EVENT REPORT

Civil Engg. PROJECT FAIR 2018

(DATE : 7th APRIL, 2018)

Coordinated By:
Prof. Ratansharan Panchal
Prof. Ajaysinh Vaghela

G H PATEL COLLEGE OF ENGINEERING AND TECHNOLOGY
(A CHARUTAR VIDYA MANDAL INSTITUTION)
DEPARTMENT OF INFORMATION TECHNOLOGY

Department of Civil Engineering, G H Patel College of Engineering and Technology, Vallabh Vidyanagar has organized the "Civil Engg. Project Fair 2018" on 7th April 2018.

Total 16 projects were demonstrated by final year civil students. They have displayed the flex banners and rough prototypes of their project to make it easily understandable for junior students who had visited the fair. An open invitation was sent to all the staff members and students of the institute. Many faculties have visited the fair. This fair has provided a great platform for final year students to share their learning, ideas and experiences with the visitors.

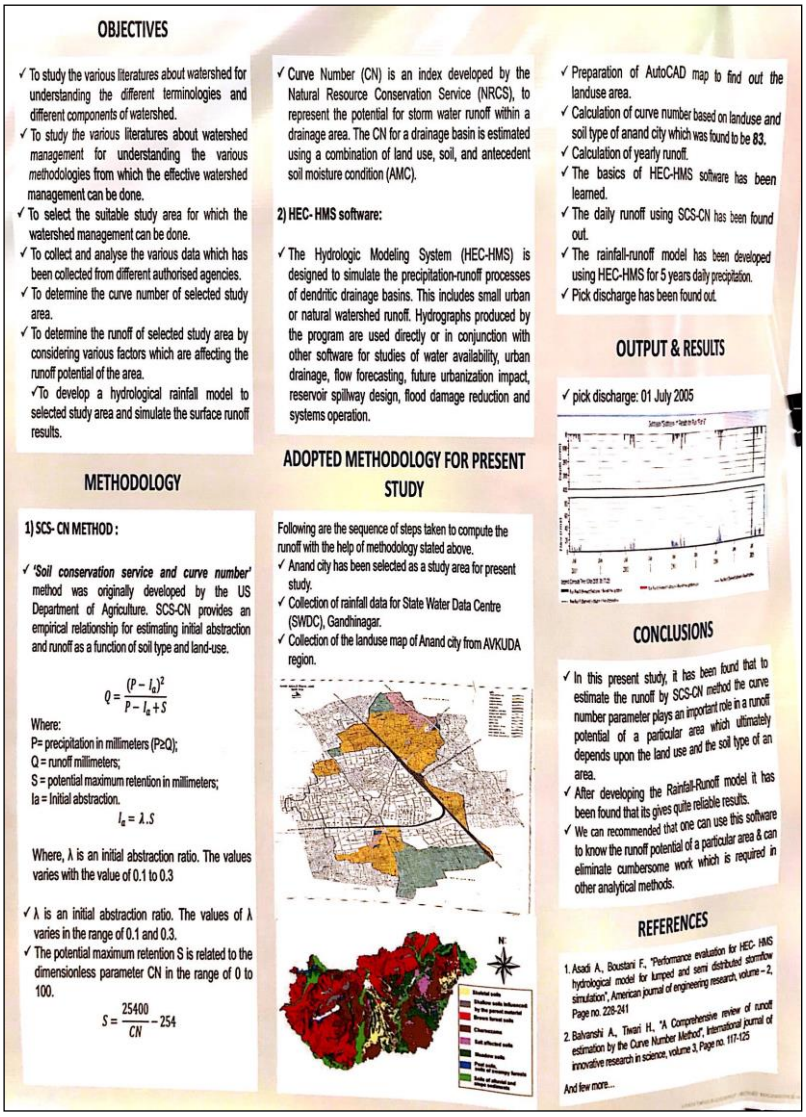
We have invited an expert Dr. Vatsal Patel from A D Patel Institute of Technology, New V. V. Nagar to judge the projects.

By the judgement of expert Dr. Vatsal Patel, following 5 projects were chosen in the category of Best 5 projects.

Sr. No.	GTU Project ID	Enrollment No.	Name of Student	Title of Project
1	24631	140110106006	Bhanushali Tejaskumar A.	Low Impact Development for Stormwater Management
		140110106031	Manavar Pratik	
		140110106060	Thesiya Bhargav	
		140110106066	Vora Vinit Mahendrakumar	
		140110106067	Wala Brijesh Ashokbhai	
2	15486	140110106001	Acharya Hirenkumar Sanjaykumar	Early Strength Prediction of Concrete using Maturity Method (*IDP)*
		140110106003	Akabari Kaushik Prabhudas	
		140110106019	Jadeja Mahipalsinh J.	
		140110106024	Kakdiya Kaushik J.	
3	15651	140110106009	Bhavsar Yash Anilkumar	Rooftop Rainwater Harvesting: A Case Study of GCET, Vallabh Vidyanagar
		140110106022	Jariwala Devang Nareshbhai	
		140110106042	Patel Dhruv Bhadreshkumar	
		140110106048	Pitroda Jalpesh Rajeshbhai	

		140110106059	Thakor Vedantkumar Babubhai	
4	14618	140110106002	Adwani Nikhil M.	Application of Geosynthetics in Coastal Area - A Case Study
		140110106014	Dadwanee Sohil Anilbhai	
		140110106017	Shah Harsh R.	
		140110106029	Maheshwari Dhruvansh B.	
		140110106034	Paghdar Kervin Hirjibhai	
5	14610	150113106010	Oza Harsh Nilesh	Terrace Farming system
		150113106011	Patel Hiten Arunbhai	
		150113106012	Rochiramani Ashish Dinesh	
		150113106014	Vyas Raj Nareshbhai	
		150114106002	Patel Dipkumar Rajendrabhai	

Photographs of the event



OBJECTIVES

- To study the various literatures about watershed for understanding the different terminologies and different components of watershed.
- To study the various literatures about watershed management for understanding the various methodologies from which the effective watershed management can be done.
- To select the suitable study area for which the watershed management can be done.
- To collect and analyse the various data which has been collected from different authorised agencies.
- To determine the curve number of selected study area.
- To determine the runoff of selected study area by considering various factors which are affecting the runoff potential of the area.
- To develop a hydrological rainfall model to selected study area and simulate the surface runoff results.

METHODOLOGY

1) SCS- CN METHOD :

- 'Soil conservation service and curve number' method was originally developed by the US Department of Agriculture. SCS-CN provides an empirical relationship for estimating initial abstraction and runoff as a function of soil type and land-use.

$$Q = \frac{(P - I_a)^2}{P - I_a + S}$$

Where:
P= precipitation in millimeters (P≥Q);
Q = runoff millimeters;
S = potential maximum retention in millimeters;
Ia = Initial abstraction.

$$I_a = \lambda . S$$

Where, λ is an initial abstraction ratio. The values varies with the value of 0.1 to 0.3

- λ is an initial abstraction ratio. The values of λ varies in the range of 0.1 and 0.3.
- The potential maximum retention S is related to the dimensionless parameter CN in the range of 0 to 100.

$$S = \frac{25400}{CN} - 254$$

- Curve Number (CN) is an index developed by the Natural Resource Conservation Service (NRCS), to represent the potential for storm water runoff within a drainage area. The CN for a drainage basin is estimated using a combination of land use, soil, and antecedent soil moisture condition (AMC).

2) HEC- HMS software:

- The Hydrologic Modeling System (HEC-HMS) is designed to simulate the precipitation-runoff processes of dendritic drainage basins. This includes small urban or natural watershed runoff. Hydrographs produced by the program are used directly or in conjunction with other software for studies of water availability, urban drainage, flow forecasting, future urbanization impact, reservoir spillway design, flood damage reduction and systems operation.

ADOPTED METHODOLOGY FOR PRESENT STUDY

Following are the sequence of steps taken to compute the runoff with the help of methodology stated above.

- Anand city has been selected as a study area for present study.
- Collection of rainfall data for State Water Data Centre (SWDC), Gandhinagar.
- Collection of the landuse map of Anand city from AVKUDA region.

- Preparation of AutoCAD map to find out the landuse area.
- Calculation of curve number based on landuse and soil type of anand city which was found to be 83.
- Calculation of yearly runoff.
- The basics of HEC-HMS software has been learned.
- The daily runoff using SCS-CN has been found out.
- The rainfall-runoff model has been developed using HEC-HMS for 5 years daily precipitation.
- Pick discharge has been found out.

OUTPUT & RESULTS

- pick discharge: 01 July 2005

CONCLUSIONS

- In this present study, it has been found that to estimate the runoff by SCS-CN method the curve number parameter plays an important role in a runoff potential of a particular area which ultimately depends upon the land use and the soil type of an area.
- After developing the Rainfall-Runoff model it has been found that its gives quite reliable results.
- We can recommended that one can use this software to know the runoff potential of a particular area & can eliminate cumbersome work which is required in other analytical methods.

REFERENCES

1. Asadi A., Boustani F., "Performance evaluation for HEC- HMS hydrological model for lumped and semi distributed stormflow simulation", American journal of engineering research, volume – 2, Page no. 228-241
2. Bahvarshi A., Tiwari H., "A Comprehensive review of runoff estimation by the Curve Number Method", International journal of innovative research in science, volume 3, Page no. 117-125

And few more...

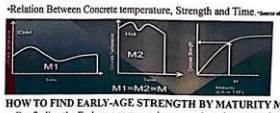
G H PATEL COLLEGE OF ENGINEERING AND TECHNOLOGY V V NAGAR (CIVIL DEPARTMENT)

Measurement of Early-Age Compressive Strength and Projecting Later-Age Strength of Concrete by Maturity Method

ABSTRACT:- The maturity method is a technique to account for the combined effects of time and temperature on the strength development of concrete. The method provides a relatively simple approach for making reliable estimates of in-place strength during construction. As now a day construction process is very fast due to technology so that measurement of In-place concrete strength is very important because to know whether concrete reach its desire strength or not at 28 days as per mix design. In this project we will cast cube of concrete with different type of materials use by replace cement and measure its Later-Age strength by maturity method and compare with actual strength.

INTRODUCTION:-

•Relation Between Concrete temperature, Strength and Time. •Source of Image : ASTM code



HISTORY:-

- Skyline tower in Fairfax country, 1973
- Progressive collapse from the 23rd floor.
- 14 workers were died.
- Early removal of formwork.

- On April 27, 1978, there is major construction failure of a cooling tower at Willow Island.
- Reason of collapse was insufficient concrete strength to support the applied construction load.
- After this disaster NBS is decide to develop the technology for measurement of Early-Age strength of concrete.

HOW TO FIND EARLY-AGE STRENGTH BY MATURITY METHOD:-

- For finding the Early-age compressive strength at site we required calibration curve of that mix design which is use at site.
- calibration curve is plot by laboratory method.
- **What is calibration curve????**
- Calibration curve is strength versus maturity graph. For different type of mix design calibration curve is different and as same mix design if ingredient of concrete change than also calibration curve is change.
- **How to find maturity????**
- Now there is two methods for finding the strength of in place concrete
  1.Nurse-saul (Temperature time factor) method
  2.Arrhenius (Equivalent age) method

1.Nurse-saul (Temperature time factor) method

$M(t) = \sum (T_a - T_o)\,\Delta t$

Where: M (t) = the temperature-time factor at age t, degree-days or degree-hours

Δt = a time interval, days or hours,

T_a = average concrete temperature during time interval Δt AND

T_o = datum temperature °C

EXAMPLE:-

- **predict the later-age strength by maturity method:**

$S_M = S_m + b\,(\log M - \log m)$

S_M = projected strength at maturity index M,

S_m = measured compressive strength at maturity index m,

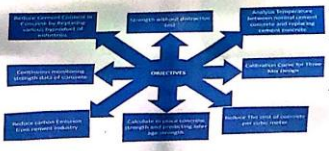
b = slope of the line,

M = maturity index under standard curing conditions, and

m = maturity index of the specimen tested at early age.

Age of concrete in days	Convert age to hour	Temperature of concrete	Temperature-Time Factor (maturity)	Strength of concrete from cube
1	24	26	559	12.5
3	48	22	1120	30.36
7	96	20	2124	43.47
14	168	20	3626	52.70
28	336	23	7728	54.88

WORK FLOW:-



CONCLUSION:-

- We prepare three calibration curve of OPC M35 ,50%OPC+20%flyash+30% GGBS and 51%OPC+15%flyash+30%GGBS+4%silica fume mix design.
- We done cost analysis and conclude that by using 50%OPC+20%flyash+30% GGBS mix design we get minimum cost and desire strength.
- Global level 5% carbon dioxide emitted by cement industry by using this mix design we reduce carbon foot print.
- Per cubic meter 50% cement saving.

Sr.No.	CEMENT	FLYASH OPC M35	GGBS	SILICA	TOTAL
%	100	0	0	0	100
Kg	370	0	0	0	370
MONEY	1850	0	0	0	1850
		MIX-2			
%	50	20	30	0	100
Kg	185	74	111	0	370
MONEY	925	74	333	0	1332
		MIX-3			
%	51	15	30	4	100
Kg	188.7	55.5	111	14.8	370
MONEY	943.5	55.5	333	444	1776

MATURITY LOGGER - APPLICATIONS:-

- Roadway Paving/Patching: Know exactly when to open to traffic.
- Midrise and high rise buildings: Know when to strip forms, remove shoring/reshoring, and load structures on the slabs, columns or shear walls.
- Bridges: Know when to strip forms, remove shoring, and load structures.
- Precast Operations: Monitor element strengths to optimize processes and timing of shipments.
- Moisture protection Terminate moisture protection measures based on the actual amount of placement hydration, as opposed to an arbitrary number of days.
- Post Tensioning: Optimize post tension timing.
- Form Stripping: Optimize the timing of form stripping operations.

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APPLICATIONS OF GEOSYNTHETICS IN COASTAL AREAS

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Guided By : Prof. Riddhi Vashi

ABSTRACT

t years have seen an exponential human develop- and excessive civilization near the coastlines. There any problems which are associated with the coastal opments. One major alarming reason is the difficulty ndation due to low bearing capacity. There are a lot ditional solutions available. These solutions need to pgraded to match the current demands. The use of ynthetics - an ancient technique which has recently e to the limelight. Geosynthetics are manmade poly- s or natural materials with an engineering approach, y are found to be suitable to improve bearing capacity, ront cost might increase, but this will help in material ing and lowers the maintenance cost for the service life structure.

OBJECTIVE OF STUDY

e major obstacle against the coastal development is the n-uniform and weak soil which directly as well as indi- ctly affects the structure and its foundation. The soil operties for the coastal region are tested and bearing ca- acity is calculated for ordinary sample. Appropriate solu- on for improving the strength is suggested using the con- ept of **"Geosynthetics"**.

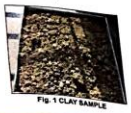


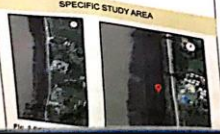
Fig. 1 CLAY SAMPLE

LOCATION

Fig. 2 POLITICAL MAP OF VALSAD

The site selected for the study was the Coastal Area of Tithal beach located 12 kms away from the main highway. The co-ordinate of the area is mentioned below: Latitude: 37° 24' 7.2" N Longitude: 123° 55' 19.2" W

SPECIFIC STUDY AREA



TEST METHODOLOGY

Fig. 5 Fig. 6 Fig. 7 Fig. 8 Fig. 9

Fig. 10

MATERIAL

Geotextile is a permeable, polymeric (synthetic or natural) textile material, in the form of manufactured sheet (which may be woven, nonwoven or knitted) used in geotechnical, environmental, hydraulic and transportation engineering applications.

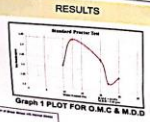
Fig. 11 MULTIFILAMENT WOVEN GEOTEXTILE

The properties[1] of the geotextile are as given below.

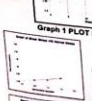
Table 1 Specifications of Geotextile

Type of geotextile	Multifilament Woven
Type of fiber	Polypropylene
Weight	240 gm/ m²
Pore size	less than 75 microns
Maximum extension	27 %
Tensile strength (Wide strip method)	Warp 55 KN/m Weft 43 KN/m
Bursting strength	6500 Kpa
Permeability	31 Lit/ m/ sec

RESULTS



Graph 1 PLOT FOR O.M.C & M.D.D



Graph 2 ORDINARY SAMPLE

Graph 3 SAMPLE WITH GEOTEXTILE ADDED AT 1/2 DEPTH OF MOULD FROM TOP

RESULT ANALYSIS

Table 2. HYDROMETER ANALYSIS

GRAIN SIZE ANALYSIS	GRAVEL (>4.75 mm)	2%
	SAND (4.75—0.075 mm)	15%
HYDROMETER ANALYSIS	SILT (0.075-0.002 mm)	51%
	CLAY (<0.002 mm)	32%

Table 3. DIRECT SHEAR BOX TEST

SAMPLE	C (Kg/cm²)	Ø
ORDINARY	0.10	18
WITH GEO TEXTILE AT 1/2 LAYER	0.14	14
WITH GEO TEXTILE AT 1/3 LAYER	0.14	13

Table 4.BEARING CAPACITY USING IS METHOD (KN/m²) (IS 6403)

SAMPLE	W.T. NOT CONSIDERED	W.T AT GROUND LEVEL
ORDINARY	270.22	232.47
WITH GEO TEXTILE AT 1/2 LAYER	275.2	256.57
WITH GEO TEXTILE AT 1/3 LAYER	206.78	187.5

The soil is categorised as C-Ø in nature. The sample is classified as CM (silty clay).

The value of bearing capacity was calculated using IS Code method (IS 6403). Local Shear failure is observed as Ø<28°.

The dimensions and depth of foundation are taken as per local reference.

CONCLUSION

All experiments are performed as per IS standards.

Direct Shear test is performed for the analysis of the shear parameters, in which the value of cohesion, in case of sample in contact with geotextile surface is more than that of ordinary clay. For the particular soil sample, value of cohesion has a greater impact on bearing capacity compared to value of Ø (angle of internal friction).

Significant increase in bearing capacity has been observed when water table is considered at the ground level and geotextile is placed at 1/2 depth compared to bearing capacity of sample without the use of geotextile and geotextile placed at 1/3 depth.

Thus, greater bearing capacity using the geosynthetic material was obtained.

REFERENCES

[1]Jadhav N., Ranadive M.,—"*Improvement in bearing capacity of soil by geotextiles*– an Experimental

[2] Otani J.,H.Ochiga


WHITE HART BOY'S


G. H. PATEL COLLEGE OF
ENGINEERING AND TECHNOLOGY
LOW IMPACT DEVELOPMENT FOR STORMWATER
MANAGEMENT (Group ID: 317)
ABSTRACT
OBJECTIVES OF LID
RESULTS AND ANALYSIS