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 – 4th
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)

- **Transportation engineering**
- **MODES OF TRANSPORTATION**
- **ROLE /IMPACT OF TRANSPORTATION**
- Characteristics of road transport
- **HISTORICAL DEVELOPMENT OF ROAD CONSTRUCTION**
- **Classifications Of Highways**
- Highway alignment and surveys
-

Transportation engineering

- **Transportation engineering** is the application of technology and scientific principles to the planning, functional design, operation and management of facilities for any mode of transportation in order to provide for the safe, efficient, rapid, comfortable, convenient, economical, and environmentally compatible movement of people and goods from one place to other.

Basic mode of transportation are-

- Land
  - Roadway
  - railway
- Water
- Air

- MODES OF TRANSPORTATION

- **Highways**
  Car, Bus, Truck, non- motorized ..etc
- **Railways**
  Passenger and Goods
- **Airways**
  Aircraft and Helicopters
- **Waterways**
  Ships, boats…
- **Continuous Flow systems**
  Pipelines,belts,elevetor,ropeway…etc.
- Merits and Demerits: Based on accessibility, mobility, cost, tonnage..

- **Airways**

- Fastest among all other modes
- More comfortable
- Time saving
- Uneconomical

- **Waterways**

- slowest among all other modes
- It needs minimum energy to haul unit load through unit distance.
- This can be possible between ports on the sea routes or along the river
- Economical

Railways

- The transportation along the railways track could be advantageous by railways between the stations both for the passengers and goods, particularly for long distance.
- It depends upon the road transport i.e. road could serve as a feeder system.
- Energy require to haul a unit load through unit distance by the railway is only ¼ to 1/5 of that required by road.
- Safety

Highways

- It gives the maximum service to one and all
- It gives maximum flexibility for travel with reference to route, direction, time and speed of travel
- It provide door to door service
- Other modes are depend on it
- It requires small investment for the government
- Motor vehicles are cheaper than other carriers like rail locomotive and wagons
- It saves the time for short distance
- High degree of accident due to flexibility of movement

Scope of Highway Engineering

- Development, planning and location
- Highway design, geometric and structure
- Traffic performance and its control
- Materials, construction and maintenance
- Economic, finance and administration

ROLE /IMPACT OF TRANSPORTATION

- Economic Development
- Social Development
- Spatial Development
- Cultural Development
- Political Development

Highway Development in India

- **Jayakar Committee (1927)**
- **Central Road Fund (1929)**
- **Indian Roads Congress (IRC), 1934**
- **Central Road Research Institute (CRRI), 1950**
- **Motor vehicle act (1936)**
- **National Highway Authority of India (NHAI),1995**
- **First twenty year road plan (1943-61)**
- **Second twenty year road plan (1961-81)**
- **Highway Research board (1973)**
- **National Transport Policy committee (1978)**
- **Third twenty year road plan (1981-2001)**

Classifications Of Highways

Depending on weather

- All weather roads
- Fair weather roads

Depending the type of Carriage way

- Paved roads(WBM)
- Unpaved roads(earth road or gravel road)

Depending upon the pavement surface

- Surfaced roads(bituminous or cement concrete road)
- Un surfaced roads

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

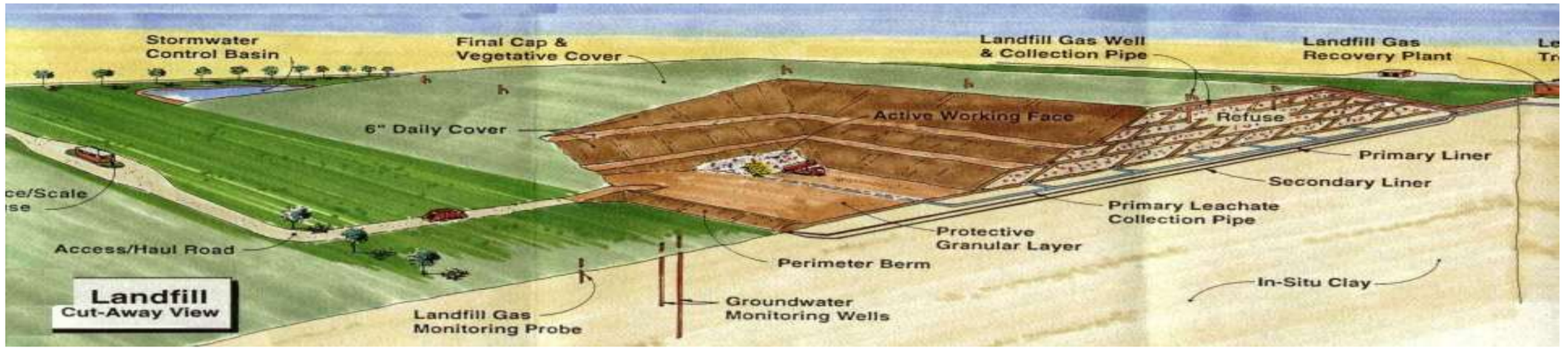
1 DUMPING

- 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

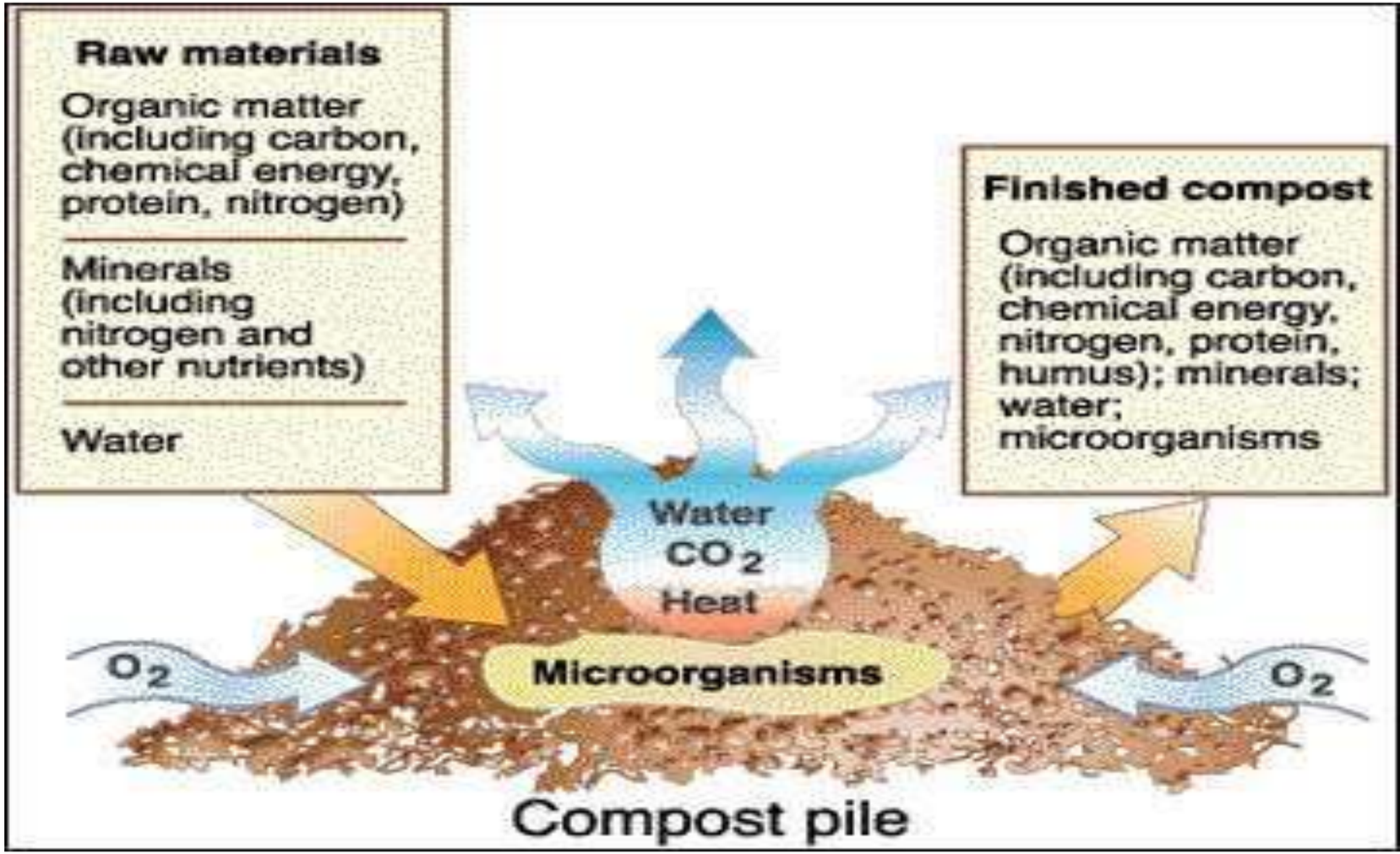


3.INCINERATION -

- 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