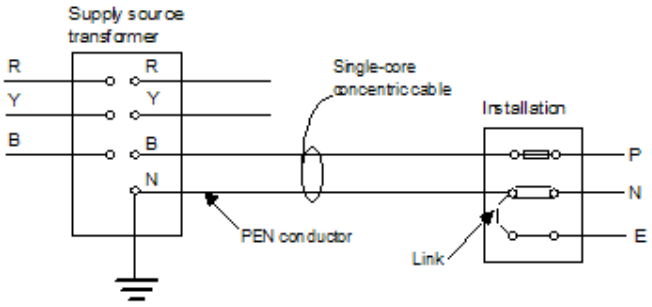
TN-S SYSTEM

(Fig-32)

The resistance around the loop P-B-N-E should be no more than 0.8 ohms.

TN-C-S SYSTEM

A TN-C-S system is as the TN-S but the supply cable sheath is also the neutral, i.e. it forms a combined earth/neutral conductor known as a PEN (protective earthed neutral) conductor.
The installation earth and neutral are separate conductors.
This system is also known as PME (protective multiple earthing



TN-C-S SYSTEM

(Fig-33)