

E.G.S PILLAY ENGINEERING COLLEGE (AUTONOMOUS)

NAGAPATTINAM-611002

NBA Accredited Programmes(CSE,EEE,ECE,IT,CIVIL,MECH/Accredited by NAAC WITH “A” Grade

(AN ISO 9001:2015 CERTIFIED INSTITUTION) / Approved by AICTE New Delhi

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SRISHTI-2019

[DEPARTMENT OF CIVIL ENGINEERING]

(June' 2018- May' 2019)



DEDICATED TO OUR FOUNDER- CHAIRMAN CHEV. Dr. G.S. PILLAY

Department of Civil Engineering
MAGAZINE: JUNE' 2018-MAY'2019

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DEPARTMENT OF CIVIL ENGINEERING

VISION

To evolve as a centre of excellence by imparting quality technical education and promoting research to meet the emerging challenges in the field of Civil Engineering.

MISSION

Civil Engineering department is committed to

M1: Provide quality education through innovative teaching and learning practices

M2: Encourage faculty and students to pursue higher education and carry out socially relevant innovative research thereby establishing centers of excellence in emerging areas of research

M3: Offer consultancy services using state of the art facilities fulfilling the needs of the industry and society.

M4: Enable our students and faculty to play leadership roles in a sustainable manner by adopting professional ethics, entrepreneurship activities, interpersonal skills and lifelong learning attitude.

ABOUT THE DEPARTMENT

The Department of Civil Engineering was established in the year 2011 with the intake of 60 students. The intake is increased to 120 students in the year of 2013 The department has well qualified and experienced teaching faculties and technical staff with state of the art laboratories to meet the quality education required for present challenging societal and industrial needs. Department is involved in Research & Consultancy activities in the areas of Structural Engineering, Environmental Engineering, Geotechnical Engineering, Concrete highway Engineering and Surveying with many national and international publications. Department is actively involved in co-curricular and extra-curricular activities with the association of professional bodies. ..

COURSES OFFERED:

B.E-Civil Engineering

Association Name: PEACE

**PRECIOUS ENLIGHTENING ASSOCIATION
OF CIVIL ENGINEERING**

E.G.S PILLAY ENGINEERING COLLEGE, NAGAPATTINAM

(AUTONOMOUS)

Department of Civil Engineering

PROGRAMME OUTCOMES

Engineering Graduates will be able to:

- 1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural science, and engineering sciences
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusion
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
- 6. The engineering and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the Professional engineering practice
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
- 11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
- 12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in Independent and life-long learning in the broadest context of technologic

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The civil engineering program aims at:

PEO1: Preparing graduates to become a successful Civil Engineer to meet the demand driven needs in the field of Civil Engineering and related professions or pursue higher study and research or become an entrepreneur.

PEO2: Developing core competence by analyzing and design of Civil engineering systems with social awareness and responsibilities.

PEO3: Building professionalism, ethical approach, communication skills, teamwork in their profession and adapting to modern trends by engaging in lifelong learning.

PROGRAM SPECIFIC OUTCOMES (PSOs)

After successful completion of the programme, students will be able to

PSO1: Analyze the effects of natural calamities like Tsunami, storms, earthquakes, landslides etc. in the design of stable structures.

PSO2: Use eco-friendly materials and mechanisms for sustainable and life-line infrastructures.

**E.G.S PILLAY ENGINEERING COLLEGE, NAGAPATTINAM
(AUTONOMOUS)**

Department of Civil Engineering

ACTION PLAN AND ACHIEVEMENTS

S.N O	PLAN OF ACTIVE	ACHIEVEMENTS
1	Planned to send at least two faculty membersto go for research oriented higher studies.	5 Faculty members are doing higherstudies.
2	Planned to send at least three faculty membersto take part in the International and National Conferences, Workshops and Seminars.	All the faculty members attended the International Conference.
3	Planned to send all the faculty members to publish papers in the reputed National andInternational Journals.	All the faculty members published papersin reputed International Journals.
4	Planned to send the proposals to obtain assistance from Government bodies such as UGC, AICTE and other funding agencies formajor and minor projects.	We have proposed and are trying to get funding from government bodies and we received funds from TNCST and TNSDC.
5	We motivate all the students to take part in theworkshops, seminars, symposiums held in other colleges.	Our students participated in various workshops, paper presentations and symposiums in other colleges.
6	We have planned to improve the department-wise results at least 15%compared to earlier semesters.	We increased our results by 10% when compared to the last semester.
7	Though a proper system of teaching, we will increase the subject-wise results to 90% andabove.	Subject wise results increased 90% andabove in five subjects.
8	Planned to conduct at least one guest lecturer and one industrial visit this year.	We conducted guest lecturers for 5 subjectsand visited one industry per year.

MESSAGES:

FROM SECRETARY DESK

This is indeed a happiness showered on me to know that the department of civil Engineering is organizing a national level technical symposium SRISHTI-2K19. Sky is the limit for one's excellence and perfection, but an attempt to reach the acme is praiseworthy.

As a secretary of this institution, I consider it my duty to motivate and congratulate the organizer who has been strenuously planning to make the national level technical Symposium a grand success.

**SHRI S.
PARAMESHWARAN.,
SECRETARY,
EGSPEC**

PRINCIPAL MESSAGE

Empowerment of students for their all- round development through education is our cherished motto. Today education means much more than merely acquiring knowledge. It is acquisition of knowledge and skills, building character and improving employability of our young talent, this future leadership. I am sure, being stars and their painstakingly and gainfully developed EGSPEC culture, we inherited a strong foundation to march achieve the within mentioned education objectives for a stronger and brighter India.

It gives me immense pleasure to pen a few words as prologue to our in-house magazine SRISHTI-2K19 exclusively meant for churning out the latent writing talent which bears immense potentiality of sharpening your communication skills as part of your overall personality development. I congratulate all the contributors and the editorial board for bringing out such a beautiful magazine.

Wishing you all the best...!

**Dr.S.RAMABALAN.
PRINCIPAL, EGSPEC**

HOD'S MESSAGE

It gives me immense pleasure to encourage the department of civil engineering, which is organizing a symposium on 17th February, 2019. This kind of symposium provides a platform for the students to have interactions that are taking place in the outside world.

I have great pleasure in wishing the release of the magazine SRISHTI-2K19a great success.

**Dr.V.MOHAN,
HOD/EEE**

I am very glad to wish a grand success for the symposium SRISHTI-2K19 arranged by the department of civil engineering, it is a fantabulous occasion where the students are interestingly performing all the activities, I wonder about their creativity and wish to be a part of it.

**Dr.G.GURUMOORTHY,
HOD/MECH**

Its gives me pride and pleasure to wish the civil engineering department symposium a grand success I hope that you will enjoy exploring the symposium and I appreciate the interest in enhancing the creative potential of individuals.

The symposium is creating an environment where teaching and scholarship complement each other at all levels of educating the students to conceptualize and express ideas analytically and creatively and to reason critically.

**Dr. B. PADMANABAN
HOD/ECE**

On behalf of Science and Humanities, I wish all the faculty members and students of Civil Department for their outstanding performance in academic activities. Also I convey my hearty wishes for the grand success of the symposium“SRISHTI-2K19”.

Dr.A.R.Deepa

HOD/S&H

I am very happy to meet you through SRISHTI-2K19. Education is not an act of acquiring knowledge but learning a skill to lead life and forming one’s personality. This is an ennobling process of growth. I can boldly say that we have excellent in every initiative that we undertook and we have understood together in facing the challenges in providing quality education to students. It gives me great pleasure to see the birth of our college magazine. I congratulate all the contributors and the editorial board for making this happens.

Dr.J.Vantha,

HOD/MCA

Greeting to Civil Department for wonderful and great coordination for organizing National Level Technical Symposium (SRISHTI-2K19).

Engineering is the way of delivering multi-disciplinary project and environment to create young talent and skills. Knowledge, Skill and Attitude are the importance for producing and talent, future leaders. I wish and congratulate

faculty members and students for your wonderful support. I pray to god for creating a successful event.

Mr. Dr.Manikandan

HOD/IT

STAFF MESSAGE

INTRODUCTION:

Conventional concrete contains water, aggregates, Cement with variant proportions and known to be weak in tensile strength, brittle and easily erodible by chemicals and high velocity water flow. This is Becoming an ever growing problem in today's society with the need for the least amount of maintenance and longer lasting structures. In early 1950 research into a different form of concrete was discovered, polymer concrete. Polymer concrete has increased strength characteristics as well as improved resistance to environmental factors and a faster curing time. With such improved properties, polymer concrete became a fast growing area of research. Polymer concrete is a composite material which results from polymerization of a monomer/aggregate mixture. The polymerized monomer acts as binder for the aggregates and the resulting composite is called "Concrete." Later on because of rapid curing, excellent bond to cement concrete and steel reinforcement, high strength, and durability, it was extensively used as repair material Polymer concrete (PC), also known as synthetic resin concrete.

METHODS:

An experimental program have been carried out for investigating the mechanical properties of polymer resin concrete with 3% and 5% percentages of resin and 0.5% polymer of cement weight is considered. The tests performed which are compressive strength, flexural strength and also determining the workability of fresh prepared polymer concrete. The workability tests such as slump cone test is performed for fresh concrete mixes.

Compressive strength test was undertaken in accordance with the technical requirements, an universal testing machine is used for performing compressive tests, The polymer concrete specimens size 150mm*150mm*150mm are to be casted and tested after curing period of 7days and 28days respectively.



Compressive strength test

Flexural strength, tests were performed in accordance with ISO 178:1993 using specimens with a width of 100mm, height of 100mm and a length of 500mm, Specimens were tested under three point loading at a loading rate of 1mm/min in a MTS testing machine. The load and mid span deflection were recorded up to failure to determine the strength and elastic properties of PC.



Flexural strength test

MIX DESIGN SPECIFICATION:

The concrete mix shall be designed to produce the grade of concrete having the required workability and a characteristic strength not less than appropriate strength of concrete mix should be equal to the characteristic strength plus 1.65 times the standard deviation.

- Characteristic compressive strength required in the field at 28 days grade designation M 25
- Nominal maximum size of aggregate 20 mm Shape of CA Angular
- Degree of workability required at site 50-75 mm (slump)
- Degree of quality control available at site As per IS: 456
- Type of exposure the structure will be subjected to (as defined in IS: 456)
- Type of cement: PSC conforming IS: 455
- Method of concrete placing: pump able concrete

AVG OF COMPRESSIVE STRENGTH RESULTS FOR 7 DAYS

	Avg compressive strength N/MM
Conventional Concrete-M25	18.29
Polymer resin concrete-3%R-M25	17.62
Polymer resin concrete- 5%R-M25	18.7
Polymer Fiber concrete-0.5%F-M25	21.57
Polymer Fire concrete-1%F-M25	21.84

T.ADHAVANTAHAN

SAMPLE PREPARATION

SOIL SAMPLING

Soil sampling is crucial for success in soil analyses and interpretation. First, a sample should be fit to the experiment purpose. Second, because physical and chemical properties of soils are heterogeneous in fields, one should mind how it is difficult to take a representative sample.

DRYING AIR

dry samples collected as soon as possible under well-ventilated conditions. Wet samples must be spread on a sheet or a plate, less than 1 cm in thickness. Otherwise, the soils will rot and their chemical properties will change. Watch drying process and crush clods by hands carefully and frequently. Proper crushing time depends on soil's physical properties: For instance, right crushing timing is limited in clayey soils. Remove any foreign material such as organic matters, charcoal, shells, and plant seeds.

SIEVING TO PARTICLES LESS THAN 2.0 MM IN DIAMETER:

Sieve the air-dried soil sample through a screen with 2 mm circular holes. Grind large clods with a pestle and mortar: do not crush gravel or other foreign materials. Sieve them, and repeat the procedure until no soil is left on the screen. Weigh the soil and gravel separately; calculate the proportion of gravel. Store the sieved soil in an air-tight container like a plastic bottle or bag

SIEVING TO PARTICLES LESS THAN 0.5 MM IN DIAMETER:

Grind the air-dried, 2 mm sieved soil with a pestle and mortar; sieve the ground soil through a 0.5 mm mesh screen.

2. MOISTURE CONTENT

Most soil analyses are made on air-dried soil, but their results are routinely expressed on the dry weight basis. Therefore, the moisture content of the air-dried soil has to be determined.

APPARATUS:

- a. Drying oven
- b. Analytical balance with 0.001 g accuracy
- c.. Aluminum cups or evaporating dishes

PROCEDURE:

- (1) Dry an aluminum cup (or evaporating dish) at 105 o C for 2–3 hours in the drying oven; measure the constant weight (A gram).
- (2) Put about 10 g of air-dried soil into the cup; weigh the cup with the soil in it (B gram).
- (3) Dry the soil in the cup at 105 o C for 24 hours (See Appendix 3-9).
- (4) Take out the cup from the drying oven, cool it in a desiccators, and weigh it (C gram)

A. PIRAKASAM

INTRODUCTION:

Site feasibility study for geotechnical projects is of far most beneficial before a project can take off. Site survey usually takes place before the design process begins in order to understand the characteristics of subsoil upon which the decision on location of the project can be made. The following geotechnical design criteria have to be considered during site selection.

1. Design load and function of the structure.
2. Type of foundation to be used.
3. Bearing capacity of subsoil.

COMPONENTS OF STABILIZATION:

Soil stabilization involves the use of stabilizing agents (binder materials) in weak soils to improve its geotechnical properties such as compressibility, strength, permeability and durability. The components of stabilization technology include soils and or soil minerals and stabilizing agent or binders (cementations materials).

STABILIZING AGENTS:

These are hydraulic (primary binders) or non-hydraulic (secondary binders) materials that when in contact with water or in the presence of pozzolanic minerals reacts with water to form cementations composite materials. The commonly used binders are:

- Cement
- Lime
- fly ash
- blast furnace slag

Presence of organic matters, sulphates, sulphides and carbon dioxide in the stabilized soils may contribute to undesirable strength of stabilized materials (Netterberg and PaigeGreen, 1984, Sherwood, 1993).

APPLICATIONS:

For geotechnical and environmentally purposes, the typical application of deep mixing methods can be grouped into two main categories:

Non-structural purposes

- Ground cutoff wall
- Dewatering wall
- Secondary containment

1. Structural purposes

- Deep and shallow foundation
- Tunnel and Retaining wall (stabilization of cuts and open excavation)

G.Prakash

PILE FOUNDATIONS:

Pile foundations are the part of a structure used to carry and transfer the load of the structure to the bearing ground located at some depth below ground surface. The main components of the foundation are the pile cap and the piles. Piles are long and slender members which transfer the load to deeper soil or rock of high bearing capacity avoiding shallow soil of low bearing capacity. The main types of materials used for piles are Wood, steel and concrete. Piles made from these materials are driven, drilled or jacked into the ground and connected to pile caps. Depending upon type of soil, pile material and load transmitting characteristic piles are classified accordingly. In the following chapter we learn about, classifications, functions and pros and cons of piles. Pile foundations are the part of a structure used to carry and transfer the load of the structure to the bearing ground located at some depth below ground surface. The main components of the foundation are the pile cap and the piles. Piles are long and slender members which transfer the load to deeper soil or rock of high bearing capacity avoiding shallow soil of low bearing capacity. The main types of materials used for piles are Wood, steel and concrete. Piles made from these materials are driven, drilled or jacked into the ground and connected to pile caps. Depending upon type of soil, pile material and load transmitting characteristic piles are classified accordingly. In the following chapter we learn about, classifications, functions and pros and cons of piles.

CLASSIFICATION OF PILE WITH RESPECT TO TYPE OF MATERIAL:

- Timber
- Concrete
- Steel
- Composite piles

CLASSIFICATION OF PILES:

End Bearing Piles (Point Bearing Piles)

Friction piles (cohesion piles)

Combination Of Friction And Cohesion Piles

FUNCTION OF PILES:

A structure can be founded on piles if the soil immediately beneath its base does not have adequate bearing capacity. If the results of site investigation show that the shallow soil is unstable and weak or if the magnitude of the estimated settlement is not acceptable a pile foundation may become considered. Further, a cost estimate may indicate that a pile foundation may be cheaper than any other compared ground improvement costs.

In the cases of heavy constructions, it is likely that the bearing capacity of the shallow soil will not be satisfactory, and the construction should be built on pile foundations.

Piles can also be used in normal ground conditions to resist horizontal loads. Piles are a convenient method of foundation for works over water, such as jetties or bridge piers.

A.ARJUNAN

INTRODUCTION:

Wastewater is water whose physical, chemical or biological properties have been changed as a result of the introduction of certain substances which render it unsafe for some purposes such as drinking. The day to day activities of man is mainly water dependent and therefore discharge 'waste' into water. Some of the substances include body wastes (feces and urine), hair shampoo, hair, food scraps, fat, laundry powder, fabric conditioners, toilet paper, chemicals, detergent, household cleaners, dirt, micro-organisms (germs) which can make people ill and damage the environment. It is known that much of water supplied ends up as wastewater which makes its treatment very important. Wastewater treatment is the process and technology that is used to remove most of the contaminants that are found in wastewater to ensure a sound environment and good public health. Wastewater Management therefore means handling wastewater to protect the environment to ensure public health, economic, social and political soundness (Metcalf and Eddy, 1991).

CHARACTERISTICS OF WASTEWATER:

Depending on its source, wastewater has peculiar characteristics. Industrial wastewater with characteristics of municipal or domestic wastewater can be discharged together.

Industrial wastewater may require some domestic wastewater. The characteristics of wastewater vary from industry to industry.

SOIL AQUIFER TREATMENT:

Soil matrix has quite a high capacity for treatment of normal domestic sewage, as long as capacity is not exceeded. Partially-treated sewage effluent is allowed to infiltrate in controlled conditions to the soil. The unsaturated or "vadose" zone then acts as a natural filter and can remove essentially all suspended solids, biodegradable materials, bacteria, viruses, and other microorganisms. Significant reductions in nitrogen, phosphorus, and heavy metals concentrations can also be achieved. After the sewage, treated in passage through the vadose zone, has reached the groundwater it is usually allowed to flow some distance through the aquifer for further purification before it is collected through the aquifer.

Soil-aquifer treatment is a low-technology, advanced wastewater treatment system. It also has an aesthetic advantage over conventionally treated sewage since effluent from an SAT systems is clear and odour free and it is viewed as groundwater rather than effluent.

Discharge effluent should travel sufficient distance through the system and residence times should be long enough, to produce effluent of desired quality (FAO, 2006).

S.SHYAM SUNDHAR

PLAIN CONCRETE:

Plain concrete is structural concrete without reinforcement or with less than the minimum amount required by ACI 318 for reinforced concrete. It is sometimes used in slabs-on-grade, pavement, basement walls, small foundations, and curb-and-gutter.

REINFORCED CONCRETE:

Plain concrete has compressive strength—the ability to resist crushing loads; however, its tensile strength is only about 10% of its compressive strength. Its tensile strength is so low that it is nearly disregarded in design of most concrete structures. Reinforced concrete is a combination of adequate reinforcement (usually steel bars with raised lugs called deformations) and concrete designed to work together to resist applied loads. Properly placed reinforcement in concrete improves its compressive and tensile strength.

MATERIALS FOR REPAIR AND STRENGTHENING OF STRUCTURAL CONCRETE MEMBERS:

Strengthening a structural concrete member after it is built usually involves removing and replacing concrete, attaching additional material to the member, or wrapping the member in another material. Strengthening accomplished by adding or replacing concrete is beyond the scope of this document. Strengthening by adding reinforcing bar or prestressing reinforcement (external to the member) uses materials covered elsewhere in this document.

PRESTRESSED CONCRETE PRESTRESSED:

concrete is structural concrete in which internal stresses have been introduced to reduce potential tensile stresses in the concrete resulting from loads. This introduction of internal stresses is called prestressing and is usually accomplished through the use of tendons that are tensioned or pulled tight prior to being anchored to the concrete. Tendons can consist of strands, wires, cables, bars, rods, or bundles of such elements. Tendons are usually made from high-strength steel, but can also be made from other materials such as FRP.

N. KARTHIKA

WHAT IS A SURVEY METHOD:

A survey method is a process, tool, or technique that you can use to gather information in research by asking questions to a predefined group of people. Typically, it facilitates the exchange of information between the research participants and the person or organization carrying out the research.

Survey methods can be qualitative or quantitative depending on the type of research and the type of data you want to gather in the end. For instance, you can choose to create and administer an online survey with Form plus that allows you to collect statistical information from respondents. For qualitative research, you can conduct a face-to-face interview or organize a focus group.

ADVANTAGES OF SURVEYS:

Surveys allow you to gather data from a large sample size or research population. This helps to improve the validity and accuracy of your research findings.

The cost of creating and administering a survey is usually lower compared to other research methods.

It is a convenient method of data collection for the researcher and the respondents.

DISADVANTAGES OF SURVEYS:

The validity of the research data can be affected by survey response bias.

High survey dropout rates can also affect the number of responses received in your survey.

OBSERVATION:

Just as the name suggests, observation is a method of gathering data by paying attention to the actions and behaviors of the research subjects as they interact in their environment. This qualitative research method allows you to get first-hand information about the research subjects in line with the aims and objectives of your systematic investigation.

If you have tried out this survey method, then you must have come across one or more of the 4 types of observation in research. These are; Complete observer method, observer as participant method, participant as observer method, and complete participant method.

J. BRITTO

TEST METHODS FOR SELF COMPACTING CONCRETE:

The tests methods presented here are devised specifically for self compacting concrete. Existing rheological test procedure have not considered here, though the relationship between the results of these tests and the rheological characteristics of the concrete is likely to figure highly in future work, including standardization work.

A concrete mix can only be classified as self compacting concrete if the requirements for all the following three workability properties are fulfilled.

Filling ability

Passing ability and

Segregation resistance

SEGREGATION RESISTANCE:

The self compacting concrete must meet the filling ability and passing ability with uniform composition throughout the process of transport and placing

1.Slump flow test

The slump flow test is used assess the horizontal free flow of self compacting concrete in the absence of obstructions. The test method is based on the test method for determining the slump

2.V Funnel Test

V funnel test on self compacting concrete is used to measure the flow ability. But the flow ability of concrete is affected by its other properties as well which may affect the flow ability of the concrete during testing.

3. U Box Test

U Box test is used to measure the filling ability of self compacting concrete. U box test was developed by the Technology Research Centre of the Taisei Corporation in Japan. Some time the apparatus is called a “box shaped” test.

DR..S. SIVA KUMAR

TESTS ON CONCRETE:

SLUMP TEST:

The slump test is conducted to measure the consistency of concrete in that specific batch. Here, consistency of concrete refers to workability or fluidity of freshly made concrete, and therefore it is a measure of the ease with which concrete flows.

Therefore, the Concrete slump test also known as the Workability Test of Concrete is used on-site to measure the workability of concrete or the degree of fluidity in the concrete mix. Generally, loose wet mixes are more workable than drier mixes, but concrete of the same consistency may vary in workability.

CONCRETE SLUMP TEST:

The Slump test concrete is carried out with the help of a conical cone open at both ends. The slump cone filled with concrete lifted up and the resulting height of concrete spread over the surface shows the degree of fluidity, workability, and consistency of the concrete mix. It also indicates the amount of water added is correct or not.

HOW TO MEASURE SLUMP OF CONCRETE:

The slump value of concrete can be easily measured by using the slump cone test method. In which fresh concrete is poured and filled till the top. Then the cone is lifted slowly, the difference between the top of the cone and top concrete fall is measured as a slump of concrete.

TYPES OF SLUMP TEST:

According to the free fall shape of concrete, the slump is classified into three types termed as true slump, shear slump, or collapse slump.

SLUMP CONE TEST IS CODE:

Is Code followed for Slump Cone Test is IS 1199 – 1959 Methods Of Sampling And Analysis Of Concrete

R.HARINIVAS

INTRODUCE CONTOUR:

explain to students that a contour map is another name for a topographic map, or a map that shows the elevation of land on a flat paper surface. ask: why might this be useful? elicit from students that contour maps are a convenient way to visualize flat and steep terrain, especially for hikers or other people navigating with maps. remind students that an acronym is a word formed from the first letters of other words. ask students if they have ever heard the acronym dogs tails. write the acronym on the board and explain to students that most topographic maps include these map essentials:

Date: when the map was made

Orientation: direction (north arrow or compass rose)

Grid: lines that cross to form squares

Scale: map distance

Title: what, where, and when

Author: who made the map

Index: the part of the grid where specific information can be located

Legend: what the symbols mean

Sources: who provided information for the map

READ A CONTOUR MAP OF YOUR AREA:

Use the Nat Geo Topo! Explorer website to find and display a contour map of your area. Point out the contour lines. Explain to students that these are imaginary lines that join points of equal elevation, and that they allow you to read the shape of the Earth's surface.

USE SYMBOLS TO IDENTIFY OTHER FEATURES ON THE CONTOUR MAP OF YOUR AREA:

Display the USGS Topographic Map Symbols PDF for students. Review some of the most common symbols. Then ask students to use those symbols to identify other human-made features on the contour map of your area. Have students identify each of the human-made features below and its symbol.

their own or another school

other buildings

roads

railroads

Encourage students to use what they learned about symbols to identify natural features and their symbols too.

TOTALLY ORDERED CONTOUR SETS (TOCS):

Generic and fixed interval contour sets do not have a single root contour region as just shown by the mathematical characterization. Now we specifically define a class of contour sets – the single parent contour sets denoted as SPCS(s) – that have a unique contour region that spatially contains all other contour regions in the set (SPCS-D). This region serves as the root of the contour set. Note that the two subclasses of generic contour sets, the single parent contour sets SPCS and the fixed interval contour sets FICS, are not necessarily disjoint and neither is a subclass of the other.

HARIHARAN.E

VACUUM CONCRETE :

Vacuum concrete is concrete which includes high water content during the mixing to facility the Mixing process and to improve the workability to enable it to be handled, placed into complicated moulds or around extensive reinforcement. Vacuum processed concrete first invented by Billner in United state in 1935. This process is to reducing the final water /cement ratio of concrete before setting to controls strength and other properties of concrete

THE ADVANTAGE OF THIS TECHNIQUE IS:

- 1.Improve the compressive and tensile strength
2. Make concrete resistance to abrasion and impact
3. Make concrete resistance to the freeze-thaw
4. Reduce the shrinkage
5. Make lower permeability and greater durability

TECHNIQUE AND EQUIPMENT'S FOR VACUUM CONCRETE:

The main aim of the technique is to extract extra water from concrete surface using vacuum dewatering. As a result of dewatering, there is a marked reduction in effective water-cement ratio and the performance of concrete improves drastically. The improvement is more on the surface where it is required the most.

Mainly, four components are required in vacuum dewatering of concrete , which are given below:

1. Vacuum pump
2. Water separator
3. Filtering pad

4. Screed board vibrator

Vacuum pump is a small but strong pump of 5 to 10 HP. Water is extracted by vacuum and stored in the water separator. The mats are placed over fine filter pads, which prevent the removal of cement with water. Proper control on the magnitude of the water removed is equal to

the contraction in total volume of concrete. About 3% reduction in concrete layer depth takes place. Filtering pad consists of rigid backing sheet, expanded metal, wire gauge or muslin cloth sheet. A rubber seal is also fitted around the filtering pad as shown in fig.1. Filtering pad should have minimum dimension of 90cm x 60cm.

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