

CERTIFICATE



This is to certify that the project entitled “Hydraulic Design of Barrage at Village Mhaisal on Krishna River” submitted by Sujay Shendage (111701046), Vismit Bandgar (111701063), in the partial fulfilment of Bachelor of Technology in Civil Engineering of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of their own work.

Dr. Sukhanand S. Bhosale
(Guide)
Department of Civil Engineering
College of Engineering, Pune

Dr. M. S. Ranadive
(Head of the Department)
Department of Civil Engineering
College of Engineering, Pune

Date: 28 may, 2021

Place: Pune.

ABSTRACT

Barrage is a barrier with low crest provided with a series of gates across the river to regulate the water surface level and pattern of flow upstream. It is a type of diversion structure that can be used for the purpose such as irrigation, water supply, lift irrigation etc.

In this project, hydraulic design of barrage is studied by referring to various Indian Standards and Central Water Commission Manual. The parameters of hydraulic design like desired discharge, afflux, rating curve, silt grade, retrogression etc. are studied considering case study of new proposed barrage near old existing weir, over Krishna River at village Mhaisal, Tal-Miraj, Dist.- Sangli.

This report consists of a comparative study of barrage at two locations. Irrigation Department has proposed new barrage at the downstream side of the existing weir. This alignment will submerge the old existing weir with not only loss of existing storage but also opportunity of use of available storage as stilling basin if alignment of new barrage is at upstream of the existing weir. Therefore, to utilise the existing weir as stilling basin for energy dissipation purpose, new location is suggested on upstream side of old weir. This project work presents comparative study of these two alignments. Based on this comparison conclusions are drawn.

Key words: Hydraulic Design of Barrage, Stilling Basin, Energy dissipation structures,

Alignment of barrage, silt grade.

CERTIFICATE



This is to certify that the report entitled '**Study for Development of Inter-Basin Water Grid for Maharashtra using Geospatial Tools**' submitted by **Raibbhann Sarnobbat, Pritam Bhadane and Vaibhav Markad** in the partial fulfilment of the requirement for the award of degree of Bachelor of Technology (Civil Engineering) of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of their own work.

Dr. R.K. Suryavanshi

Emeritus Professor

Civil Engineering Department

College of Engineering Pune

Date:

Place: College of Engineering Pune

Dr. M. S. Ranadive

Head of the Department

Civil Engineering Department

College of Engineering Pune

CHAPTER 1

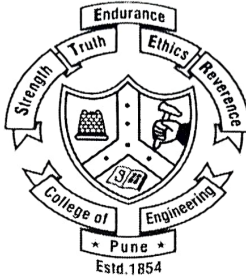
INTRODUCTION

1.1 General

The concept of the Inter basin water transfer is to be explored and implemented to ensure uniform distribution of available natural water resources and to mitigate the consequences of hydrologic extremes of floods and droughts. The implementation of Inter basin water transfer is the need of the hour for the overall development of a country like India in which the population is growing at an alarming rate. Also, the Inter basin water transfer helps to prevent the formation of deltas along the coastline and migration of people from drought affected regions. The water level has decreased at an alarming rate. It is very important to understand. The importance of exhausting water quality has degraded as well as river interlinking is one of the ways to solve the issue of the people facing water scarcity or shortage. The river which is heavily flooded during monsoon can be used for river interlinking projects. The water from the flood river can be diverted into the dry river or can be stored in a reservoir. Stored water reservoirs can later be transported to the places facing water scarcity.

Inter-basin water grid means linking two or more rivers by creating a network of manually created canals and providing land areas that otherwise do not have river water access. It is because some rivers have surplus water while some rivers have deficit water. So, the water from the surplus river basin can be transferred to the deficit river basin by creating a network of canals or pipes to interconnect the rivers by gravity flow. For the purpose of uniform distribution of water. Which will mitigate drought and floods to an extent. Maharashtra has a variation in rainfall condition, that is Konkan region has very high rainfall while Marathwada region has very less rainfall. Maharashtra has non uniform spatial distribution of water resources and water demands. There is enough water in some basins while in some other basins there is water scarcity. In addition, considering the rate of the increasing population and the improving economy, it is necessary to have long-term planning to balance the supply and the demand distribution. The inter-basin water transfer project is an alternative to balance the nonuniform temporal and spatial distribution of water resources and water demands. Transferring water from an area may cause a variety of negative impacts, social and environmental impacts. But a water transfer project can be executed if it is environmentally and economically justified.

CERTIFICATE



This is to certify that **Mr. Pranav Kole, Mr. Aditya Patil and Mr. Onkar Sonawane** have satisfactorily completed the dissertation work entitled “**Design of Water Distribution System for High Rise Building**”. This work is being submitted for the award of degree of Bachelor of Technology in Civil Engineering (B. Tech Civil). It is submitted in the partial fulfillment of the prescribed syllabus for the academic year 2020–2021.


Dr. Nitin M. Mohite

(Assistant Professor)

Department of Civil Engineering
College of Engineering, Pune


10/8/21
Department of Civil Engineering
College of Engineering Pune
Dr. M. S. Randive

(Head of the Department)

Department of Civil Engineering
College of Engineering, Pune

Date: May 28, 2021

Place: Pune

ABSTRACT

Water supply to building is very essential. It is one of the major parts in plumbing of building. The desire to build high into the sky has been a part of human existence for thousands of years. High rise buildings reflected the need to make the best possible usage of a relatively small area of land in densely populated urban spaces across the world. Further, with the increase in density of population in Indian cities, there is an exponential vertical development calling for high rise structures sprawling the city skylines. This poses a huge challenge when it comes to design of efficient water distribution systems in these high-rise structures. Efficient water supply to building considers number of parameters which are needed to identify and studied. With proper selection of materials, their installations and proper designing efficiency in water supply can be achieved. There is huge demand of water conservation and effective utilization of available water in the world. Efficient water supply in building provides a way to meet this challenge.

In this present study, water supply to high rise building is studied by using different Indian standards and other code and manuals. The parameters for water supply like proper selection of pipe material. Effective water distribution layouts to save pumping energy, hot water generation and distribution, firefighting system consideration, use of recycled water are consider.

This report consists of design of water supply system for 39.25m high rise residential use building using the National Building Code of India 2016, Section 2, Part – IX and other supporting codes for various parts of the system. The design also considers the conventionally available metallic pipe material and advanced thermoplastic material to compare the efficiency and economy.

COLLEGE OF ENGINEERING, PUNE

MAY 2021

CERTIFICATE



This is to certify that the report entitled '3D Printing of Structures' submitted by Ganesh Vhanamane in the partial fulfilment of the requirement for the award of degree of Bachelor of Technology (Civil Engineering) of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of their own work.

Prof. Birajdar

Project Guide

Department of Civil Engineering

College of Engineering, Pune

Dr. M. S. Ranadive

Head of Department

Department of Civil Engineering,

College of Engineering, Pune

Date: 28 May 2021

Place: College of Engineering, Pune

Chapter 1

Introduction

1.1: Objective of project

- i. To study and apply knowledge of additive manufacturing in construction of house structure.
- ii. To propose design of house by 3d printing

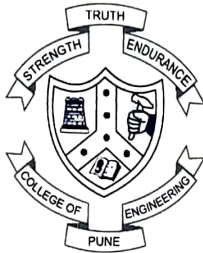
1.2: Introduction to 3D printing

Additive manufacturing (AM) or additive layer manufacturing (ALM) is the industrial production name for 3D printing, a computer controlled process that creates three dimensional objects by depositing materials, usually in layers.


Using computer aided design (CAD) or 3D object scanners, additive manufacturing allows for the creation of objects with precise geometric shapes.

These are built layer by layer which is in contrast to traditional manufacturing that often requires machining or other techniques to remove surplus material.

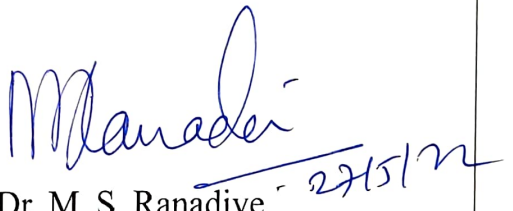
Certificate



This is to certify that the report entitled '**Use of Medical Waste Material in Concrete Pavement**' submitted by **Jamdade Nayan and Bagul Himanshu** in the partial fulfilment of the requirement for the award of degree of Bachelor of Technology (Civil Engineering) of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of their own work.


Prof. B.G. Birajdar
Guide

Civil Engineering Department
College of Engineering Pune


Dr. M. S. Ranadive - 27/5/22

Head of the Department
Civil Engineering Department
College of Engineering Pune

Date:

Place: Pune

CHAPTER 1

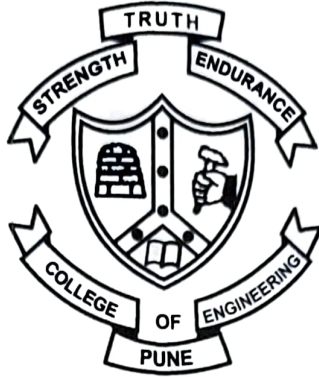
Introduction

1.1 General:

Cement is a binder, a substance used for construction that sets, hardens and adhering to other materials, binding them together. Cement is seldom used on its own, but rather to bind sand and gravel together. Cement is used with fine aggregates to produce mortar for masonry, or with sand and gravel aggregates to produce concrete. Concrete is a composite material composed of fine and coarse aggregate bonded together with a fluid cement that hardens over time.

Biomedical waste, generated from medical sources and activities is a cause of concern for environmentalist. These wastes are generated in the process of diagnosis treatment and similar activities pertaining to human and animals. Also, in the production or testing of biological instruments/components. Biological waste is broadly classified as biological and nonbiological wastes that may or may not be infectious. According to ministry of environment and forest, about 4,05,702 kg biomedical waste is generated every day in India out of which, around 72% is disposed of by burning it and dumping in the landfills. However, more than 28% is biomedical waste is left unattended. Most common process of disposal of biomedical waste is incineration in specifically made for biomedical waste. Left out biomedical waste is used as landfill. Toxicity and potential hazards of biomedical waste is generally depended upon its origin. At present, 170 common biomedical waste treatment facilities are available and having 140 incinerators throughout the country. These wastes can effectively be used in concrete making, which will result in reduce the demand of land for disposal of

CERTIFICATE



This is to certify that the report entitled **Urban solid waste management using GIS technique: A Case study of Nashik city** submitted by Akanksha Birari (MIS No. 111713009), Neelam Kapse (MIS No.141801004) and Pratiksha Deokar (MIS No. 111701071) in the partial fulfillment of the requirement for the award of degree of Bachelor of Technology in Civil Engineering of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of his own work.

Dr. M. U. Khobragade
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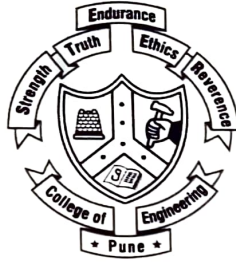
Date: 28/05/2021

Place: College Of Engineering, Pune

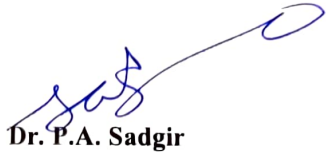
ABSTRACT

Municipal solid waste management is a major environmental issue in India. Due to rapid increase in urbanization, industrialization and population, the generation rate of municipal solid waste in Indian cities and towns is also increased. Mismanagement of municipal solid waste can cause adverse environmental impacts, public health risk and other socio-economic problem. To ensure that it does not affect the environment and not cause health hazards to the people living there, proper solid waste management has to be undertaken. To understand the solid waste management in Nashik city several visits and surveys has done. Different GIS software are used to find out efficacy of existing system and to provide more economic solution. This thesis report describes how the solid waste is managed in Nashik city and recommendation for better waste management. As due to covid pandemic there were limitations to carry out this project. Therefore software outputs for few routes of waste collection are also included in it.

Certificate



Certified that the work “**Electrocoagulation Wastewater Treatment**” submitted by Riya Gajbhiye (1117011019), Rishikesh Khaire (111701028), Nikita Salunke (111701043) in the fulfilment of Btech Project Course of Final Year Civil Engineering of College of Engineering, Pune is a record of student’s own work carried out by them under the supervision and guidance of Dr. P. A. Sadgir Sir.



Dr. P.A. Sadgir

Professor,
Department of Civil Engineering,
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Dr. M. S. Randive

Head of Department of Civil Engineering,
Department of Civil Engineering,
College of Engineering, Pune

Abstract

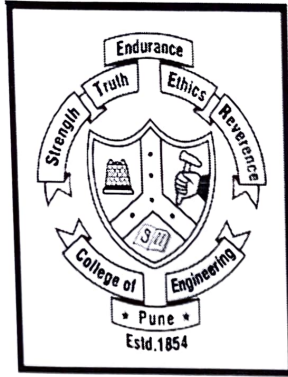
Electrocoagulation is an electrochemical method of treating waste water whereby sacrificial anodes corrode to release active coagulant precursors (usually aluminium or iron cation) into solution. Accompanying electrolytic reaction evolve gas (usually as hydrogen bubbles) at the cathode. Electrocoagulation has a long history as a waste water treatment technology having been employed to remove a wide range of pollutants. However electrocoagulation is not yet accepted as a mainstream water treatment technology, due to unsystematic approach to electrocoagulation reactor design/operation and the issue of electrode reliability (particularly passivation of the electrodes over time) have limited its implementation. However recent technical improvements combined with a increasing need for small-scale decentralised water treatment facilities have led to a re-evaluation of electrocoagulation.

Starting with a review of electrocoagulation reactor design/operation, this project examines and identifies a conceptual practical framework for electrocoagulation that focuses on the interactions between electrochemistry, coagulation and flotation. The conclusion is drawn that electrocoagulation has a future as a decentralised waste water treatment technology

COLLEGE OF ENGINEERING, PUNE

May 2021

CERTIFICATE



It is to certify that the report entitled 'DESIGN OF GEOSYNTHETIC REINFORCED SOIL EMBANKMENT' submitted by Pratiksha Chavan, Gayatri Dangare and Prajakta Patil in the partial fulfillment of the requirement for the award of degree of Bachelor of Technology (Civil Engineering) of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of their own work.

Mrs. R. S. Dalvi

Project Guide

Department of Civil Engineering

College of Engineering, Pune

Date: 28 May 2021

Place: College of Engineering, Pune

Dr. M. S. Ranadive

Head of Department

Department of Civil Engineering

College of Engineering, Pune

ABSTRACT

Landslides in slopes, failures of embankment and cut slopes lead to loss of life and property. Several factors, natural and manmade such as heavy rainfall, unplanned construction, deforestation, restricting waterways of rivers and their tributaries are major causes for instability of slopes.

Restoration of the slide with geosynthetics can be simpler, faster, and economical. Designing slopes with Geosynthetics has several advantages. Hence, in this project, we have studied role and functions of different types of geosynthetics, and along with it we did the design of the Geosynthetically Reinforced Soil Embankment of 9m height, which is carrying traffic load over it. For that designed embankment we performed bearing capacity, lateral sliding analysis by analytical methods as well as global/rotational analysis using GEO5 software.

Analysis involved comparison of Factor of safety (FOS) for unreinforced and reinforced embankment. Change in FOS by provision of basal reinforcement. Also, the values of FOS with seismic analysis.

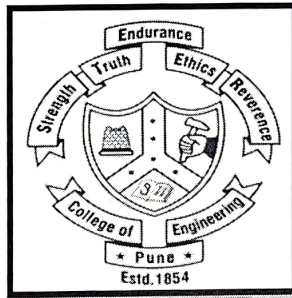
Several ground improvement techniques like sub-soil replacement, provision of basal reinforcement, stage wise construction along with PVDs were implemented. To reduce differential settlement and to increase the stability of embankment and soft foundation beneath it, we opted for basal woven geotextile reinforcement.

Preloading of structure was done adopting the stage wise construction. It increases the bearing capacity of soil foundation. Also, to accelerate rate of consolidation, PVD (Prefabricated Vertical Drains) was incorporated alongside stage construction. PVDs are ground improvement technique which reduces consolidation period.

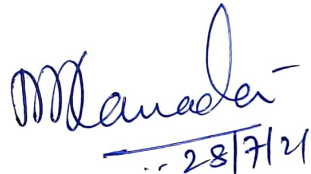
Cost reduction due to the use of geosynthetics, reduction in carbon footprint, less land requirement, facilitation of natural vegetation, usable area availability at the toe of slope due to reinforced steep slope are the sustainable aspects we could cover in our project.

CERTIFICATE

This is to certify that the thesis, entitled " Microbial Fuel Cell application in Wastewater Treatment and Stack system analysis " submitted by Miss. Mansi. C. Patil (MIS No.111701031), Siddhi Chandak (MIS No. 111701051), Tanmayee Ahire (MIS No. 141801010) in partial fulfilment of requirement for the award of the B.Tech. with specialization in Civil Engineering at College of Engineering, Pune, affiliated to Savitribai Phule Pune University is a bonafide record of the project work carried out by them under the supervision and guidance of Prof. P. A. Sadgir. The results presented in this project report have not been submitted to any other University or Institute for the award of any degree.



Prof. P. A. Sadgir
Guide Head
Department of Civil Engineering
College of Engineering, Pune.



Dr. Prof. M. S. Ranadive
Head of Department
Department of Civil Engineering
College of Engineering, Pune.

Date :
Place : Pune

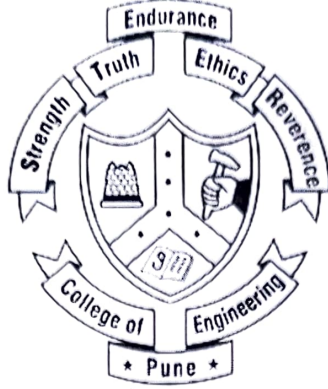
1. Introduction:-

Environmental issues associated with water sanitation are not confined to developing countries alone but are the most basic human and environmental necessities all over the world. Wastewater sources are major causes for environmental pollution in surface and groundwater bodies.

Current wastewater treatment technologies are not sustainable to meet the ever growing water sanitation needs due to rapid industrialization and population growth, simply because they are energy- and cost-intensive leaving latitude for development of technologies that are energy-conservative or energy-yielding.

For the present and future context, microbial fuel cells technology may present a sustainable and an environmentally friendly route to meet the water sanitation needs. Microbial fuel cell based wastewater systems employ bioelectrochemical catalytic activity of microbes to produce electricity from the oxidation of organic, and in some cases inorganic, substrates present in urban sewage, agricultural, dairy, food and industrial wastewaters.

CERTIFICATE



This is to certify that the report entitled 'INTELLIGENT TRANSPORTATION SYSTEM' submitted by Utkarsha M. Barabde (111701006), Vidhina R. Meshram (111701033) and Shruti D. Lokhande (111701049) in partial fulfilment of the requirement for the award of degree of Bachelor of Technology(Civil) of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of their own work.

Prof. Dr. M. S. Ranadive
Guide
Department of Civil Engineering

Prof. Dr. M. S. Ranadive
Head of Department
Department of Civil Engineering

Date – 28/07/2021

Place – College of Engineering, Pune

ABSTRACT

India, the second maximum populous us of a in the world, and a quick developing economic system, is seeing horrible road congestion troubles in its towns. Bus rapid Transit (BRT), metro rails and mono rails are being built in extraordinary cities to encourage the usage of public shipping. However still there is a steep boom of personal motors. A few towns like Bangalore, Pune, Hyderabad and Delhi-NCR, with their sudden growths within the IT sector, also have a steep increase in population, further increasing transportation desires. Such boom with infrastructure increase is outwardly infeasible, often because of space and fee constraints.

The non-lane based disorderly visitors with excessive heterogeneity of vehicles, need the present strategies to be tailored to the Indian scenario, before they may be used. As a result ITS inside the Indian context desires large R&D efforts. ITS is an interdisciplinary research area Constructing road sensors need embedded systems historical past.

The following is a list of identified benefits of ITS projects :

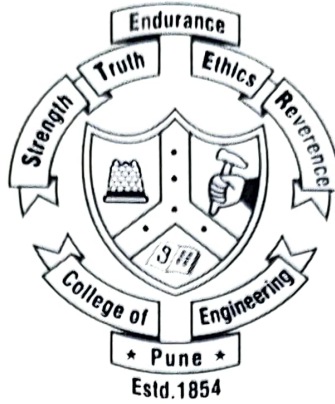
- Reduced rush hour congestion and delay
- Increased safety and personal security
- Time savings and operation efficiencies
- Reduced fuel consumption and emissions
- Improved customer service and reduced frustration
- Reduced road accidents and fatalities and
- Enhanced economic productivity.

There may be scope for evaluating present ideas in exclusive and difficult visitors eventualities, innovate new solutions and empirically evaluate ideas in collaboration with public and personal sectors.

In this project, we make a small attempt to study the different ideas and humans relevant in ITS, in order that it gives a top level view of the hassle and there to behad solutions and outlines a hard and fast of open questions to answer.

To ensure round the clock safety, it is of prime importance to provide real time and precise information to users about road conditions ,traffic situation ,incidents and weather conditions on highway. It is also important to make interventions for smooth, safe and efficient traffic movement by providing rescue and relief to users to avoid distress.

CERTIFICATE



This is to certify that the report entitled 'Study of effect of plastic waste on the properties of bricks' submitted by Apoorva V. Lambat (111701003) and Mrunal D. Thombare (111701058) in the partial fulfilment of the requirement for the award of degree of Bachelor of Technology (Civil Engineering) of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of their own work.

Prof. Mrs. Y.T. Lomte Patil
Guide
Civil Engineering Department
College Of Engineering Pune

Dr. M. S. Ranadive
Head of the department
Civil Engineering Department
College Of Engineering Pune

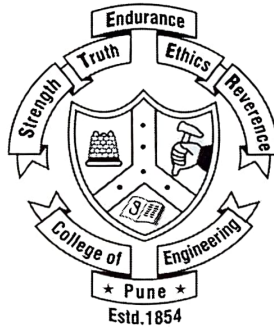
Date: 22/7/2021

Place: Pune.

ABSTRACT

Urbanization caused a vast and rapid growth of construction industries which requires a lot of building materials that utilizes natural resources either in their production plant or as the materials itself. More recently the world concern about the demands for construction materials and the rate production of plastic that increases rapidly every year. This paper outlines the utilization of municipal plastic waste and domestic waste in construction industries. This project aims on manufacturing an alternative building material by combining aggregates, cement and plastic waste as binding material. The aim of the research is to evaluate the effect of addition of granulated waste plastics on the compressive strength, density of concrete and water absorption capacity. In Plastics, we consider LDPE, PET and some types of HDPE. We have used only those plastics which comes with “Recyclable” symbol or indication and were used already such as plastic bags, plastic bottles and cups, wrappers and other plastic waste. The study also presents results of experimental work on bricks made of recyclable plastic waste granules obtained after shredding constituting 0 to 30% by weight, cement and aggregates making up the remainder. The bricks were cured under water for 7 days. The key characteristics of these bricks are found to be lightweight, porous, of low thermal conductivity, and of appreciable mechanical strengths. . It is observed that plastic bricks have low water absorption, low density and high compressive strength. We have found that the concept of plastic bricks is eco-friendly, energy-efficient and economically feasible.

CERTIFICATE



This is to certify that the report entitled 'Effect of rise to span ratio on performance of steel footover bridge by analysis using STAAD PRO' submitted by Swarup S. Gaidhani (111701055), Rajat A. Thosare (111701059) and Vishal M. Birari (111701062) in the partial fulfillment of the requirement for the award of degree of Bachelor of Technology (Civil Engineering) of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of their own work.



Dr. I. P. Sonar
Guide
Civil Engineering Department
College of Engineering Pune



Dr. M.S. Ranadive
Head of the Department
Civil Engineering Department
College of Engineering Pune

Date:
28/05/21

Place: Pune

ABSTRACT

This paper presents a comparative study of footover bridges based on their varying rise to span ratio. The comparison is done between different steel footover bridges which have variable span length and rise to span ratio keeping the same support condition. The aim of our present study is to select the optimum value of rise to span ratio of footover bridge as the cost of the footover bridge increases with the increasing of the rise. In order to fulfill the objective, several rise to span ratios have been considered for the same span of footover bridge and various structural parameters such as Bending moment, shear force etc have been calculated for different models. A comparative study has been done for several footover bridges finally to select the optimum rise to span ratio of the Arch bridges. In the present study. Different rise to span ratios: have been modeled and are analyzed with the help of a Computational Software named StaadPro to evaluate the results such as Bending moments, Shear force, displacements, Stresses, influence line diagrams, critical loads. In the present study, 18 models of footover bridges for 18 to 30 m span with different rise to span ratio have been thoroughly investigated.

KEYWORDS: Rise to Span ratio, Steel footover bridge, Economy, Warren truss, STAAD PRO, Design of steel structures, Bridge modelling.

CERTIFICATE



This is to certify that the project report entitled '**Financial risk identification and management of road projects in Hybrid Annuity Model**' submitted by **Tanmay Mansing Katkar (111701027)**, **Siddhesh Tushar Yeole (111701050)**, and **Rasika Rajiv Mangudkar (111701074)** in the partial fulfilment of the requirements for the completion of project of Bachelor of Technology (Civil Engineering) of College of Engineering, Pune, affiliated to the Savitribai Phule Pune University, is a record of his own work.

G.S. Vyas
5/8/21

Dr. G.S. Vyas

Assistant Professor

Department of Civil Engg.

College of Engineering, Pune

M.S. Ranadive
5/8/21

Dr. M.S. Ranadive

Professor and Head of Department

Department of Civil Engg.

College of Engineering, Pune

Date: *05 August 2021*

Place: *Pune*

Abstract

Public Private Partnerships (PPP) are collaborations between governments and private entities to provide services to the public. PPP is being used in India for outsourcing a public project to a private party. The Hybrid Annuity Model (HAM) was introduced by the Government of India in 2016. It was introduced owing to the reluctance of the private parties from investing in road projects. The model was aimed to rejuvenate investments in the Highway sector. The aim of the research work is to identify financial risks and management of road projects under HAM from the Contractor's perspective. Factors affecting HAM have been analyzed from research articles, which then are quantified using a survey.

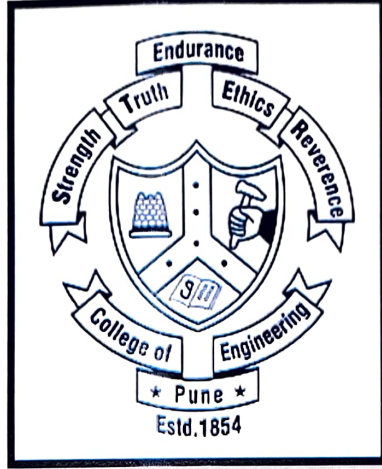
The limitations of the research are that the response rate of a questionnaire survey is less. Also, the majority of literature reviewed for the project are based in countries like China, Malaysia etc. But the survey has maximum respondents from India. Gauging the probability of the risk parameters along with their impacts will help the contractor in considering the mitigation strategies.

Keywords: Public Private Partnership, Hybrid Annuity Model, Risk mitigation

COLLEGE OF ENGINEERING, PUNE

May 2021

CERTIFICATE



This is to certify that the report entitled 'APPLICATIONS OF JUTE AS AN EMERGING GEOTEXTILE' submitted by Vishwajeet Narnavar, Abhijeet Takras and Kanhaiya Agrawal in the partial fulfillment of the requirement for the award of degree of Bachelor of Technology (Civil Engineering) of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of their own work.

Dr. Rupa S. Dalvi

Dr. M. S. Ranadive

Project Guide

Department of Civil Engineering

College of Engineering, Pune

Head of Department

Department of Civil Engineering

College of Engineering, Pune

Date: 28th May 2021

Place: College of Engineering, Pune

ABSTRACT

Geosynthetics are materials made from various types of polymers, used with geological materials like soil, rock, etc. to enhance, improve or modify the behavior of various civil engineering works. They are classified further into geotextiles, geogrids, geonets, geomembranes, geosynthetic clay liners, geofoams and geocells. The project is based on jute geotextiles (JGT) in particular and its applications in general. Geotextiles are textile materials which are permeable, made by either woven or non-woven processes, used along with soil or backfill material for improving the performance of civil engineering structures. Jute geotextile is obtained from the bast of jute plant and it is widely available throughout the Indian subcontinent, particularly in India and Bangladesh. It is an eco-friendly material. Being biodegradable they ultimately coalesce with the soil on which it is laid, adding nutrients to it and retain water for growth of vegetation. Unlike synthetic geotextiles, JGT have no disposal problems. There are several areas of application which have proved effective after field trials, such as, surface erosion control in slopes, slope stabilization, road works, railway works and embankment protection. But there are some limitations to its use in the field. It is biodegradable and hence it has a lesser lifespan and lesser durability. It also does not function well with heavy water flow and degrades too quickly in very humid condition. It is susceptible to microbial attack. Thus, the project tries to address these problems by adopting different methods. Some of the methods such as esterification, laccase treatment and bituminization have been proposed as solutions to the problems raised. The project also discusses some case studies which the authors feel are important for understanding the design parameters, the installation methods and the effects of using jute geotextile in the field, which will be helpful for practicing engineers and contractors. Another aspect that has been covered under the project is of the selection of different types of vegetation for different climatic, geographical and geological conditions. The installation methods of jute geotextiles as propounded by Indian standards has been discussed which will serve as guidelines for the engineers and contractors alike. Thus, the project tries to cover the area of JGT comprehensively.

CERTIFICATE



This is to certify that the project, entitled "Study Of Seismic Pounding Between Two Adjacent RC Buildings" submitted by Ms. Aditi Virupaksh Khurd (111701029), Mr. Nitin Ravindra More (111701036), Ms. Jui Shrinivas Dixit (111701072), Ms. Manjiri Vijay Paraskar (141801011) in partial fulfilment of requirement for the award of the B.Tech. with specialization in Civil Engineering at College of Engineering Pune, affiliated to Savitribai Phule Pune University is a bonafide record of the project work carried out by them under the supervision and guidance of Prof. Dr. S. N. Madhekar. The results presented in this project report have not been submitted to any other University or Institute for the award of any degree.

Prof. Dr. S. N. Madhekar

Guide

Department of Civil Engineering
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Prof. Dr. M. S. Randive

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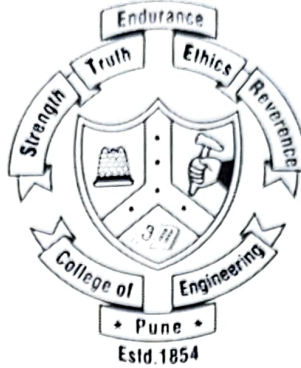
Date :

Place : Pune

Abstract

Seismic pounding is defined as the collision of structures during earthquakes when these structures have different dynamic characteristics. It is an instance of rapid strong pulsation like hammering and repeated heavy blows. This pounding of closely spaced buildings can be seen largely in some densely populated urban areas. Some modern codes have included seismic separation gap requirement clauses for adjacent structures but since large parts of metropolitan cities in seismically active regions of India were built before such requirements were introduced, the seismic separation gap requirements have not been fulfilled. Pounding can be catastrophic and even more dangerous than the effect of earthquakes on a single building. Thus, the action of pounding of buildings needs to be mitigated to avoid loss of life and property during earthquakes. The problem of pounding is particularly common in many cities in India, located in seismically active zones, where due to various socio-economic factors and land usage requirements, buildings are often constructed crowded together. This paper is focused on the study of the seismic pounding between two RC buildings with different dynamic characteristics. A systematic study of response of seismic pounding between adjacent buildings and seismic hazard mitigation practices like effect of different separation distances and effect of providing dampers are investigated, using the ETABS software. A 12 storey and a 16 storey building have been considered for the study of pounding. Time history analysis is carried out for seven real earthquake ground motions on the models with varying separation gaps. The results were obtained in the form of pounding force and point displacements. It is revealed that the pounding effect varies inversely with the separation distance. With increasing separation distance pounding effect is reduced greatly and so the damage to the neighboring buildings is also minimized. Also, the pounding forces are seen to be decreasing considerably between the adjacent buildings due to the provision of dampers at suitable locations, as compared to the case of adjacent buildings

CERTIFICATE



This is to certify that the report entitled

‘SUBGRADE STABILIZATION USING PLASTIC ’

Is submitted by Chetan A. Deshmukh (111701015), Avinash P. Gadade (111701018) and Gaurav K. Shinde (111701047) in the partial fulfillment of the requirement for the award of degree of Bachelor of Technology (Civil Engineering) of College of Engineering Pune, affiliated to the Savitribai Phule Pune University, is a record of their own work.

Dr. S.M. Nawghare

Guide

Civil Engineering Department

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Dr. M.S. Ranadive

Head of the Department

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Date:

Place:

Abstract

According to the literature, soil fibre composites have been found to be effective in increasing the CBR value. According to these findings, the stress-strain-strength properties of randomly distributed fibre reinforced soil are affected by fibre content and aspect ratio. Significant improvement in frictional resistance was also reported. Furthermore, the use of polyethylene fibre (plastic waste) increased both the peak and ultimate strength soil. When soil is mechanically stabilised with short thin plastic strips of varying length and content, its strength and load bearing capacity are significantly increased. The feasibility of reinforcing soil with reclaimed high density polyethylene strips has also been investigated. It has also been reported that the presence of a small fraction of HDPE fibre can increase the soil's fracture energy. Although a few studies on the subject of engineering behaviour of HDPE reinforced soil are available in the literatures, a detailed study pertaining to its use in real-world problems is still lacking. The current study has been taken up with special reference to its feasibility for application in subgrade construction and approximate cost estimation of pavement on virgin soil and soil reinforced with HDPE strips is also done.

Keywords: High Density Polyethylene, Pavement, Reinforcement, California Bearing Ratio.

CERTIFICATE



This is to certify that the B.Tech Project report entitled '**Solid Waste Utilization Techniques**' submitted by Kishor Jadhav, Ajit Hande, and Aftab Momin is record of their own work.

Kamlesh Tripathi

Dr.K.K. Tripathi

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Place: College of Engineering Pune.

ABSTRACT

The present work involves the synthesis of a petroleum-based fuel by the catalytic pyrolysis of waste plastics. Catalytic pyrolysis involves the degradation of the polymeric materials by heating them in the absence of oxygen and in the presence of a catalyst. In the present study different oil samples are produced using different catalysts under different reaction conditions from waste plastics. The synthesized oil samples are subjected to a parametric study based on the oil yield, selectivity of the oil, fuel properties, and reaction temperature. Depending on the results from the above study, an optimization of the catalyst and reaction conditions is to be done.

The global plastic production increased over years due to the vast application of plastics in many sectors. The continuous demand of plastics caused the plastic wastes accumulation in the landfill consume a lot of spaces that contributed to the environmental problem. The rise in plastics demand led to the depletion of petroleum as part of non-renewable fossil fuel, since plastics were the petroleum-based material. Some alternatives that have been developed to manage plastics wastes were recycling and energy recovery method. However, there were some drawbacks of the recycling method as it required high labour cost for the separation process and caused water contamination that reduced the process sustainability. Due to these drawbacks, the researchers have diverted their attentions to the energy recovery method to compensate the high energy demand. Through extensive research and technology development, the plastics waste conversion to energy was developed.

Project was focused towards obtaining different kind of oil at the end of the pyrolysis and to analyze them. A domestic model was prepared to perform the above activities.