UNIT-V
WATER MANAGEMENT SYSTEM
By the end of this unit, you will be able to learn:

- HARD WATER
- TYPES OF PUMPS
- METHODS OF WATER SUPPLY IN A BUILDING
- PIPES & VALVES
- PLUMBING PROBLEMS
SOURCES OF WATER & HARD WATER

- SOURCES OF WATER: Following are various sources of water:

SURFACE WATER: i.e. rivers, ponds, lakes etc.
GROUND WATER: i.e. by water pumps, tube wells, wells etc.
RECYCLED WATER:
WATER MANAGEMENT SYSTEMS

- WATER

- HARD WATER: It is of following types:
  TEMPORARY HARDNESS.
  PERMANENT HARDNESS.
PROCESS OF REMOVAL OF HARDNESS

- ALKALI METHOD
- LIME SODA METHOD
- SEQUESTERING AGENTS:
- PERMUTIT OR ION EXCHANGE PROCESS:
EFFECTS OF HARD WATER

- Lime buildups within pipes and around plumbing fixtures, inside boilers.
- Formation of soap curd.
- The shelf life of linen is reduced.
WATER SUPPLY

- WATER SUPPLY:
- FROM MAINS:
- FROM WELLS: In case there is no supply from mains, water may be pumped from a deep well. For the pumping of water, following types of water pumps are available:
  A. JET PUMPS
  B. CENTRIFUGAL PUMPS
  C. RECIPROCATING PUMPS.
JET PUMPS

- It is a type of impeller diffuser pump that is used to draw water from wells into residence.
- The initial cost of the pump is low but operating energy requirement is high.
- The water table should be 100 feet (30.5m) of the ground surface.
- The diagram shows that of a jet pump.

Gautam Singh, Hospitality Trainer, 07830294949
CENTRIFUGAL PUMPS

- It is a type of pump that consists of a spoke wheel (impeller) within a casing (volute).
- TURBINE PUMPS
- SUBMERSIBLE PUMPS
These pumps are based on a reciprocating piston design.

A motor driven CAM pulls the piston back & forth in the piston head.
CALCULATION OF WATER REQUIREMENTS

- Water consumption per occupied room per night (Gallon of water per occupied room).
- Water consumption per guest room per year (Gallons of water per room per year).
- Water consumption per square foot per year (Gallons of water per square foot).
- Water consumption per cover in food service outlets & room service (Gallons of water per cover).
WATER DISTRIBUTION SYSTEM

There are two ways of water distribution system:
1. UPFEED SYSTEM
2. DOWNSPEED SYSTEM.
UPFEED SYSTEM

COLD WATER

SERVICE PIPE

WATER HEATER

FIXTURE

FIXTURE
PIPING

- **PIPING**: This includes pipes, pipe fittings, plumbing fixtures & valves.

- **PIPES**: This includes:
  - **A. MAIN SERVICE PIPE**:
  - **B. DISTRIBUTION PIPE**:
  - **FIXTURE BRANCH PIPES**:

- Pipes are made of plastic, galvanized steel, brass & copper.

- Grades of plastic pipes
PIPE FITTINGS

VALVES: The main function of valves is to regulate the flow of water. It is of following types:
- GATE VALVE
- ANGLE OR GLOBE VALVE
- CHECK VALVES
- NEEDLE VALVE
PLUMBING FIXTURES

- The number of plumbing fixtures depends on the maximum number of people that may occupy a room at any given point of time. The plumbing fixtures are grouped into various categories. Urinals & toilets may include one group.

- Other group of fixtures may include lavatories (for washing face & hands); showers, sinks of all types such as laundry trays & sinks, vegetable preparation sinks, pot and pan washing sinks; dishwashing equipments, swimming pools.
LEAKING FAUCETS & PIPING

- These increase costs as well as they may be annoying to the guests.
- A VISIBLE SEAT WASHER needs to be changed.
- The valve also has a STEM WASHER or packing. Whenever valve seat washer is changed, the stem washer should also be changed.
- Water leaks can happen at piping connections hence there must be inspection points.
LEAKING FAUCETS & PIPING
LEAKING FAUCETS & PIPING

Gautam Singh, Hospitality Trainer, 07853254545
LEAKING FAUCETS & PIPING
LEAKING FAUCETS & PIPING

Gautam Singh, Hospitality Trainer, 07830294949
PLUMBING VIBRATION NOISE

- Plumbing vibrations can create noise which can be transmitted throughout the building.
- Hot water pipes can create a noise problem. Due to the high temperature of hot water, they expand rapidly, which can generate noise.
- Hence, adequate piping insulation will solve this problem.
PIPING EXPANSION PROBLEMS

- Expansions in pipes can cause pipes & connection points to separate. While all new installations use copper & plastic, these materials have greatest co-efficients of expansion.

- One solution is to install expansion devices such as piping loops & expansion joints. These devices do not prevent materials from expanding, but they allow piping to expand at controlled points & eliminate undesirable expansion noises.
REVIEW

- Sources of water
- Hard water & removal of hardness.
- Water supply (Jet pump, centrifugal pumps, reciprocating pumps)
- Water distribution systems (upfeed, downfeed & combination systems)
- Leaking faucets
- Plumbing vibration noise
- Piping expansion problems
ASSIGNMENT

- What is hard water? Explain different processes of removal of hardness from water.
- What is UPFEED & DOWNFEED distribution system?
- Explain:
  - A) Gate valve
  - b) Angle valve
  - c) Check valve
  - d) Needle valve
  - e) Plumbing vibrations
- Write a short on leaking faucets and steps taken to prevent leaking faucets.
REFERENCES

- **PLUMBING NOISES**

- **LEAKING FAUCET**
  - [http://www.wikihow.com/Fix-a-Leaky-Faucet](http://www.wikihow.com/Fix-a-Leaky-Faucet)

- **JET PUMP**
  - [http://www.animatedsoftware.com/pumpglos/jet_pump.htm](http://www.animatedsoftware.com/pumpglos/jet_pump.htm)

- **CENTRIFUGAL PUMP**

- **RECIPROCATING PUMPS**
  - [http://www.ustudy.in/node/538](http://www.ustudy.in/node/538)

- **HARD WATER**
REFERENCES

➢ UPFEED & DOWNFEED SYSTEM:
   http://www.scribd.com/doc/55566252/7/Up-Feed-Water-Distribution

➢ TYPES OF VALVES:
   http://www.gharexpert.com/articles/Plumbing-Water-Supply-676/What-various-types-valves-water-pipe-lines--0.aspx

➢ TEXT BOOK OF HOTEL MAINTENANCE BY N.C. GOYAL & K.C. GOYAL