Shirpur Education Society's

R. C. Patel College of Engineering & Polytechnic, Shirpur

Department of Civil Engineering

Name of Subject: - **EMERGING TRENDS IN CIVIL ENGINEERING (ETC)**

Course Code: - **315315**

Scheme:- **CE-5K**

Semester:- **Fifth**

Unit No. 04

SUSTAINABILITY IN CONSTRUCTION

CO2 - Adopt the relevant techniques for sustainable construction.

Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
II	Sustainability in Construction	CO4	4	4	4	2	10

THEORY SYLLABUS CONTENT

Unit - IV Sustainability in Construction

4.1 Energy Audit: Necessity and methods.

4.2 Properties of renewable ,recyclable material and recycling of construction debris with its applications.

4.3 Sustainable Drainage system(SuDs) : Principles, Components and Benefits of SuDs.

Subject Incharge

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Sustainability in construction.

Energy Audit :- It is an analysis of energy used or consumed into purchased, distributed and wasted while construction.

Necessity :-
- To reduce energy conservation
- To reduced operating cost
- To Identify area of energy losses.
- Adopt energy saving equipments and machines.
- To reduced green house gases to protect environment.
- Aware about energy conservation.

Types :-

① preliminary energy Audit :-
- To determine the demand of energy of organisation and find out the area where the energy should be saved.
- It requires immediate improvements or savings.
- It carryout by pre-existing records or data.

(2) Detailed energy audit :— It involves a multiple parameter such as measurement, monitoring and analysis of energy-consuming systems.

↓

pre-audit

↓

Audit

↓

post Audit.

Steps —

Data collection → survey → measurements → Energy balance → Identify Losses. → Energy savings → Analysis

↓

Report.

(3) potential and magnitude of energy Audit :—

- It require systematic process while auditing.
- to plan the steps and measures for critical audit.
- preliminary survey and collecting records during operations.

☆ Renewable construction materials :—

these materials obtaining from Natural.

sources that can be recreated is known as Renewable construction Materials.

properties :— sustainable material
- Bio-degradable
- Recyclable
- structural strength
- durability
- workability
- low carbon emission

☆ Recycled construction materials :—

Recycled construction materials are obtained from various demolished and waste materials.

- it minimize waste from construction and demolition. and also reduced the demand of raw material.

properties :— ① Recyclable ② Durable ③ structural integrity. ④ ease of seperation. ⑤ moisture and weather resistance ⑥ workability ⑦ Economic efficiency. ⑧

☆ Recycling of construction debris :—

construction debris such as concrete, bricks, asphalt, soil and excavated material, steel, wood, glass etc.

Recycling process :—

1. collection
↓
seperation
↓
removal of contaminants.
↓
crushing
↓
screening
↓
removal of metals
↓
quality testing.
↓
Reuse.

Applications :—

Crushed concrete → recycled aggregate, road base

Waste bricks → Brick aggregate, road construction.

Asphalt waste → asphalt pavement

steel → structural products and metal product.

Wood → Furniture, fuel.

Glass → decorative products.

Excavated soil → Backfilling, embankments.

plastics → composite materials

Sustainable drainage system (SuDs) :-

It is a techniques used to manage surface water run-off from buildings, roads, pavements, and other developed areas in a way that imitates the natural water cycle.

principles :-

(1) Rainwater should be at close to the location ~~of~~ where ~~locate~~ rainfall occures.

(2) To increase infiltration and reduce the ammount of water entering conventional drainage system.

(3) To reduce the velocity of runoff

(4) To increase the rate of infiltration.

(5) To improve water quality

Components :-

Source control measures

- * porous paving → provide permeable surface
- * Green Roofs → vegetated roofs that retain
- * Blue roofs → It manage rainwater outflow at roof levels.

Infiltration and Retentation systems :—

* Retention ponds :— it's permantly contain some water and provide additional storage during storms.

* Infiltration trenches :—

Narrow, gravel filled under ground structure that recieves runoff and allows it to infiltrate into surrounding soil.

* Detention Basins :— it store temporarily stores stormwater during rainfall events.

* Filter strips :— A vegetated areas through which runoff flows before reaching a drainage system

Benefits :—

- SUDS reduce the flood and prevent urban flooding
- ~~Pro~~ it allows rainwater to enter the ground and contribute to ground water recharge
- Vegetation and filtration media remove pollutants form storm water.
- It reduce pressure on drainage systems.