

**NATIONAL CONFERENCE ON
RECENT ADVANCEMENTS
IN
CIVIL ENGINEERING RESEARCH**

12th - 14th SEPTEMBER, 2022

PROCEEDINGS

Organized by

THE DEPARTMENT OF CIVIL ENGINEERING



MEA ENGINEERING COLLEGE
P E R I N T H A L M A N N A

VENGOOR - PATTIKKAD PO, PERINTHALMANNA, MALAPPURAM DISTRICT, KERALA - PIN 679325



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MEA Engineering College, the first NAAC accredited self-financing engineering college in Malappuram district, is committed to provide excellent and value-based education with a flair for ethics and professionalism. The College is located amidst panoramic natural beauty over-looking the hills and valleys at Nellikunnu, near Perinthalmanna – a town of various educational institutions- on the Perinthalmanna- Melattur road. The College is easily accessible by road, rail and air. The College is governed by the MEA sponsored by the “Samastha Kerala Jammiyyathul Ulama”, a society instituted by topclass intellectuals of the Muslim community. Janab Panakkad Sayyid Haydar Ali Shihab Thangal is its charismatic head. The institution is affiliated to the APJ Abdul Kalam Technological University and approved by the A I C T E. The college offers 6 B.Tech programmes, 3 M.Tech programmes and Ph.D programmes. The College Management has chosen this backward area for establishing the College with the aim of sharing the responsibility of uplifting the people of the area by making technical education affordable and within reach. The Management has no motive of making profit from the College but aims at creating a Center of Excellence in Engineering and Technology.

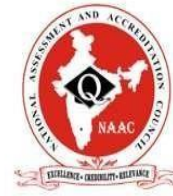
ABOUT THE DEPARTMENT

The Department of Civil Engineering started in the year 2011 and the first batch of students passed out in the year 2015. The Department offers undergraduate course in Civil Engineering. In all, there are around 480 students in undergraduate programme. It has faculty with expertise in diverse fields. Presently, the department has 23 qualified, sincere and dedicated teaching faculty members. The Department has established a state of the art experimental facilities and laboratories in different fields of Civil Engineering. The Department strongly believes in continuous efforts to strive for excellence by exploring new frontiers of knowledge, imparting the latest technical knowledge to the students and conducting high quality research.



MEA ENGINEERING COLLEGE
P E R I N T H A L M A N N A

VENGOOR - PATTIKAD P.O, PERINTHALMANNA, MALAPPURAM DISTRICT, KERALA - PIN 679325



VISION

To provide top class education to the community by achieving excellence in engineering education and mould world class engineers with competence, integrity and social commitment.

MISSION

To provide the best faculty, excellent infrastructure, commendable facilities for excellent academic ambiance to encourage research and development and to strengthen employability and campus placements.

DEPARTMENT OF CIVIL ENGINEERING

VISION

Emerge as an excellent centre for Civil Engineering education by building up professionally competent Civil Engineers

MISSION

- Develop professionally competent and socially committed Civil Engineers with ethical values, entrepreneurship, and leadership qualities.
- To impart quality education by implementing state-of-the-art teaching-learning methods to enrich the academic competency, credibility and integrity of the students.
- Inspire and create interest towards learning the subjects, and train diversified students to achieve academic excellence.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- Be employed in industry, government, or entrepreneurial endeavors to demonstrate professional advancement through significant technical achievements and expanded leadership responsibility.
- Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment.
- Progress through certificate programs, advanced degree, and research in Civil engineering and other professionally related fields.

CONTENTS

Organising Committee

Schedule

List of Papers Presented

Technical session 1	1-4
Technical session 2	5-10
Technical session 3	11-14
Technical session 4	15-19
List of Participants	20-21

SCHEDULE	
RACER '22 National Conference on Recent Advancements in Civil Engineering Research - 2022 Department of Civil Engineering , MEA Engineering College Perinthalmanna - 679325	
Day 1 : 12 - 09 - 2022 Monday	
Platform for conference : Google Meet (ID:- http://meet.google.com/mnb-iqcu-gkw)	
Inaugural Session : 2.00 PM to 3.00 PM	
Prayer	:
Welcome Address	: Dr. Hema Nalini A.V. Dean Research & HoD , Department of Civil Engineering, MEAEC
Presidential Address	: Dr. G Ramesh , Principal MEAEC
Inaugural Address	: Dr. Samson Mathew, Director(On deputation), KSCSTE-NATPAC
Felicitation	: Mr. Zubair C.K. Administration Manager MEAEC Prof. Haneesh Babu K T, Vice Principal MEAEC Prof. Sreeram S, Dean Academics MEAEC
Vote of Thanks	: Mr. Anees K, Assistant Professor, Department of Civil Engineering, MEAEC
Invited Lectures	
Day 1 : 12 - 09 - 2022 Monday	
Invited Lecture - 1 (3.10 PM to 4.00 PM)	
Speaker : Dr. George K. Varghese, Assistant Professor , Department of Civil Engineering, NIT Calicut	
Day 2 : 13 - 09 - 2022 Tuesday	
Invited Lecture - 2 (10.00 AM to 10.40 AM)	
Speaker : : Dr. Darsana O, Assistant Professor , Department of Civil Engineering, NIT Thiruchirappalli	
Paper Presentation (10.45 AM to 4.00PM)	
Day 3 : 14 - 09 - 2022 Wednesday	
Invited Lecture : 10.00 AM to 10.20 AM	
Invited Lecture - 3	
Speaker : Dr.P.R Sreemahadevan Pillai, Principal, Ahalia School of Engineering & Technology,Palakkad	
Paper Presentation (10.30 AM to 4.00PM)	
Vote of Thanks (4.00 PM)	

TECHNICAL SESSIONS		
<p>RACER'22</p> <p>National Conference on Recent Advancements in Civil Engineering Research - 2022</p> <p>Department of Civil Engineering , MEA Engineering College Perinthalmanna - 679325</p>		
<p>Day 2 : 13- 09 - 2022 Tuesday</p> <p>Platform for conference : Google Meet (ID:- http://meet.google.com/mnb-iqcu-gkw)</p>		
Technical Session - 1		
Review Panel		
Chairman	Dr. Darsana O, Assistant Professor , Department of Civil Engineering, NIT Thiruchirappalli	
Members	Dr. Jeeja Menon , Associate Professor, Department of Civil Engineering, MEAEC Perinthalmanna Mr. Prajith V , Scientist B, CWRDM Calicut	
Time	Sl No	Paper Tittle
From 10.45 AM onwards	P1	Static and dynamic investigation of plants inspired bio-mimic column structures
	P2	Strengthening of RC beams using glass reinforced polymer sheets and comparison between different
	P3	Study on mechanical properties of concrete with partial replacement of cement by Ferrock And GGBS
Technical Session - 2		
Review Panel		
Chairman	Dr.Suresh PS, Professor, Department of Civil Engineering, MEAEC Perinthalmanna	
Members	Mrs. Yasmin N , Associate Professor, Department of Civil Engineering, MEAEC Perinthalmanna Mr. Najeeb M , Phd Scholar, NIT Calicut	
Time	Sl No	Paper Details
From 1.30 PM onwards	P4	Performance evaluation of novel hollow sections under non prismatic conditions
	P5	Torsional behavior analysis of reinforced concrete beams strengthened with aramid fiber strips
	P6	Structural performance of pre twisted cruciform column
	P7	Finite element analysis of concrete filled steel tubular columns with artificial damage scenario
	P8	Retrofitting by elevating framed structure for flood protection.
**** Day 2 Ends****		

Day 3 : 14- 09 - 2022 Wednesday		
Platform for conference : Google Meet (ID:- http://meet.google.com/mnb-iqcu-gkw)		
Technical Session - 3		
Review Panel		
Chairman	Dr. George K. Varghese, Assistant Professor , Department of Civil Engineering, NIT Calicut	
Members	Dr. Jeeja Menon , Associate Professor, Department of Civil Engineering, MEAEC Perinthalmanna Mrs. Sudhanya KS, Phd Scholar, Karpakam Academy of Higher Education ,Coimbatore	
Time	Sl No	Paper Details
10.30 AM ONWARDS	P9	Replacement of coarse aggregate by E-waste
	P10	Retrofitting of RC beam using E-glass fibre
	P11	Study on concrete with partial replacement of fine aggregate by steel slag and cement by micro silica
Technical Session - 4		
Review Panel		
Chairman	Dr.A.K Vasudevan , Professor, Department of Civil Engineering, Thejus Engineering College,Thrissur	
Members	Mr.Noushad K , Phd Scholar, NIT Calicut Mr. Abdullah Abdul Salam , Department of Civil Engineering, MEAEC Perinthalmanna	
Time	Sl No	Paper Details
1.30 PM onwards	P12	Performance of polyethylene terephthalate bottle strips reinforced weak soil
	P13	Experimental investigation on seepage velocity and piping resistance of polypropylene fiber reinforced soil
	P14	Experimental study on effect of coir geotextile on piping resistance of soil
	P15	Analytical analysis of shell foundation with ring beam
**** Day 3 Ends****		

LIST OF PAPERS

RACER'22

**National Conference on Recent Advancements in Civil Engineering
Research - 2022**

**Department of Civil Engineering , MEA Engineering College Perinthalmanna -
679325**

Paper No	Title
P1	Static and dynamic investigation of plants inspired bio-mimic column structures
P2	Strengthening of RC beams using glass reinforced polymer sheets and comparison between different
P3	Study on mechanical properties of concrete with partial replacement of cement by Ferrock and GGBS
P4	Performance evaluation of novel hollow sections under non prismatic conditions
P5	Torsional behavior analysis of reinforced concrete beams strengthened with aramid fiber strips
P6	Structural performance of pre twisted cruciform column
P7	Finite element analysis of concrete filled steel tubular columns with artificial damage scenario
P8	Retrofitting by elevating framed structure for flood protection.
P9	Replacement of coarse aggregate by E-waste
P10	Retrofitting of RC beam using E-glass fibre
P11	Study on concrete with partial replacement of fine aggregate by steel slag and cement by micro silica
P12	Performance of polyethylene terephthalate bottle strips reinforced weak soil
P13	Experimental investigation on seepage velocity and piping resistance of polypropylene fiber reinforced soil
P14	Experimental study on effect of coir geotextile on piping resistance of soil
P15	Analytical analysis of shell foundation with ring beam

TECHNICAL SESSION – 1

Structural Investigation of Plants Inspired Bio Mimic Column Structures

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ABSTRACT

Bio-inspired engineering design has received considerable attention in recent years for the remarkable structural features of the biological systems. The energy absorption of the bionic structure was much higher than that of traditional multi-cell tubes, according to studies done on a thin-walled construction inspired by bamboo under axial and lateral loads. The combined effects of load optimization and maximum load bearing capacity are shown in this research, which will enhance the energy absorption, strength, and stability of newly constructed or existing column structures. Analyses using hot rolled steel and cold form steel sections of various thicknesses are performed. This study is using tubular sections as its major structure by utilising the properties of steel. A non-linear finite element method has been used in ANSYS software to complete the analytical model and extensive parametric studies. The magnitude of increase of load carrying capacity was quantified by varying thicknesses, diameters, rib shapes and grades of steel. The test results indicate that there is a beneficial increase in the load carrying capacity of S1100 grade steel sections using rounded ribs. The results were also affected by the thickness and spacing of sections.

Keywords: Biomimic structures, Circular Hollow Sections (CHS), Load carrying capacity, Optimum weight, Rounded ribs.

Strengthening of RC Beams Using Glass Fibre Reinforced Polymer Sheets and Comparison of 90 Degree Strip Wrapped Beams and 45 Degree Wrapped Beams

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ABSTRACT

Strengthening of reinforced concrete beams with externally bonded fiber reinforced composites is a technique that has been developed in recent years. Here in the present study Glass Fiber reinforced polymer sheets are used for finding behavior of beams strengthened with composite materials. Eight beams are casted, two beams as control beams. Resin mortar with promoter, catalyst, and accelerator, is used as a binding materials in various patterns. After 24 hours of wrapping and 7 days air curing beams are tested. U wrapping, Bottom wrapping, 45 degree strip wrapping, 90 degree strip wrapping, Combination of Bottom wrapping with 90 degree u wrapping are tested in static three point loading frame set up. The test results were evaluated in terms of load deflection behavior, ultimate load carrying capacity, ultimate deflection, crack patterns and associated failure modes. The results obtained clearly demonstrate the effectiveness of strengthening of RC beams using Glass reinforced polymer sheets. The beams treated with Resin mortar with accelerator, catalyst and promoter improved the strength and load carrying capacity.

Keywords: Glass Fiber reinforced Polymer (GFRP), Strengthening, Retrofitting Three Point Loading Frame, Catalyst, Promoter, and Accelerator, Load Carrying Capacity, Wrapping.

Mechanical Properties of Partial Replacement of Cement

By Ferroch and GGBS

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RACER'22

TECHNICAL SESSION – 2

RACER'22

Performance evaluation of novel hollow sections under non- prismatic conditions

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ABSTRACT

Cold formed steel (CFS) tubular sections have great significance in structural engineering. This study has been undertaken to investigate the axial compressive behavior of semi-oval and oval CFS columns. Eighteen sections are analyzed with ANSYS R₂ 22.0 workbench. Steel member with different cross-section can be easily formed by hot-rolling or cold forming process. Typical tubular hollow section family is composed of rectangular, square and circular hollow sections. Advanced technology allows the production of tubular sections like elliptical, oval, semi-oval, hexagonal and octagonal sections. Normal and non-prismatic sections of 9 numbers with different heights variance is done with tapering. There are two shapes are considered one is semi-oval and another one is oval. Each shape having three type of cross sections with three sets with different heights. Heights are 440, 880 and 1320 respectively. Considering semi – oval section, one is regular shape other two are semi-oval shape with single side taper (SST) then another one is semi- oval shape with double side taper (DST). This SST and DST are non-prismatic models. The top width of the column is 50 mm and bottom width is 100 mm for SST and DST. For regular shape, width of the column is 50 mm. Considering oval section, one is regular shape other two are oval shape with single side taper (SST) then another one is oval shape with double side taper (DST). This SST and DST are non- prismatic models. The top width of the column is 50 mm and bottom width is 100 mm for SST and DST. For regular shape, width of the column is 50 mm. A total of 18 non-linear analysis were performed with different columns. Primary objective of finite element analysis were to find out the ultimate load carrying capacity of each cross section under axial loading and to compare semi oval and oval coldformed steel columns. Models were solved and total deformations, ultimate load carrying capacity, deformation at ultimate load were reported. Load-deformation curves were plotted for each model. From this, further study was carried out on the column with best performance from semi oval and oval columns.

Keywords: Cold-Formed Steel, Semi oval, oval, Axial Loading, tapering

Analysis of torsional behaviour of reinforced concrete beams strengthened with aramid fibre strips

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ABSTRACT

Torsional failure mostly occurs in earthquake prone areas subjected to rapid failure of buildings. In this research, the strengthening of reinforced concrete (RC) beams for its torsional behaviour using aramid fibre strips is carried out. Most of the time aramid fibre is used as an externally bonded reinforcement to increase flexural and shear strength of RC beams. An innovative attempt is made to use it for improving torsional moment carrying capacity of RC beam. Different patterns of aramid fibre strips are selected to wrap around RC beams and torsional behaviour of these strengthened beams is studied. The main focus of this research is, to analyse the improvement in torsional moment carrying capacity of RC beam using aramid fibres and by changing the parameters of the FRP wrapping to find the best suited torsional moment carrying capacity. In this paper, RC beam of M30 grade of concrete is strengthened with aramid fibre strips and the beam size is 150 mm×300 mm and of 1.3 m in length, designed as per IS456- 2000 the following were modelled, analyse, and designed using ANSYS 2021 R2 software. The wrapping of FRP, improve the torsional moment carrying capacity of RC beams and the effect of different configurations of aramid fibre on torsional moment carrying capacity, angle of twist and failure mode of the beams is compared.

Keywords: Aramid fibre, Strengthened beams, Orientations in wrapping, Torsional reinforcement, Angle of twist, Finite element method.

Structural Performance of Pre-twisted Cruciform Column

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ABSTRACT

Pre-twisted cruciform columns are innovative Steel Column structures which provide high strength as well as architectural purposes. They are formed by the combination of I sections. In this paper a comparative study of pre-twisted box column and pre-twisted cruciform column with parallel-double web hollow and perpendicular were studied. A total of 26 specimens considering the parameters such as axial shortening, deformation, plastic strain force reaction were modelled in ANSYS WORKBENCH 2022 R1 and tested. The Pre-twisting angle ratios in an increment of 30^0 were provided as quarter turn, half turn, three and half quarter and full turn .The detailed progressive response of axial shortening, lateral stiffness and lateral buckling were recorded. As a result of progressive response the best shape, effective angle ratio were found out.

Keywords: Steel Column structures, Design, Axial shortening, lateral buckling.

Finite Element Analysis of Concrete Filled Steel Tubular Columns with Artificial Damage Scenario

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ABSTRACT

Concrete Filled Steel Tubular (CFST) columns are widely used in buildings and bridges because of its good fire resistance, high strength, ductility and affordability. The CFST columns used as columns in buildings and bridge piers are susceptible to corrosion, vehicle accidents and other damages. This paper focused on the investigation on CFST stub columns in which local damage is modeled as notch with varying heights, depths, widths and orientation angles. Finite element model was developed in ANSYS Workbench and the results showed the influence of these parameters on the load carrying capacity of column. The same studies were carried out on profiled CFST columns where the effect of damages was found to be less severe.

Keywords: CFST, notches, corrugated plates.

Retrofitting by elevating framed structures for flood protection

^aAzmil bani K, ^bHusna Shireen, ^cFathima Fiba, ^dManjoor P, ^eMuhammad Favas

Abstract

Recent floods in Kerala, in the past years, which occurred at unanticipated magnitude, have culminated in very high damage levels. The redemption of the lost property or dwelling unit by making it flood resilient is the biggest challenge faced by the authorities. Adoption of building technological components that enable rapid recovery, creating adequate structural retrofits to ensure safe living conditions are major initiatives attempted as part of the post flood interventions. Elevation method is one way to structurally retrofit a building by raising it on suitable structures thereby protecting it from future floods and subsequent damages.

This project focuses on the analysis of a flooded commercial building in Kuttanad using STAAD.PRO and a comparison between the pre-retrofitted and retrofitted stages of the building under flooded condition.

Keywords: Retrofitting.

TECHNICAL SESSION – 3

Replacement of Coarse Aggregate by E-Waste

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ABSTRACT

The waste materials from electronics and electrical industries are divided in two categories hazardous and inert waste materials. The inert waste is also known as E-waste describes obsolete, discarded and malfunctioned electrical or electronics devices. It is very difficult to dispose-off the E-waste materials. Utilization of waste materials and by products is a partial solution to environmental and ecological problems. Use of these materials not only helps in getting them utilized in cement, concrete and other construction materials, it helps in reducing the cost of cement and concrete manufacturing, but also has numerous indirect benefits such as reduction in landfill cost, saving in energy, and protecting the environment from possible pollution effects. Electronic waste, abbreviated as E-waste, consists of discarded old computers, TVs, refrigerators, radios basically any electrical or electronic appliance that has reached its end of life. Efforts have been made concrete industry to use non bio degradable components of E-waste as a partial replacement of the coarse or fine aggregates. An experimental study is made on the utilization of E-waste. Particles as Coarse aggregates in concrete with a percentage replacement ranging from 0 %,5%,10%,15% and 20% on the strength criteria of M20 Concrete. Compressive strength, Tensile strength and Flexural strength of Concrete with and without E-waste as aggregates was observed which exhibits a good strength gain.

Keywords: E-waste, Workability, Hardened concrete.

RETROFITTING OF RC BEAM USING E-GLASS FIBRE

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Abstract

When structures are subjected to construction mistakes, overloading or other unexpected behaviour, material damages occur. The most preferred remedy to overcome the structural collapse is retrofitting. An experimental study is carried out to observe the performance of E-glass fibre as a retrofitting material for reinforced concrete beams. In this study, the first set of beams are designed with minimal transverse reinforcement to obtain failure under shear force. The second set of beams are designed to obtain failure under flexural conditions. All the beams are subjected to external loading so that the initial cracks developed. Then the cracked beams are retrofitted with E glass fibres along the line of cracks on the bottom face of the beam by applying it with epoxy resin for flexural study. The shear deficient beams are retrofitted with straps at an angle of 45, on the side faces near the supports where the shear forces are expected to be maximum. The specimens are subjected to external loading to obtain deflection and cracking pattern.

Study on concrete with partial replacement of fine aggregate by steel slag and cement by micro silic

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ABSTRACT

The solid materials required for concrete production are all non-renewable resources. To have sustainable construction and development, it is necessary to reduce the use of natural non-renewable resources by construction industries. Steel slag is an industrial by-product obtained from the steel manufacturing industry and can be used as a material for fine aggregate. It influences both the mechanical and physical properties of concrete. Micro silica is a waste material available in the ferrosilicon industry. It is added to cement to. increase its compressive strength, bond strength, and abrasion resistance. This project focuses on the study of the partial replacement of fine aggregate with steel slag and cement with micro silica in M20 concrete production. Preliminary tests were conducted for fineness modulus and standard consistency tests for both cement and micro silica. Sieve analysis, specific gravity, and water absorption tests were conducted for the fine aggregate, and specific gravity and water absorption test for coarse aggregate. To study the effect of partially replaced material on concrete, cubes were cast with the replacement of fine aggregate for 10%, 20%, and 30% of steel slag. Replacement of cement was done for 5%, 10%, 15%, and 20% of micro silica

Keywords: Steel slag, Micro silica , Partial Replacement, Compressive strength

TECHNICAL SESSION – 4

Performance of Polyethylene Terephthalate Bottle Strips Reinforced Weak Soil

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ABSTRACT

Soil reinforcement is a very efficient way of improving the soil geotechnical properties. Soil mixed with plastic bottle strips have advantages over other reinforcing materials. Polyethylene terephthalate bottle strips can be used as an effective stabilizer. This paper presents a study of performance of polyethylene terephthalate bottle strips that reinforce the soil . The plastic strips were prepared with size of length 10mm,15mm,20mm and width of 5mm are randomly mixed soil with varying percentages(0%,0.5%, 1%.1.5%,2%) to find out optimum percentage that increase the CBR value .

Keywords: Soil Reinforcement, PET Bottle strips , Light compaction, California Bearing Ratio test, Sub grade stabilization.

Experimental Investigation on Seepage Velocity and Piping Resistance Using Polypropylene Fiber

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ABSTRACT

Piping of soils is a major problem that occurs in the hydraulic structures under the influence of the seepage forces that acts upwards. A continuous washing-out of soil particles below these geotechnical structures can lead to complete collapse. This study focuses on the investigation of reducing seepage velocity and thereby improving the piping resistance of the soil with the help of randomly distributed polypropylene fibers. One dimensional piping test is conducted to investigate the discharge and seepage velocity of water flow of both the reinforced and unreinforced silty sand collected from Thanikudam of Thrissur district. Polypropylene fiber of various percentages (0.25%, 0.5%, 0.75%, 1%, 1.25% and 1.5%) and lengths (12 mm and 6 mm) are used and tested under varying hydraulic heads. The results from the piping test were compared and the results showed that the inclusion of fiber reduces the discharge velocity and seepage velocity and also increased the piping resistance of soil. A mathematical model based on regression method is also developed for quantifying the seepage velocity at various hydraulic gradients, fibre contents and fibre lengths.

Keywords: Seepage velocity, Polypropylene fiber, Piping resistance, Piping test.

Experimental Study on Effect of Coir Geotextile on Piping Resistance of Soil

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ABSTRACT

Piping is a form of seepage erosion and refers to the development of subsurface channels in which soil particles are transported through porous media. Piping erosion is also described as the formation of an open channel, or pipe, within or beneath the soil mass of a water-retaining embankment. Continued erosion caused by the increasing flow of water enlarges the channel size. This eventually leads to failure and collapse of the entire structure. These are dangerous and generally observed in irrigation and drainage projects such as river levees, contour bunds, temporary check dams, and soil structures. Hence effective measures have to be taken to increase the piping resistance of soils. This paper presents a study to examine the effect of density of soil on the piping behaviour of a soil and also the effect of non-woven coir geotextile on the discharge velocity, critical hydraulic gradient and piping resistance. In this study, a number of experiments were carried out for determining the discharge velocity, critical hydraulic gradient and piping resistance of a soil. The soil used in this study was sand. The experiments were carried out for various hydraulic heads, different density of soil and for various number of geotextile layers within the soil. The discharge velocity of flow of water through the soil, critical hydraulic gradient and piping resistance were determined for each case and the results were compared. From the results it is clear that, the decrease in density of soil increased the discharge velocity and decreased the critical hydraulic gradient and piping resistance of the soil considerably. The non-woven coir geotextile can be used effectively to decrease the discharge velocity and increase the critical hydraulic gradient and piping resistance of the soil.

Keywords: Coir geotextile, Density, Discharge velocity, Hydraulic head, Piping resistance.

Analytical analysis of pyramidal shell foundation with ring beam

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ABSTRACT

Shell foundation transmits load by their geometry rather than mass. Shell foundation is an alternative to conventional foundation when heavy loads are transmitting to weak soils. This thesis describes an analytical assessment of the behaviour of shell foundation with ring beam using finite element software ANSYS 19.0. The ultimate load carrying capacity and settlement characteristics of both flat foundation and shell foundation with ring beam are find out with help of the software. The load applied at which the equivalent elastic strain value of concrete exceeds 0.002 is considered as the ultimate load carrying capacity and deformation corresponding to ultimate load is taken as settlement. The result showed that shell foundation with ring beam has good ultimate load carrying capacity and settlement characteristics than flat foundation. The ultimate load carrying capacity of shell with ring beam is seven more than that of flat foundation. Parametric studies were conducted by varying folded angle of the shell foundation. The various folded angles chosen were 20°, 30°, 40°, 50° and 60°.

Keywords: Ultimate load carrying capacity, settlement, shell foundation with ring beam, Folded angles

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