JECRC Foundation

JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE

JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE

Year and Sem – B.tech 1st year and 1st sem
Subject –basics of civil engineering
unit –
Presented by – Sudhir Panwar (A.P.),Civil Engineering

Civil Engineering Department

Course Outcomes

Subject – Basic Civil Engineering **Code – 1FY3-09/2FY3-09**
Branch – CS, IT, ME/ CE, EE, ECE **Semester- I/II(2020-2021)**

Upon successful completion of this course students will be able to:

CO1 Comparing various surveying methods and understanding its principles along with the latest technological advancements in surveying.

CO2 Understand building construction technology and identify construction materials along with sustainable construction technology with focus on Green buildings.

CO3 Understand about traffic, road safety and various types of roads and railway systems along with road and vehicular characteristics required at obtaining a consistent and efficient traffic system

CO4 Recognize various types of pollution and associated risks and identify their control measures; also understand municipal waste treatment methods and outline emerging and efficient technologies of solid waste management.

VISION

To become a role model in the field of Civil Engineering for the sustainable development of the society.

MISSION

1. To provide outcome base education.
2. To create a learning environment conducive for achieving academic excellence.
3. To prepare civil engineers for the society with high ethical values.

CONTENTS (TO BE COVERED)

- Introduction to waste and types
- Solid waste
- Types of solid waste
- Effects of solid waste
- Waste management concept
- Concept of 3R
- solid waste management storage
  - collection
  - waste handling and transport
  - method of disposal
- Technology
- Zero waste system
- Recommendation

WASTE

- It is defined as

  Waste (also known as rubbish, trash, refuse, garbage, junk) is any unwanted or useless materials.

  OR

  Any materials unused and rejected as worthless or unwanted and “A useless or profile less activity using or expanding or consuming thoughtlessly or carefully.” \

Types of wastes

- Solid waste
- Commercial waste/ Business waste ,Chemical waste
- Biomedical waste
- Bulky waste
- Liquid waste
- Gaseous waste
- Animal by product(ABPs)
- Biodegradable waste

Solid wastes

- It is defined as

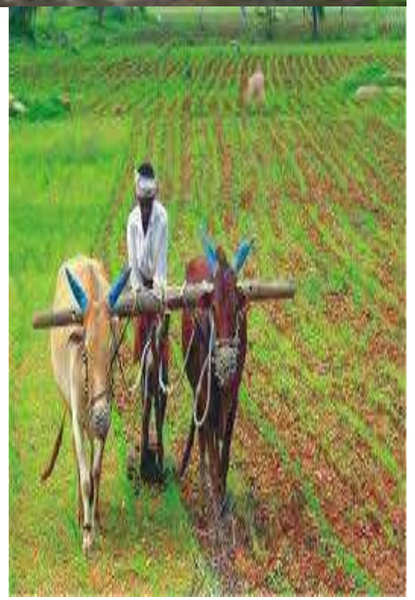
  " non liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex & sometimes hazardous substances"

- Solid waste also include
  - Garbage
  - Rubbish
  - Demolition products
  - Sewage treatment residue
  - Dead animals
  - Manure and other discarded material.

    -- Per capita solid waste out put 0.25-2.5 Kg/day

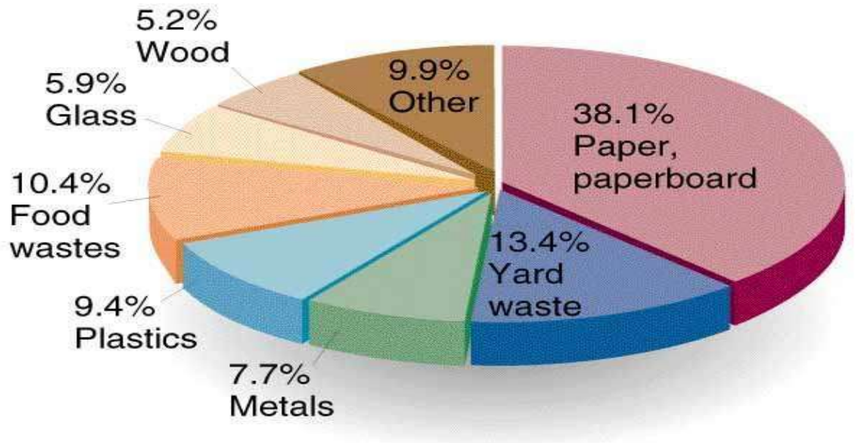
SOURCE

- Agriculture
- Fisheries
- Household
- Commerce and industry



Broadly there are 3 types of solid waste which are as follows-

1. Household waste as municipal waste
2. Industrial waste as hazardous waste
3. Biomedical waste or hospital waste as infectious waste



- Municipal solid waste consist of--- household waste construction and demolition debris sanitation residue waste from streets
- With rising urbanization and change in life style and food habits ,the amount of municipal solid waste has been increasing rapidly and its composition changing.

HAZARDOUS WASTE

- Industrial and hospital waste is considered hazardous as they may contain toxic substances
- Hazardous waste could be highly toxic to humans, animals and plants. They are
  - corrosive
  - highly inflammable or explosive
- In the industrial sector the major generators of hazardous waste are the metal' chemical' paper, pesticide, dye and rubber goods industries.
- Direct exposure to chemicals in hazardous waste such as mercury and cyanide can be fatal

HOSPITAL WASTE OR BIOMEDICAL

- Bio-medical waste means "Any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological"

  -Bio-medical waste rules ,l998
- It may includes wastes like sharp waste, pathological waste, pharmaceutical waste, genotoxic waste, chemical waste, and radioactive waste etc

EFFECTS OF SOLID WASTE

A:Health hazard

- If solid waste are not collected and allowed to accumulate , they may create unsanitary conditions.
- This may lead to epidemic outbreaks .
- Many diseases like cholera. Diarrhea, dysentery, plague, jaundice, or gastro-intestinal diseases may spread and cause loss of human lives.
- In addition improper handling of the solid wastes ,a health hazard for the workers who come in direct contact with the waste.

B: Environmental impact

- If the solid wastes are not treated properly decomposition and putrefaction(decay) may take place .
- The organic solid waste during decomposition may generate obnozious (intolerable odour)

WASTE MANAGEMENT CONCEPT

- The 3Rs (Reduce, Reuse, Recycle) to be followed for waste management.

WASTE WISE TRUST
What goes around... Comes around...

YOU SEGREGATE WE MANAGE

What We Cannot RECYCLE

Biscuit and chips packets

Wrappers of bread, noodles and wheat flour (ATTA) bags

Thermocole and aluminium lined dishware

Packaging of diapers and sanitary napkins

Cigarette, pan, 'gutkha' packets, small shampoo sachets

Laminated gift wrapping paper

Takeaway Food Parcels

Note: The items listed here have multi layer packaging that makes segregating and recovering plastic or aluminium layers difficult. These items are unlikely to get recycled and end up being a cost to the environment. As far as possible avoid or minimize their use. Look out for or ask for packaging that can be recycled.

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Waste management -

- storage
- collection
- transport and handling
- recycling
- disposal and monitoring of waste materials.

- Storage:
  - Galvanized steel dust bin
  - Paper sack
  - Public bins

- Collection
  - House-to-house collection
  - Collection from the public bins

Waste handling and separation

- Waste handling and separation involves activities associated with waste management until the waste is placed in storage containers for collection. Handling also encompasses the movement of loaded containers to the point of collection.
- waste is transferred from a smaller collection vehicle to larger transport equipment

Methods of solid waste disposals

1. Dumping
2. Controlled Tipping or Sanitary Landfill
3. Incineration
4. Composting
5. Manure pits
6. Burial

OBJECTIVES

- Public hygiene and health.
- Reuse, recovery and recycle
- Energy generation
- Sustainable development
- Aesthetics

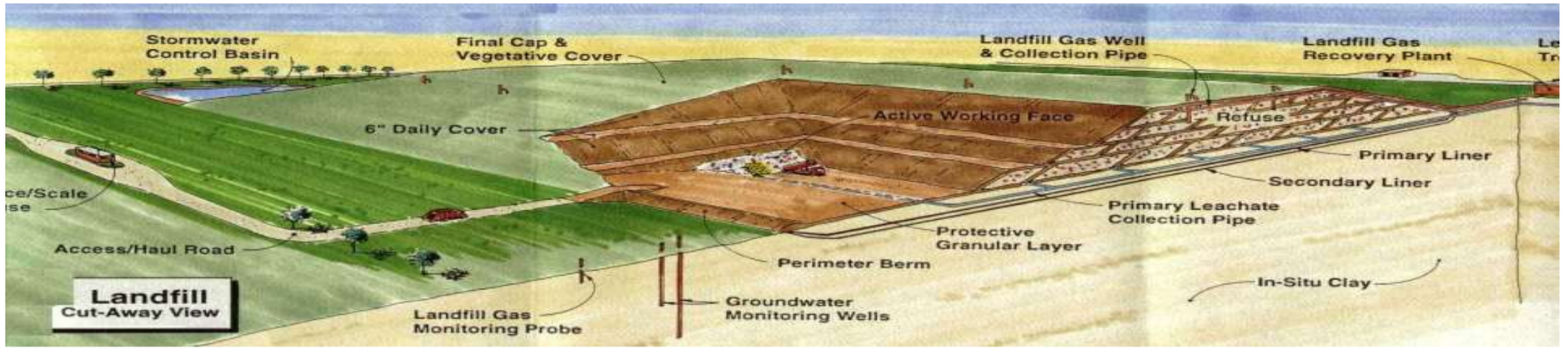
1 DUMPING

- Low lying areas.
- Mainly for dry refuses
- Kolkata disposes by this
- method and reclaimed land given for cultivation.
- Unsanitary method
  - Exposed to flies and rodents
  - Nuisance
  - Dispersed by wind
  - pollution of surface water

2 CONTROLLED TIPPING

- Satisfactory method
  - Material placed in a trench
  - Compacted with earth at the end of the working day.
- Modified sanitary land fill-where compaction and covering are accomplished once or twice a week.
  1. Trench method
  2. Ramp method
  3. Area method

- **TRENCH METHOD**
  - Long trench of 6-l0 feet deep andl2-36 feet wide.
  - Refuse is compacted and covered with excavated earth.
  - Refuse is filled up to 6 feet.
  - It is estimated one acre of land per year for l0,000 population.
- **RAMP METHOD:**
  - Suited where the terrain is moderately slopping.
- **AREA METHOD**
  - Used for filling land depressions, disused quarries and clay pits.
  - Refuse is deposited, packed and consolidated in uniform layers for 6-8 feet.
  - Each layer is sealed with a mud cover at least l2 inches.
  - Sealing prevents infestation by flies and rodents.
  - Prevents nuisance of smell and dust

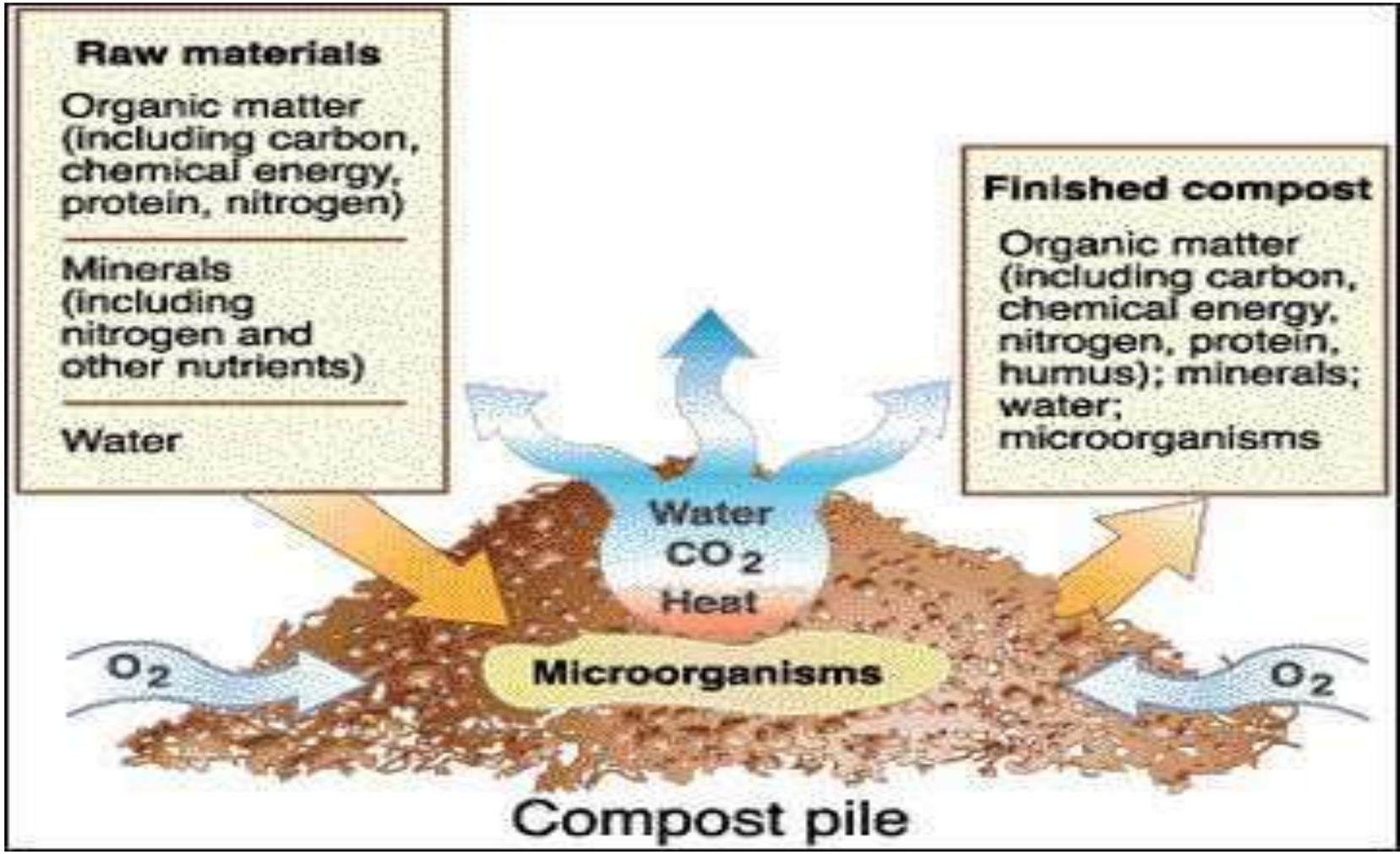


3.INCINERATION -

- It is a disposal method in which solid organic wastes are subjected to combustion so as to convert them into residue and gaseous products.
- This process reduces the volumes of solid waste to 20-30% of the original volume.
- Also described as thermal treatment
- Where land is not available
- Hospital waste

4 .COMPOSTING -

- Method of combined disposal of refuse and night soil/ sludge
- Principal by products are: CO_2 , Water and heat
- End product- compost
- Methods
  a. Bangalore method
  b. Mechanical composting
  c. Vermicomposting



5 MANURE PITS –

- Mostly used in rural areas
- Digging “manure pits” is to prevent the refuses thrown around the houses.
- The garbage, cattle dung, straw, and leaves should be dumped into the mannure pits and covered with earth.
- Two pits will be needed
- In 5-6 month’s time the refuse is converted into manure which can be returned to the field.

6.BURIAL-

- Suitable for small camp
- A trench l.5m wide &2 m deep is excavated
- The refuse is covered with 20 -30cm of earth
- When the level in the trench is 40cm from ground level, the trench is filled with earth & compacted
- 4-6 months

WASTES PER INDIAN CITIES