

# **SUSTAINABILITY OF TRADITIONAL VERNACULAR MUD HOUSES USING AUTODESK ECOTECT**

Project Work submitted to



**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**

in partial fulfillment of the requirements  
for the award of degree of

**BACHELOR OF ENGINEERING**  
in  
**CIVIL ENGINEERING**

Project Sponsored by KSCST

Submitted by

<b>Anup</b>	<b>1KG18CV003</b>
<b>Sachin Sangappa Kagal</b>	<b>1KG18CV022</b>
<b>Chaitanya K N</b>	<b>1KG19CV400</b>
<b>Pradeep Kumar S T</b>	<b>1KG19CV405</b>

Under the Guidance of

**Mrs. Sushma M ( Guide )**  
**Mr . Naveena M P (Co Guide)**  
**Assistant Professor**  
**Department Of Civil Engineering**



Department of Civil Engineering  
K.S. School of Engineering and Management  
No. 15, Mallasandra, off Kanakapura Road, Bengaluru-560109  
**2021-2022**





**KSSEM**  
K.S. SCHOOL OF ENGINEERING AND MANAGEMENT

**K.S. SCHOOL OF ENGINEERING AND MANAGEMENT  
DEPARTMENT OF CIVIL ENGINEERING**

**CERTIFICATE**

This is to certify that the project work entitled **SUSTAINABILITY OF TRADITIONAL VERNACULAR MUD HOUSES USING AUTODESK ECOTECT** a bonafide work carried out by

Anup	1KG18CV003
Sachin Sangappa Kagal	1KG18CV022
Chaitanya K N	1KG19CV400
Pradeep Kumar S T	1KG19CV405

in partial fulfillment for the award of **Bachelor of Engineering in Civil Engineering** of **Visvesvaraya Technological University, Belagavi**, during the year 2021-2022. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this report satisfies the academic requirement with respect to **Project Work (18CVP83)** prescribed for the degree.

*Sushma . M*  
*M E*

Internal Guide

Mrs. Sushma M  
Mr. Naveena M P  
Assistant Professor  
Dept. of Civil Engg

*W Akella*

Head of Department  
Dept. of Civil Engineering  
K.S. Group of Institutions  
K.S. School of Engineering & Management  
Bangalore-560 062.

Dr. Vijayalakshmi Akella  
Professor & Head  
Dept. of Civil Engg

*K. Rama Narasimha*

Principal  
Dr. K. RAMA NARASIMHA  
Principal/Director  
K S School of Engineering and Management  
Bengaluru - 560 109

Dr. K. Rama Narasimha  
KSSEM

Examiners

*Sushma . M*  
*28/07/22*

Name and Signature of Examiner-1

*W Akella*

Name and Signature of Examiner-2



## ABSTRACT

Sustainability improves the quality of our lives, protects our ecosystem, and preserves natural resources for future generations. The mud house aims to save energy by providing a more stable temperature and reduces heat losses.

With the energy crisis deepening, the role of the built environment becomes more significant. The main aim of this work is to evaluate the vernacular settlement of Kanakapura village, in terms of thermal comfort.

From the present study, the findings from thermal imaging indicate mud stores the heat gained during daytime and dissipates it gradually after 8 PM at night, after getting heated from 7 AM to 5 PM. Thermo hygrometer shows interior temperature to be less than the external temperature from 8 AM in the morning to 7 PM, during the night hours the inside temperature is almost equal to outside temperature. The Mean air temperature inside the hut during hottest time of the day over the course of 30 days remained at constant between 28.1 to 30.2 degrees Celsius. This study shows that there is 18 % increase in moisture content in mud walls compared to modern concrete walls using moisture meter.

The thermal comfort when calculated for a building of the same size with a concrete wall and concrete roof, the percentage of dissatisfaction is found to be 59.45% greater which proves the traditional huts in Kanakapura are more efficient in thermal comfort.

Keywords: Mud architecture, Thermal Comfort, Environment Friendliness

# Slope Stability Analysis of Madikeri District And Landslide Mitigation

*A Project Work submitted to*



*Visvesvaraya Technological University  
in partial fulfilment of the requirements  
for the award of degree of*

**Bachelor of Engineering  
In  
Civil Engineering**

*Submitted by*

Anil Kumar T	1KG16CV006
Chethana C R	1KG18CV007
Lavanya S	1KG18CV011
Narasimha Shenoy K P	1KG18CV014

*Under the Guidance of*

**Dr. Arekal Vijay**  
Professor  
Department of Civil Engineering  
KSSEM, Bangalore

**Dr. Vyshali Bhat**  
Associate Professor  
Department of Civil Engineering  
KSSEM, Bangalore



**KSSEM**  
K.S. School of Engineering and Management

Department of Civil Engineering  
K.S. School of Engineering and Management  
No. 15, Mallasandra, off Kanakapura Road, Bangalore-560062  
2021-22





**Department of Civil Engineering**

**Certificate**

*This is to certify that the project work entitled **Slope Stability Analysis of Madikeri district and Landslide Mitigation** is a bonafide work carried out by*

Anil Kumar T	IKG16CV006
Chethana C R	IKG18CV007
Lavanya S	IKG18CV011
Narasimha Shenoy K P	IKG18CV014

*in partial fulfilment for the award of **Bachelor of Engineering in Civil Engineering** of Visvesvaraya Technological University, Belgaum, during the year 2021-22. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this thesis satisfies the academic requirement in respect of project work prescribed for the degree.*

Internal Guide  
**Dr. Arekal Vijay**  
Professor,  
Dept. of Civil Engg.  
KSSEM, Bangalore

Co Guide  
**Dr. Vyshali Bhat**  
Associate Professor,  
Dept. of Civil Engg.  
KSSEM, Bangalore

Head of the Dept.  
**Dr. Vijaylakshmi Akella**  
Dept. of Civil Engg.  
KSSEM, Bangalore  
K.S. School of Engineering and Management  
K.S. Group of Institutions  
K.S. School of Engineering and Management  
Bangalore-560002

Principal/Director,  
**Dr. Rama Narasimha**  
KSSEM, Bangalore  
Principal/Director  
K.S. School of Engineering and Management  
Bangalore - 560 109

University Examiners:

  
28/04/22

Name and Signature of Examiner-1

Name and Signature of Examiner-2

# Abstract

This project contains the study of Landslides in Kodagu, Karnataka due to heavy rainfall in August, 2018. These events resulted in many damages to existing infrastructure in Kodagu district. The analysis of the slope of the known are i.e., Korangala village of Bhagamandala has been carried out. Slope stability is the process of calculating and assessing how much stress a particular slope can manage before failing.

Various Literature review on the Slope stability analysis has been carried out. Stability Analysis of a hill slope in Madikeri district has been done and Factor of Safety values have been obtained using Adonis Software.

The stability analysis of soil slope are evaluated through the factor of Safety using Mohr-Coulomb method under different density i.e., dry and wet conditions. The Mohr-Coulomb method are adopted on various geo-parametric data that included slope angle, length, width, height, cohesion, density, angle of internal friction that varied for different scenarios. The Factor of Safety for the wet condition was 1.182, and for dry condition it was 1.377 for the existing slope angle of 40. Thus, it may be concluded that the Factor of Safety of 1.182 for wet condition may not be safe for heavy downpour. Hence, remedial measures are recommended to keep the existing slopes in stable condition.

# Design of Pile Foundation For High Rise Structure and Numerical Validation

*A Project Work submitted to*



*Visvesvaraya Technological University  
in partial fulfilment of the requirements  
for the award of degree of*

**Bachelor of Engineering  
in  
Civil Engineering**

*Submitted by*

<b>Aishwarya M</b>	<b>1KG18CV001</b>
<b>Reemashree Das</b>	<b>1KG18CV021</b>
<b>Sunitha T U</b>	<b>1KG18CV027</b>
<b>Tejaswini Shivaram</b>	<b>1KG18CV030</b>

*Under the Guidance of*

**Dr. Arekal Vijay**

Professor  
Department of Civil Engineering  
KSSEM, Bangalore



**KSSEM**  
K.S. SCHOOL OF ENGINEERING AND MANAGEMENT

Department of Civil Engineering  
K.S. School of Engineering and Management  
No. 15, Mallasandra, off Kanakapura Road, Bangalore-560062  
**2021-22**





**K.S. School of Engineering and Management**  
No. 15, Mallasandra, off Kanakapura Road, Bangalore-560062



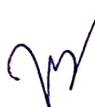
**Department of Civil Engineering**

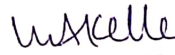
## Certificate


*This is to certify that the project work entitled Design of Pile foundation for High Rise Structure and Numerical Validation is a bonafide work carried out by*

Aishwarya M	1KG18CV001
Reemashree Das	1KG18CV021
Sunitha T U	1KG18CV027
Tejaswini Shivaram	1KG18CV030

*in partial fulfilment for the award of Bachelor of Engineering in Civil Engineering of Visvesvaraya Technological University, Belgaum, during the year 2021-22. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this thesis satisfies the academic requirement in respect of project work prescribed for the degree.*


  
Internal Guide  
**Dr. Arekal Vijay**  
Professor  
Dept. of Civil Engg.  
KSSEM

  
**Dr. Vijayalakshmi Akella**  
Head of the Department,  
Civil Engg. KSSEM


  
Principal/ Director  
**Dr. K. Rama Narasimha**  
K.S. School of Engineering & Management  
and Managing Director  
K S School of Engineering and Management  
Bangaluru - 560 109

University Examiners:

**K.S. School of Engineering & Management**  
Bangalore-560 062.

  
28/07/2022

Name and Signature of Examiner-1

  
28/7/2022

Name and Signature of Examiner-2





# Abstract

Piles are relatively long and slender members used to transfer loads through weak soil or water to deeper soil or rock strata having a high bearing capacity. Pile foundations are usually used for large structures and in situations where the soil at shallow depth is not suitable to resist excessive settlement, resist uplift, etc. Piles are classified on the basis of the mode of load transfer, on the function or use, on the material used, on method of installation. The basic conditions for which the pile foundation can be applied are, when the compressibility of the soil is less, the foundation subjected to horizontal force, the presence of expansive or collapsible soils, the action of uplift forces, the loss of bearing capacity of soil.

A multi storey building consisting of G+20 floors with 29 columns carrying 1,62,000 KN was considered for this study. Pile design was carried out by analytical method. A numerical analysis was also carried out using GEMS Software. Results of both design and numerical analysis of the pile foundation are analysed and compared.

From analytical study, a pile foundation system consisting of 76 piles was designed to carry a load of 1,62,000 KN. This pile group was segregated into 2 pile sizes to carry load of 6000 KN & 7000 KN. A total number of 20 columns was designed to carry 6000 KN and a total number of 9 columns was designed to carry 7000 KN. Single pile capacity for both 6000 KN and 7000 KN was determined by analytical method. And a numerical validation was carried out by using GEMS Software, the difference between analytical & numerical analysis was 1 percent.



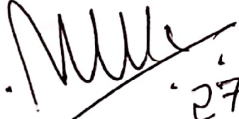


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**DEPARTMENT OF CIVIL ENGINEERING**  
**CERTIFICATE**

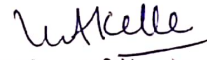
This is to certify that the project work entitled "UTILIZATION OF WASTE PLASTIC IN BITUMINOUS PAVEMENTS WITH LOCAL AGGREGATES BY DRY BLENDING" is a Bonafide work carried out by

VARSHA A	1KG18CV031
AISHWARYA S	1KG18CV002
NIRMITHA S	1KG18CV015

in partial fulfillment for the award of Bachelor of Engineering in Civil Engineering of Viswesvaraya Technological University, Belagavi, during the year 2021-2022. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this report satisfies the academic requirement with respect to Project Work (18CVP83) prescribed for the degree.

  
27/7/2022  
Internal Guide

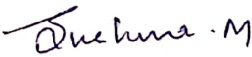
**Mr Veerendra Kumar M**  
Associate Professor  
Dept. of Civil

  
Head of the Department  
Dept. of Civil Engineering  
K.S. Group of Institutions  
K.S. School of Engineering & Management  
Bengaluru - 560 062  
Dr V Jayashankar Akella  
Head of the Department  
Dept. of Civil

  
Principal

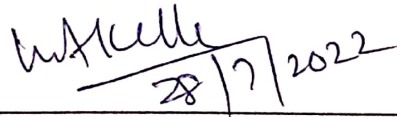
**Dr K.RamaNarasimha**  
KSSEM  
**Dr. K. RAMA NARASIMHA**  
Principal/Director  
K S School of Engineering and Management  
Bengaluru - 560 109

Examiners



28/07/2022

Name and Signature of Examiner-1

  
28/7/2022

Name and Signature of Examiner-2





## ABSTRACT

Conventional bituminous materials have tended to perform satisfactorily in most highway pavement and airfield runway applications. However, in recent years, increased traffic levels, larger and heavier loads, new axle designs and increased tyre pressures have added to the already severe demands of load and environment on the pavement system. This has facilitated the need to enhance the properties of existing bituminous pavement. Use of waste plastic in bituminous pavement is one of the solution which has been currently investigated in the world wide to overcome the limitations of bituminous pavement. Hence the current investigation focuses on utilization of waste plastic in bituminous pavement by dry blending. The experimental investigation is made to determine the properties of locally available aggregates and bitumen after which dense graded bituminous mix is designed as per MORTH specifications for varying fractions of bitumen in order to obtain optimum bitumen content for the conventional dense graded bituminous mix. The determined optimum bitumen content, is partially replaced with waste plastic in various percentage fraction so as to obtain optimum plastic blended dense graded bituminous mix. This experimental investigation has revealed the optimum bitumen content for conventional dense graded bituminous mix as 5%. For plastic modified dense graded bituminous mix, the optimum bitumen content obtained for conventional dense graded bituminous mix is partial replaced by waste plastic by dry blending. By partially replacing the 5% optimum bitumen requirement of conventional dense graded bituminous mix with 4% waste plastic by dry blending was the most optimal mix which had improved Marshall strength value by 44.52% and stability value 42.56% as compared to conventional dense graded bituminous mix.



# Generating Alternative Energy to Provide Uninterrupted Power Supply To Rural Village

A Project Work submitted to



**Visvesvaraya Technological University**

in partial fulfilment of the requirements  
for the award of degree of

**Bachelor of Engineering**  
in  
**Civil Engineering**

**Submitted by**

<b>AKASH K MURTHY</b>	<b>1KG17CV003</b>
<b>PRABIN SINGH</b>	<b>1KG18CV016</b>
<b>PRAJWAL M</b>	<b>1KG18CV017</b>
<b>CHAITRA J</b>	<b>1KG18CV034</b>

Under the Guidance of

**Dr. Vijayalakshmi Akella**

Professor and Head

Department of civil Engineering

KSSEM, Bangalore



**KSSEM**  
K.S. SCHOOL OF ENGINEERING AND MANAGEMENT

Department of CIVIL Engineering

K.S. School of Engineering and Management

No. 15, Mallasandra, off Kanakapura Road, Bangalore-560062

2021-22





**Department of Civil Engineering**

**Certificate**

This is to certify that the project work entitled **Generating Alternative Energy Provide Uninterrupted power supply to Rural Villages** is a bonafide work carried out by

<b>AKASH K MURTHY</b>	<b>1KG17CV003</b>
<b>PRABIN SINGH</b>	<b>1KG18CV016</b>
<b>PRAJWAL M</b>	<b>1KG18CV017</b>
<b>CHAITRA J</b>	<b>1KG18CV034</b>

in partial fulfilment for the award of **Bachelor of Engineering in CIVIL Engineering** of Visvesvaraya Technological University, Belgaum, during the year 2021-22. It is certified that all the suggestions indicated during the internal assessment have been incorporated in the report and this thesis satisfies the academic requirement in respect of project work prescribed for the degree.

*W Akella*

Internal Guide

**Dr. Vijayalakshmi Akella**

Dept. of Civil Engg  
KSSEM, Bengaluru

*W Akella*

Head of the Department  
Professor & Head

**Dr. Vijayalakshmi Akella**

Dept. of Civil Engineering  
K.S. Group of Institutions  
Dept. of Civil Engg  
K.S. School of Engineering & Management  
KSSEM, Bengaluru  
Bangalore-560 062.

*K. Rama Narasimha*

Principal/ Director

**Dr. K. RAMA NARASIMHA**

Principal/ Director  
**Dr. K Rama Narasimha**  
Principal  
**K S School of Engineering and Management**  
KSSEM, Bengaluru  
Bengaluru, 560 109

University Examiners:

*Sushma - M*

*28/07/2022*

Name and Signature of Examiner-1

*W Akella*

*28/7/2022*

Name and Signature of Examiner-2

## Abstract

India has immense potential for making clean power through Renewable Energy Sources (RES) to be specific Hydro, Wind and Solar, Tidal Energy, Geothermal Energy, Biomass Energy. This potential has been fittingly observed and shows India's understanding for reducing carbon impression as a making country.

Energy comes in different forms. Light is a form of energy, so is heat, and so is electricity. This project emphasizes on giving 24 hours of uninterrupted power supply to villages. Harvesting solar energy is one of the techniques of providing electricity. Bio-mass is also produced in villages that can be used. Solar energy is generated by nuclear fusion reactions within the Sun. The energy that radiates from the Sun is a mixture of ultraviolet, visible, and infrared radiation. The intensity of this radiation when it reaches the Earth is  $1361 \text{ W/m}^2$ . Solar power is energy from the sun that is converted into thermal or electrical energy. The energy produced from solar panels is converted from DC to AC by an inverter and is stored in batteries.

**EXPERIMENTAL STUDY ON GOEPOLYMER AND NORMAL  
BLOCK MASONRY WITH AND WITHOUT HORIZONTAL  
REINFORCEMENT**

A Project Work submitted to



**Visvesvaraya technological university**  
in partial fulfilment of the requirements for the award of  
degree of

**Bachelor of Engineering**  
in  
**CIVIL ENGINEERING**

Submitted by

<b>B. NAVEEN</b>	<b>1KG18CV004</b>
<b>CHANDRASHEKAR.C</b>	<b>1KG19CV401</b>
<b>LOKNATH.S</b>	<b>1KG19CV402</b>
<b>RAKESH.D</b>	<b>1KG19CV406</b>

Under the Guidance of Internal Guide

**Mr. MANJUNATH B**

**Mr. PRASHANTH M**

Assistant Professor

Department of Civil Engineering

KSSEM, Bengaluru.



**KSSEM**

Department of Civil Engineering  
K.S. School of Engineering and Management  
No. 15, Mallasandra, off Kanakapura Road, Bangalore-560109  
**2021-2022**





**K.S. School of Engineering and Management**  
No. 15, Mallasandra, off Kanakapura Road, Bangalore-560109

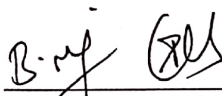


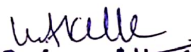
**Department of Civil Engineering**  
**CERTIFICATE**

This is to certify that the project work entitled **Experimental Study on Geo polymer And Normal Block Masonry with and Without Horizontal Reinforcement** is a bonafide work carried out by

B. NAVEEN	1KG18CV004
CHANDRASHEKAR.C	1KG19CV401
LOKNATH.S	1KG19CV402
RAKESH.D	1KG19CV406

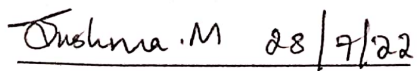
in partial fulfilment for the award of **Bachelor of Engineering in Civil Engineering** of **Visvesvaraya Technological University, Belgaum**, during the year 2021-22. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this thesis satisfies the academic requirement in respect of **project work (18CVP83)** prescribed for the degree.

  
Internal guide  
**Mr. Manjunath B**  
**Mr. Prashanth M**  
Assistant Professor  
Dept. Of Civil Engg.  
KSSEM, Bengaluru.

  
Professor & Head  
Head of the department  
Dept. of Civil Engineering  
K.S. Group of Institutions  
Dr. Vijayalakshmi Akella  
K.S. School of Engineering & Management  
Professor and Head  
Bangalore-560 052  
Dept. Of Civil Engg.  
KSSEM, Bengaluru.

  
Principal/ Director  
**Dr. K. RAMA NARASIMHA**  
Principal/Director  
Dr. K. Rama Narasimha  
K.S. School of Engineering and Management  
Principal  
Bengaluru - 560 109  
KSSEM, Bengaluru.

Examiners:

  
Name and Signature of Examiner-1

  
Name and Signature of Examiner-2

## ABSTRACT

Geopolymer block are made from GGBS, fly ash, Sodium hydroxide, Sodium silicate, distilled water and normal concrete blocks are made from M-sand, coarse aggregates and cement. The block of dimension of 400x200x150mm Total 50 blocks were casted in this study under ambient curing. The test specimen in this study was block was kept under ambient curing under 28 days. The compressive strength of ambient curing geopolymer block and Normal block 3.9 and 3.08N/mm<sup>2</sup> respectively. The casted normal block prism and geopolymer block prism with and without horizontal reinforcement. To conduct compressive strength test on block masonry prism. To know the strength and stress, strain properties under loading frame and comparing the results of different prisms. The Horizontal reinforcement is provided in the mortar joint of the masonry structure. It is either steel bar or steel mesh A masonry prism is an assembly of masonry units and mortar that is constructed to serve as a test specimen for determining properties of masonry assembly A mesh is a barrier made of connected strands of metal, fibres, or other flexible or ductile materials From the test results it is observed that the compressive load carrying capacity of geo polymer block masonry prism with mesh horizontal reinforcement of Maximum Load of 80kN at a Displacement of 13mm for 28days and Normal Blocks with Mesh Maximum Load of 60kN at a Displacement of 12mm for 28days. Geo polymer blocks masonry prism without mesh reinforcement was higher with mesh Maximum Load of 55kN at a Displacement of 11mm for and normal blocks prism without mesh Maximum Load of 50kN at a Displacement of 9 mm.

**TO MANUFACTURE AND STUDY THE STRENGTH  
PROPERTIES OF DIFFERENT BLOCKS USING STRAW**

*A Project Work submitted to*



*Visvesvaraya Technological University  
in partial fulfillment of the requirements  
for the award of degree of  
Bachelor of Engineering  
in  
Civil Engineering*

*Submitted by*

**ARUNAGOUDA SHIVANAGOUDA KADUR  
MARY AISHWARYA B  
SANTHOSH CHANDRASHEKARA HARAVI  
SWATHI K**

**1KG16CV060  
1KG18CV013  
1KG18CV025  
1KG18CV028**

*Under the Guidance of*

**MANJUNATH B**  
Assistant Professor  
Department of Civil Engineering  
KSSEM, Bengaluru.

**PRASHANTH M**  
Assistant Professor  
Department of Civil Engineering  
KSSEM, Bengaluru.

Department of Civil Engineering



**KSSEM**  
K.S. SCHOOL OF ENGINEERING AND MANAGEMENT

Department of Civil Engineering  
K.S. School of Engineering and Management  
No. 15, Mallasandra, off Kanakapura Road, Bengaluru-560109  
2021-22







**K.S. SCHOOL OF ENGINEERING AND MANAGEMENT**  
**DEPARTMENT OF CIVIL ENGINEERING**  
**CERTIFICATE**

This is to certify that the project work entitled **TO MANUFACTURE AND STUDY THE STRENGTH PROPERTIES OF DIFFERENT BLOCKS USING STRAW** is a bonafide work carried out by

<b>ARUNAGOUDA SHIVANAGOUDA KADUR</b>	<b>1KG16CV060</b>
<b>MARY AISHWARYA B</b>	<b>1KG18CV013</b>
<b>SANTHOSH CHANDRASHEKARA HARAVI</b>	<b>1KG18CV025</b>
<b>SWATHI K</b>	<b>1KG18CV028</b>

in partial fulfillment for the award of **Bachelor of Engineering in Civil Engineering of Visvesvaraya Technological University, Belagavi**, during the year 2021-2022. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this report satisfies the academic requirement with respect to **Project Work (18CVP83)** prescribed for the degree.

Internal Guide

**Manjunath B**

**Prashanth M**

Assistant Professor  
Dept. of Civil Engg.  
KSSEM, Bengaluru.

Professor & Head  
Dept. of Civil Engineering

**K.S. School of Engineering & Management**  
**K.S. Group of Institutions**

**Dr. Vijaya Lakshmi Akella**

Professor and Head  
Dept. of Civil Engg.  
KSSEM, Bengaluru.

Principal/ Director  
**Dr. K. RAMA NARASIMHA**

Principal/Director  
**K.S. School of Engineering and Management**

**Dr. K. Rama Narasimha**

Principal  
KSSEM, Bengaluru

**Examiners**

Name and Signature of Examiner-1

Name and Signature of Examiner-2





## Abstract

In India, generally blocks are made up of sand and clay, and now a days agriculture plays an important role. Straw bale acts as one of the best alternatives for all kind of people for constructing an economic building with a sustainable material. Straw bale acts as the alternative of sand. The advancement in the field of technology have influence environment in utmost extend so everyone is worried about the environment and its tremendous impact in our life. It is also cost effective, thermal performance, light weight, eco-friendly in nature. The blocks are manufactured of size 400mm×200mm×150mm. All 36 blocks are manufactured and tested for compressive strength and water absorption test after 7 days and 28 days respectively. The compressive strength results obtained for solid blocks, straw cement blocks, straw concrete blocks and straw clay blocks are 1.76 N/mm<sup>2</sup>, 1.21 N/mm<sup>2</sup>, 2.3 N/mm<sup>2</sup> and 1.38 N/mm<sup>2</sup> is for 7 days and 4.4 N/mm<sup>2</sup>, 3.04N/mm<sup>2</sup>, 5.75 N/mm<sup>2</sup> and 3.46 N/mm<sup>2</sup> is for 28 days. The water absorption test for solid blocks, straw cement blocks, straw concrete blocks and straw clay blocks obtained is 3.85%, 4.61%, 5.33% and 8.9% respectively.

# CASE STUDY ON BULLET TRAIN TRACK FROM MUMBAI- AHMEDABAD

Project Work submitted to



**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**

in partial fulfilment of the requirements  
for the award of degree of

**BACHELOR OF ENGINEERING**  
in  
**CIVIL ENGINEERING**

Submitted by

<b>BHAGATH HK</b>	<b>1KG17CV006</b>
<b>DINESH KRISHNAN</b>	<b>1KG17CV009</b>
<b>SANDEEP PATRE</b>	<b>1KG18CV023</b>
<b>SHREYAS PRASANNA</b>	<b>1KG18CV026</b>

Under the guidance of

**AMRUTHA DHIRAJ**

**Assistant Professor**

**K S School of Engineering and Management**



**KSSEM**  
K.S. School of Engineering and Management

Department of Civil Engineering  
K.S. School of Engineering and Management  
No. 15, Mallasandra, off Kanakapura Road, Bengaluru-560109  
2021-22





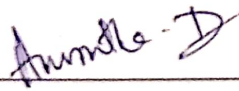
**K.S. SCHOOL OF ENGINEERING AND MANAGEMENT  
DEPARTMENT OF CIVIL ENGINEERING**

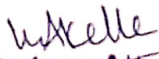
**CERTIFICATE**


This is to certify that the project work entitled “CASE STUDY ON BULLET TRAIN TRACK FROM MUMBAI-AHMEDABAD” is a bonafide work carried out by

BHAGATH HK	1KG17CV006
DINESH KRISHNAN	1KG17CV009
SANDEEP PATRE	1KG18CV023
SHREYAS PRASANNA	1KG18CV026

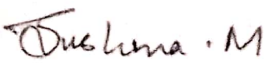
in partial fulfillment for the award of **Bachelor of Engineering in Civil Engineering** of Visvesvaraya Technological University, Belagavi, during the year 2021-22. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this report satisfies the academic requirement with respect to **Project Work (18CVP83)** prescribed for the degree.

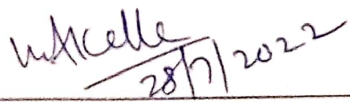
  
\_\_\_\_\_  
**Internal Guide**  
**Amrutha Dhiraj**  
Asst. Professor  
Dept. of Civil Engg.  
KSSEM, Bengaluru

  
\_\_\_\_\_  
**Professor & Head**  
**Head of the Department**  
**Dept. of Civil Engineering**  
**DK S. Gopalakrishna**  
**Professor and Head**  
**K.S. School of Engineering & Management**  
**Bangalore-560 062.**  
Dept. of Civil Engg.  
KSSEM, Bengaluru

  
\_\_\_\_\_  
**Principal**  
**Dr. K. Rama Narasimha**  
**Dr. K. RAMA NARASIMHA**  
**Principal/Director**  
**KSSEM, Bengaluru**  
**K S School of Engineering and Management**  
**Bengaluru - 560 109**

**Examiners**

  
**Dushama M**  
28/7/22  
\_\_\_\_\_  
Name and Signature of Examiner-1

  
28/7/2022  
\_\_\_\_\_  
Name and Signature of Examiner-2





## ABSTRACT

The bullet train or shinkansen is a type of passenger train which operates on Japan's high-speed railway network. Bullet train uses super conducting magnets, and that's why it is called SC maglev or super conducting magnetic levitation. The engine of maglev trains does not use fossil fuels, instead the magnetic field is created by the electrified coils in the guideway walls and the track combine to propel the train. The bullet train tracks mainly work on three mechanisms namely propulsion, levitation and guidance system. The design parameters of the railway line and the optimised locations of this track body are closely related. The National High-Speed Rail Corporation Limited (NHSRCL) is executing the Mumbai-Ahmedabad bullet train project. The Mumbai-Ahmedabad High-Speed Rail or Bullet Train Project is a 508-km-long of which 352 km lies in Gujarat (348 km) and Dadra and Nagar Haveli (4 km) while the remaining 156 km is in Maharashtra. The project is estimated to cost ₹1.1 lakh crore (US\$14 billion). Most of the line will be constructed on an elevated corridor to avoid land acquisitions and the need to build underpasses. The bullet trains in these forthcoming projects will travel around 15000 kilometres across India.

This project presents a case study on bullet train track from Mumbai to Ahmedabad in which all the parameters for designing the railway line and the various structural components and details of pile, pile caps, piers and pier caps are studied and discussed. Such initiatives will contribute to the country's economic development and will shape the future of contemporary transportation.

# PARAMETRIC STUDY OF AIR QUALITY INDEX AT SALIENT POINTS IN BENGALURU

*A Project Work submitted to*



*Visvesvaraya Technological University*

*In partial fulfilment of the requirements*

*For the award of degree of*

**Bachelor of Engineering**

**in**

**Civil Engineering**

*Submitted by*

<b>UZAIR IFTEKHAR</b>	<b>1KG15CV054</b>
<b>MADHU SUDHAN R</b>	<b>1KG16CV028</b>
<b>SANJAY S</b>	<b>1KG16CV048</b>

*Under the Guidance of*

**Dr. Rashmi H R**

Associate Professor

Department of Civil Engineering

KSSEM, Bangalore



**KSSEM**

Department of Civil Engineering

K.S. School of Engineering and Management

No. 15, Mallasandra, off Kanakapura Road, Bangalore-560109

2021-22





**KSSEM**  
K.S. Group of Institutions

**K.S. SCHOOL OF ENGINEERING AND MANAGEMENT  
DEPARTMENT OF CIVIL ENGINEERING  
CERTIFICATE**

This is to certify that the project work entitled **PARAMETRIC STUDY OF AIR QUALITY INDEX AT SALIENT POINTS IN BENGALURU** is a bonafide work carried out by


<b>UZAIR IFTEKHAR</b>	<b>1KG15CV054</b>
<b>MADHUSUDHAN R</b>	<b>1KG16CV028</b>
<b>SANJAY S</b>	<b>1KG16CV048</b>

in partial fulfillment for the award of **Bachelor of Engineering in Civil Engineering** of **Visvesvaraya Technological University, Belagavi**, during the year 2021-2022. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this report satisfies the academic requirement with respect to **Project Work (15CVP85)** prescribed for the degree.

**Internal Guide**

**Head of the Department**

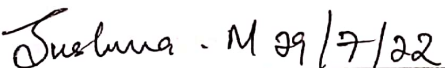
**Principal**

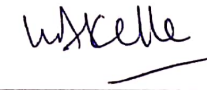
  
**Dr. Rashmi H R**  
Associate Professor  
Dept. of Civil

  
**Dr. Vijyalakshmi Akella**  
Head of Department  
Dept. of Civil  
Professor & Head  
Dept. of Civil Engineering  
K.S. Group of Institutions  
K.S. School of Engineering & Management  
Bangalore-560 062.

  
**Dr. K. Rama Narasimha**  
KSSEM  
**Dr. K. RAMA NARASIMHA**  
Principal/Director  
K S School of Engineering and Management  
Bengaluru - 560 109

**Examiners**

  
Name and Signature of Examiner-1

  
Name and Signature of Examiner-2





## ABSTRACT

Air pollution has become one of the most hazardous global concerns, killing an estimated 7 million people worldwide every year. Bengaluru, the city of India's high-tech industry has been developing economically scaling up the luxuries of living lifestyle. Due to the rapid development of this metropolitan city, it has been facing deteriorating environmental conditions. The sole objective of this project is to analyze the air pollution trend from 2022-2026 at various industrial, residential, sensitive and moderate locations in Bengaluru on various factors that contribute to air pollution.

# STRENGTH CHARACTERISTICS OF CONCRETE PRISM WRAPPED WITH CARBON FIBER

*A Project Work submitted to*



*Visvesvaraya Technological University  
in partial fulfilment of the requirements  
for the award of degree of*

**BACHELOR OF ENGINEERING**

in

**CIVIL ENGINEERING**

*Submitted by*

SANJAY M V	1KG16CV047
RAHUL K	1KG17CV029
NIRANJAN K	1KG18CV411
SUKHVEER K ACHARYA	1KG18CV413

*Under the Guidance of*

**PRASHANTH M**

**MANJUNATH B**

Assistant Professors

Department of Civil Engineering

KSSEM, Bengaluru



**KSSEM**  
K.S. SCHOOL OF ENGINEERING AND MANAGEMENT

Department of Civil Engineering  
K.S. School of Engineering and Management  
No. 15, Mallasandra, off Kanakapura Road, Bengaluru-560109  
2021-22



**K.S. School of Engineering and Management**  
No. 15, Mallasandra, off Kanakapura Road, Bengaluru-560109



**KSSEM**


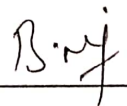
**Department of Civil Engineering**

## Certificate

*This is to certify that the project work entitled "STRENGTH CHARACTERISTICS OF CONCRETE PRISM WRAPPED WITH CARBON FIBER" is a bonafide work carried out by*

<b>SANJAY M V</b>	<b>1KG16CV047</b>
<b>RAHUL K</b>	<b>1KG17CV029</b>
<b>NIRANJAN K</b>	<b>1KG18CV411</b>
<b>SUKHVEER K ACHARYA</b>	<b>1KG18CV413</b>

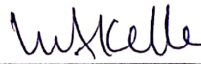
*in partial fulfilment for the award of "Bachelor of engineering in civil engineering" of Visvesvaraya Technological University, Belgaum, during the year 2021-22. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this thesis satisfies the academic requirement in respect of project work prescribed for the degree.*

Name and Signature of  
Internal Guide

**Mr. Prashanth M**  
**Mr. Manjunath B**

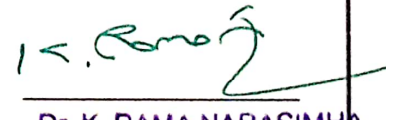
Assistant Professors  
Dept. of Civil Eng.  
KSSEM, Bengaluru



Professor & Head  
Dept. of Civil Engineering

K.S. Group of Institutions  
K.S. School of Engineering & Management  
**Dr. Vijayalakshmi Akella**  
Bengaluru-560002.

Professor and Head  
Dept. of Civil Eng.  
KSSEM, Bengaluru



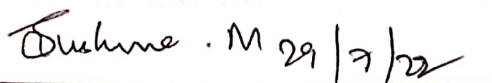
**Dr. K. RAMA NARASIMHA**  
Principal/Director

K S School of Engineering and Manag  
Bengaluru - 560 109

**Dr. K Rama Narasimha**

Principal  
KSSEM, Bengaluru

University Examiners:



Name and Signature of Examiner-1



Name and Signature of Examiner-2





# Abstract

In present scenario, it is observed that many of the structures are under distress and partly damaged due to many reasons such as, design defect, construction deficiency and natural effects, these structures need to be retrofitted to improve longer service life. Carbon Fiber-Reinforced Polymer (CFRP) is one of the best materials found from research to retrofit the distressed structures. It can restore the strength and stability of distressed structures. CFRP is a composite material comprised of high strength fibers such as glass, carbon, and steel wires, embedded in a polymer matrix. CFRP acts as main reinforcing material and the polymer matrix (epoxy resins) as a binder, protects the fibers and transfers loads between the fibers. An attempt is made in this article to evaluate the strength of conventional and CFRP wrapped concrete. M25 grade concrete mix proportion was designed; tests are conducted on basic properties of materials. The test result of compressive strength increases from 15 to 40 %, flexural strength increased from 10 to 30% and split tensile strength increased from 30 to 50% as compared with conventional concrete.

**Transit Oriented Development: A case study of Namma  
Bengaluru Metro Phase-I**

Project Work submitted to



**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**

in partial fulfillment of the requirements  
for the award of degree of

**BACHELOR OF ENGINEERING  
in  
CIVIL ENGINEERING**

Submitted by

<b>GANESH S</b>	<b>1KG16CV016</b>
<b>ROHITH KS</b>	<b>1KG16CV045</b>
<b>BHARGAVA M</b>	<b>1KG17CV401</b>
<b>MUNIRATHNAM BS</b>	<b>1KG18CV410</b>

Under the Guidance of

**Mrs. Saisushma B A**  
**Asst. Prof Civil Engineering**  
**K S School of Engineering and Management**



**KSSEM**  
K. S. School of Engineering and Management

Department of Civil Engineering  
K.S. School of Engineering and Management  
No. 15, Mallasandra, off Kanakapura Road, Bengaluru-560109  
2021-2022





**K.S. SCHOOL OF ENGINEERING AND MANAGEMENT  
DEPARTMENT OF CIVIL ENGINEERING**

**CERTIFICATE**

This is to certify that the project work entitled **Transit Oriented Development: A case study of Namma Bengaluru Metro Phase-I** is a bonafide work carried out by

<b>GANESH S</b>	<b>1KG16CV016</b>
<b>ROHITH KS</b>	<b>1KG16CV045</b>
<b>BHARGAVA M</b>	<b>1KG17CV401</b>
<b>MUNIRATHNAM BS</b>	<b>1KG18CV410</b>

in partial fulfillment for the award of **Bachelor of Engineering in Civil Engineering** of **Visvesvaraya Technological University, Belagavi**, during the year 2021-2022. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this report satisfies the academic requirement with respect to **Project Work (17CVP85)** prescribed for the degree.

**Internal Guide**

**Head of the Department**

**Principal**

*Sai Sushma BA*

**Mrs. Saisushma B A**  
Asst. Professor  
Dept. of Civil

*Wkelle*

**Dr. Vijayalakshmi Akella**  
Head of Dept. of Civil  
Professor & Head  
Dept. of Civil Engineering  
K.S. Group of Institutions  
K.S. School of Engineering & Management  
Bangalore-560 062.

*K. Rama Narasimha*

**Dr. K. Rama Narasimha**  
KSSEM  
**Dr. K. RAMA NARASIMHA**  
Principal/Director  
K S School of Engineering and Management  
Bangaluru - 560 109

**Examiners**

*Que hma - M 29/7/22*

Name and Signature of Examiner-1

*Wkelle*

Name and Signature of Examiner-2





## ABSTRACT

The population of the Bengaluru Metropolitan Region (BMR) is expected to double from 12.7 million in 2021 to 16.5 million by 2031. To accommodate the future population, it is not feasible to double the land requirement. In view of above, there is a need to optimize the available land and promote the compact, walkable and pedestrian oriented development along the corridor.

The study proposes a methodology to evaluate the impact of planned Transit Oriented Development (TOD) along new METRO rail project. Using this methodology, the applicability of TOD principles using vertical development in rapidly developing metropolitan city, Bengaluru, in India is explored. The methodology focuses on prediction of mode choice behavior of people, change of street scape, socio economic analysis and accident analysis after implementation of planned TOD. Findings of this study show that TOD can be an effective tool for achieving the sustainable development in highly congested metropolitan cities of developing country as even though density is increased within Transit Influence Area (TIA), the congestion on roads will not be increased.

**Key words:** TOD, mode choice behavior, sustainability.

**UTILIZATION OF WASTE PLASTIC IN BITUMINOUS  
PAVEMENTS WITH LOCAL AGGREGATES BY WET BLENDING**

Project Work submitted to



**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**

in partial fulfillment of the requirements

for the award of degree of

**BACHELOR OF ENGINEERING**

in

**CIVIL ENGINEERING**

Submitted by

<b>MOHAMMED ADNAN SALIK</b>	<b>1KG16CV033</b>
<b>RASHMI.K.N</b>	<b>1KG17CV031</b>
<b>TEJAS.S</b>	<b>1KG17CV038</b>
<b>MOHAMMED RIZWAN A</b>	<b>1KG18CV408</b>

Under the Guidance of

**Mr VEERENDRA KUMAR M**

**ASSOCIATE PROFESSOR**

**K S School of Engineering and Management**



Department of Civil Engineering

K.S. School of Engineering and Management

No. 15, Mallasandra, off Kanakpura Road, Bengaluru-560109

**2021-2022**





**KSSEM**

**K.S. SCHOOL OF ENGINEERING AND MANAGEMENT**

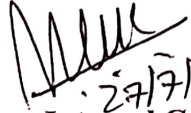
**DEPARTMENT OF CIVIL ENGINEERING**

**CERTIFICATE**


This is to certify that the project work entitled "UTILIZATION OF WASTE PLASTIC IN BITUMINOUS PAVEMENTS WITH LOCAL AGGREGATES BY WET BLENDING" is a bonafide work carried out by


MOHAMMED ADNAN SALIK	1KG16CV033
RASHMI.K.N	1KG17CV031
TEJAS.S	1KG17CV038
MOHAMMED RIZWAN A	1KG18CV408

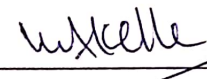
in partial fulfillment for the award of Bachelor of Engineering in **Civil Engineering** of **Visvesvaraya Technological University, Belagavi**, during the year 2021-2022. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this report satisfies the academic requirement with respect to **Project Work (17CVP85)** prescribed for the degree.

  
27/7/2022  
**Internal Guide**  
**Mr Veerendra Kumar M**  
Associate Professor  
Dept. of Civil

  
**Head of the Department**  
**Dr Vijayalakshmi Akella**  
Head of the Department  
Dept. of Civil  
Professor & Head  
Dept. of Civil Engineering  
K.S. Group of Institutions  
K.S. School of Engineering & Management  
Bangalore-560 062

  
**Principal**  
**Dr. K. Rama Narasimha**  
KSSEM  
**Dr. K. RAMA NARASIMHA**  
Principal/Director  
K S School of Engineering and Management  
Bangaluru - 560 109

**Examiners**  
  
Sushma . M 29/7/22

  
Name and Signature of Examiner-2

Name and Signature of Examiner-1





## ABSTRACT

Conventional bituminous materials have tended to perform satisfactorily in most highway pavement and airfield runway applications. However, in recent years, increased traffic levels, larger and heavier loads, new axle designs and increased tyre pressures have added to the already severe demands of load and environment on the pavement system. This has facilitated the need to enhance the properties of existing bituminous pavement. Use of waste plastic in bituminous pavement is one of the solution which has been currently investigated in the world wide to overcome the limitations of bituminous pavement. Hence the current investigation focuses on utilization of waste plastic in bituminous pavement by dry blending. The experimental investigation is made to determine the properties of locally available aggregates and bitumen after which dense graded bituminous mix is designed as per MORTH specifications for varying fractions of bitumen in order to obtain optimum bitumen content for the conventional dense graded bituminous mix. The determined optimum bitumen content, is partially replaced with waste plastic in various percentage fraction so as to obtain optimum plastic blended dense graded bituminous mix. This experimental investigation has revealed the optimum bitumen content for conventional dense graded bituminous mix as 5%. For plastic modified dense graded bituminous mix, the optimum bitumen content obtained for conventional dense graded bituminous mix is partial replaced by waste plastic by dry blending. By partially replacing the 5% optimum bitumen requirement of conventional dense graded bituminous mix with 4% waste plastic by dry blending was the most optimal mix which had improved Marshall strength value by 44.52% and stability value 42.56% as compared to conventional dense graded bituminous mix.

# EXPERIMENTAL INVESTIGATION ON UTILIZATION OF BAMBOO IN RC STRUCTURES

A Project Work submitted to



**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**  
In partial fulfilment of the requirements for the award of  
degree of

## **Bachelor of Engineering in CIVIL ENGINEERING**

Submitted by

**K YASWANTH                      1KG17CV015**

**MADHUNANDAN S              1KG18CV012**

**MOUNESH KUMAR N         1KG19CV403**

Under the Guidance of Internal Guide

**Mr. NAVEENA MP**

**Mrs. SUSHMA M**

Assistant Professor  
Department of Civil Engineering



**KSSEM**  
K.S. SCHOOL OF ENGINEERING AND MANAGEMENT

Department of Civil Engineering  
K.S. School of Engineering and Management  
No. 15, Mallasandra, off Kanakapura Road, Bangalore-560109  
**2021-2022**

**K.S. School of Engineering and Management**  
No. 15, Mallasandra, off Kanakapura Road, Bangalore-560109



**Department of Civil Engineering**

## CERTIFICATE

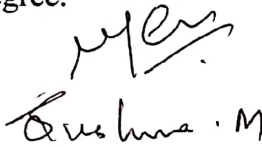
This is to certify that the project work entitled is a bonafide work carried out by

**K YASWANTH**                      **1KG17CV015**

**MADHUNANDAN S**                **1KG18CV012**

**MOUNESH KUMAR N**            **1KG19CV403**

in partial fulfilment for the award of Bachelor of Engineering in Civil Engineering of Visvesvaraya Technological University, Belgaum, during the year 2021-22. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this thesis satisfies the academic requirement in respect of project work prescribed for the degree.



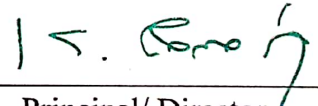
Name and Signature of  
Internal Guide

**Mr. Naveen M P**  
**Mrs. Sushma M**  
Assistant professor  
Dept. of civil Engg



Head of the Department  
Professor & Head  
Dept. of Civil Engineering  
K.S. Group of Institutions  
K.S. School of Engineering & Management  
Bangalore-560 062

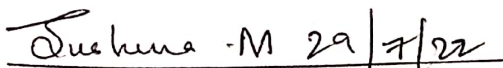
**Dr. Vijayalakshmi Akella**  
Professor & head  
Dept. of civil Engg




Principal/ Director  
**Dr. K. RAMA NARASIMHA**  
Principal/Director  
K S School of Engineering and Management  
Bangaluru - 580 109

**Dr. K. Rama Narasimha**  
Principal/ Director  
KSSEM

**Examiners:**

  
Name and Signature of Examiner-1

  
Name and Signature of Examiner-2



## *ABSTRACT*

RCC (Reinforced Cement Concrete) are the structures which carries a gravity load. The reinforcement is the element which is popular as HYSD bars is used to provide to carry the tensile stress in the beam. But the disadvantages of HYSD bars are heavy in weight, un – ecofriendly and non-renewable material. Aiming to mitigate this concern to sustainable and ecofriendly material like Bamboo is used reinforcement as fully and partially replacement to the HYSD bars in the concrete beam.

Feasibility of usage of bamboo as a reinforcement was investigated through experimental work in the laboratory. The three types of beams were cast first beam of Longitudinal and shear reinforcement as HYSD bars (B1), Second beam of Longitudinal Bamboo and Shear reinforcement as HYSD bars (B2) and Third beam of Longitudinal and shear reinforcement as Bamboo (B3). The size of the beam is 2100mmX200mmX150mm. The flexural strength and load deflection behavior of beams are investigated. It is observed that both types of beams B1, B2 have shown significantly higher load carrying capacity then B. the bamboo reinforced beam having 60% of the conventional HYSD bars beams (B1).

# SMART IRRIGATION SYSTEM USING IOT IN DRIP IRRIGATION

Project Work submitted to



**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**

in partial fulfillment of the requirements  
for the award of degree of

**BACHELOR OF ENGINEERING**  
in  
**CIVIL ENGINEERING**

Submitted by

<b>RAVI V</b>	<b>1KG18CV020</b>
<b>T M ROHIT YADAV</b>	<b>1KG18CV029</b>
<b>VARUN C J</b>	<b>1KG18CV032</b>
<b>ABHINANDAN BHAGAT</b>	<b>1KG18CV033</b>

Under the Guidance of  
**SHASHI PRASAD N**  
Assistant Professor

**K S School of Engineering and Management**



**KSSEM**  
K.S. SCHOOL OF ENGINEERING AND MANAGEMENT

Department of Civil Engineering  
K.S. School of Engineering and Management  
No. 15, Mallasandra, off Kanakapura Road, Bengaluru-560109  
2021-2022



**K.S. SCHOOL OF ENGINEERING AND MANAGEMENT  
DEPARTMENT OF CIVIL ENGINEERING**

**CERTIFICATE**

This is to certify that the project work entitled “**SMART IRRIGATION SYSTEM USING IoT IN DRIP IRRIGATION**” is a bonafide work carried out by

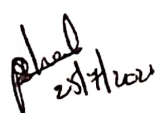
<b>RAVI V</b>	<b>1KG18CV020</b>
<b>T M ROHIT YADAV</b>	<b>1KG18CV029</b>
<b>VARUN C J</b>	<b>1KG18CV032</b>
<b>ABHINANDAN BHAGAT</b>	<b>1KG18CV033</b>


in partial fulfillment for the award of **Bachelor of Engineering in Civil Engineering** of **Visvesvaraya Technological University, Belagavi**, during the year 2021-2022. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this report satisfies the academic requirement with respect to **Project Work (18CVP83)** prescribed for the degree.

**Internal Guide**

**Head of the Department**

**Principal**

  
**Mr. Shashi Prasad N**  
Assistant Professor  
Dept. of Civil Engg.

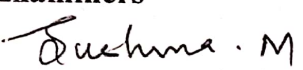
  
**Dr. Vijayalakshmi Akella**  
Professor & Head  
Head of the Department  
Dept. of Civil Engineering  
K.S. Group of Institutions

  
**Dr. K. Rama Narasimha**  
Principal/ Director  
KSSEM

**K.S. School of Engineering & Management**  
Bangalore-560 062

**Dr. K. RAMA NARASIMHA**  
Principal/Director  
**K S School of Engineering and Manager**  
Bangaluru - 580 109

**Examiners**

  
28/07/22  
Name and Signature of Examiner-1

  
Name and Signature of Examiner-2



## ABSTRACT

The increasing demand of the food supplies requires a rapid improvement in food production technology. In many countries where agriculture plays an important part in shaping up the economy and the climatic conditions are isotropic, but still we are not able to make full use of agricultural resources. One of the main reasons is the lack of rains & scarcity of land reservoir water. Extraction of water at regular intervals from earth is reducing the water level as a result of which the zones of un-irrigated land are gradually increasing. Also, the unplanned use of water inadvertently results in wastage of water. In a smart irrigation system, the most significant advantage is that water is supplied only when the moisture in soil is reduced. This saves us a lot of water. In recent times, the farmers have been using irrigation technique through the manual control in which the farmers irrigate the land at regular intervals by turning the water-pump on/off when required. This process sometimes consumes more water and sometimes the water supply to the land is delayed due to which the crops dry out. Water deficiency deteriorates plants growth before visible wilting occurs. In addition to this slowed growth rate, lighter weight fruit follows water deficiency. This problem can be perfectly rectified if we use Automated Irrigation System in which the irrigation will take place only when there will be intense requirement of water, as suggested by the moisture in the soil.

As water supply is becoming scarce in today's world there is an urgency of adopting smart ways of irrigation. The project describes how irrigation can be handled smartly using IoT. This project aims at saving time and avoiding problems like constant vigilance. It also helps in conserving water by automatically providing water to the plants/field depending on the water requirements. This system can also prove to be helpful in agriculture, parks and lawns. The objective of this system is to detect the moisture content of the soil and depending on it sprinkle water. This entire information will be sent to the user's mobile phone.