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Sustainability Trends and Challenges in Civil Engineering

Select Proceedings of CTCS 2020



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 Book
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Investigations on Compression Behaviour of Short Reinforced NSC Columns

J. Sanjith, R. Prabhakara, M. S. Sudarshan & Jayachandra

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(LNCE, volume 162)

Abstract


The analysis is carried out for studying subsequent parameters to know structural performance of NSC columns and aim is to predict the values of deformation, yielding load and ultimate load of short reinforced Normal Strength Concrete of three different grades M20, M30 and M40 subjected to axially compressive load in loading frame. ANN tool was trained with proper inputs like fresh properties of materials, spacing of stirrups and percentage of longitudinal reinforcement and keeping target values obtained from experiment and results are compared with the ANN values accompanied by marginal errors which are around 0.5%.

Keywords


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Contents

Stability Analysis of Embankments on Soft Consolidating Layered Foundation Soil	1
P. Radhika Bhandary, A. Krishnamoorthy, and Asha U. Rao	
Curvature Ductility of Reinforced Masonry Walls and Reinforced Concrete Walls	9
Jacob Alex Kollerathu	
Application of Image Analysis in Infrastructure Sector Fields—An Overview	25
G. Sreelakshmi and M. N. Asha	
Microalgae and Sewage Treatment for Developing Countries	41
Nandini Moondra, R. A. Christian, and N. D. Jariwala	
A Review on the Development of Outriggers and Introduction to Hybrid Outrigger System on Tall Buildings	59
Neethu Elizabeth John and Kiran Kamath	
Efficiency of <i>Carica papaya</i> Stem Activated with Phosphoric Acid and Sodium Hydroxide in Mining Wastewater Treatment	85
Ezekiel A. Adetoro and Samson O. Ojoawo	
Response Surface Models for Optimal Concrete Designs	115
C. Chandre Gowda, B. C. Kumar Raju, and B. E. Bhojaraj	
Thermal Comfort Studies of Residential Building Models in Vijayawada	123
Jagadish Vengala, Srinivas Chava, and Premkumar Pydipati	
Investigations on Compression Behaviour of Short Reinforced NSC Columns	135
J. Sanjith, R. Prabhakara, M. S. Sudarshan, and Jayachandra	


xv

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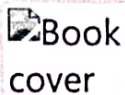
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Sustainability Trends and Challenges in Civil Engineering pp 167–180

Investigations on Compression Behaviour of Short Reinforced SCC Columns

[J. Sanjith](#), [R. Prabhakara](#), [M. S. Sudarshan](#) & [H. K. Thejas](#) 

Conference paper | [First Online: 03 September 2021](#)

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Part of the [Lecture Notes in Civil Engineering](#) book series (LNCE, volume 162)

Abstract


The objective of this work is to predict the values of deformation and load at cracking point, yielding point and ultimate point of short reinforced self-Compacting Concrete columns which was subjected to axially compression in loading frame. An ANN tool by giving proper inputs like fresh properties of materials, spacing of stirrups and percentage of longitudinal reinforcement and keeping target values obtained from experiments, it is compared with the experimental values accompanied by marginal errors.

Keywords

SCC **Short columns** **ANN**


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Seismic Analysis of Multi-storey Building on Sloping Ground with Ground, Middle and Top Soft Storey	149
Ratnakala S. Bidreddy and Shankar H. Sanni	
Investigations on Compression Behaviour of Short Reinforced SCC Columns	167
J. Sanjith, R. Prabhakara, M. S. Sudarshan, and H. K. Thejas	
Performance Evaluation of Bituminous Pavement with High Recycled Asphalt Pavement Material content—A Case Study	181
P. B. Gnanamurthy and B. V. Kiran Kumar	
Life Cycle Costing on a Building, An Approach to Make Building Energy Efficient	201
Shashwath M. Nanjannavar, Samreen Hullur, Darshan Baddi, Shadab Mulla, and A. G. Ramyashree	
An Experimental Study on Usage of Treated Waste Water (Domestic) on the Fresh and Hardened Properties of Conventional Vibrated Concrete for Sustainable Construction	215
N. M. Rakshit Jain, N. Ajay, and P. U. Vinyas Gowda	
Parametric Study of Shear Behavior of Compacted Kaolinite-Bentonite-Sand Mix Proportions	229
D. N. Jyothi, H. S. Prasanna, C. V. Amrutha Lakshmi, and D. K. Nageshwar	
A Study on Volumetric Shrinkage of Compacted Fine-Grained Soils Subjected to Various Energy Levels	247
H. S. Prasanna, C. Thrupthi, and B. Varshini	
A Study on Secondary Compression of Compacted Fine-Grained Soils	271
H. S. Prasanna, B. V. Rachana, R. Anusha, and Ganesh Basavaraj Badaradinni	
Slag-Fly Ash-Glass Powder-Based Alkali-Activated Concrete—A Critical Review	293
Shriram Marathe, I. R. Mithanthaya, and Siddhivinayaka Hegde	
Progressive Collapse of Steel-Framed Structures	311
T. Anusha and H. G. Nahushananda Chakravarthy	
Durability Studies Concerning Permeability on High Performance Concrete Using Artificial Sand as Fine Aggregate	325
Prashant U. Narale and H. S. Jadhav	
Shoreline Change Monitoring of Karwar Coast of Karnataka, India, Using Sentinel-2 Satellite	339
Sheetal Mutagi, Arunkumar Yadav, and Chandrashekarayya G. Hiremath	


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 Book
coverSustainability Trends and Challenges in Civil Engineering pp 601–618

Comprehensive Analysis of Outrigger System for High Rise Structures Subjected to Wind and Earthquake Loadings

N. M. Priyanka, D. T. Abhilash, H. A. Ajay, H. S. Mohan & S. Apoorva


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Abstract

Tall building development has been rapidly increasing worldwide introducing new challenges that need to be met through engineering judgment. High rise buildings are very vulnerable to earthquake and wind loads on regular basis. Hence, to make high rise buildings safe against lateral loads, different types of structural systems are used. One of these structural systems is outrigger system. This project aims to show the analysis of a 60 storied three-dimensional building located at Delhi using ETABS 2016 software. Analysis of eight different models with outriggers and belt truss configuration is carried out by response spectrum


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A Novel Approach to Utilize Fly Ash to Enhance Compressive Strength of Diesel-Soaked Concrete	525
Sneha S. Bandekar, Chidanand Patil, Girish S. Kulkarni, and K. B. Prakash	
Studies on the Effect of Frequency Content of Earthquakes on Structures with Infill	537
A. R. Avinash, A. Krishnamoorthy, and Kiran Kamath	
Soil Structure Interaction Analysis of Tanks Filled with Fluid Subjected to Near-Fault Earthquakes	551
M. Chaithra and A. Krishnamoorthy	
Analysis of Interaction-Dynamics Between Vehicle and Bridge	563
S. Akhila and Durgaprasad Janjanam	
The Influence of Ceramic Ball as a Fine Aggregate in Concrete	589
Pradeep Karanth, Sabyath P. Shetty, Thushar S. Shetty, and Sushanth S. Bhandary	
Comprehensive Analysis of Outrigger System for High Rise Structures Subjected to Wind and Earthquake Loadings	601
N. M. Priyanka, D. T. Abhilash, H. A. Ajay, H. S. Mohan, and S. Apoorva	
Possible Risk on Human Health and Agricultural Land Associated with Application of Humanure	619
S. Srirashmi, R. Varshini, D. Istalingamurthy, and K. S. Lokesh	
An Investigation of Coefficient of Torsional Irregularity for Irregular Buildings in Plan	637
K. K. Sneha and Janjanam Durgaprasad	
Regionalization of Flow Duration Curves for West Flowing Rivers of India	657
Chandrashekarayya G. Hiremath and Lakshman Nandagiri	
Comparative Analysis of Precast Prestressed Hollow Core Slabs	669
B. Rekha and R. Ravindra	
Study on Rainfall Trends and Water Requirement for Crops in Bellary District of Karnataka, India	687
R. Sreedevi and B. R. Ramesh	
Mitigation of Seismic Pounding Observed in Adjacent Buildings with Fluid Viscous Damper	711
Basanagouda I. Patil, Bapugouda B. Biradar, and Rashmi Doddamani	
Hydrological Review and Dam Break Analysis of Suvaranavathi Dam Using HEC-RAS	733
B. S. Naveen Kumar, K. Usha, and M. S. Kanchana	


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DEVELOPMENT OF CONCRETE USING LATERITE SOIL AS A PARTIAL REPLACEMENT TO SAND

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ABSTRACT

Development that regards sustainability has become a policy in the construction industry and often the search for new, innovative and ecofriendly materials have been appreciated. Construction industry has been growing in India for the past many years and so is the difficulty of getting materials. Research in replacement techniques for concrete constituents have been successful since the materials replaced often conform to local availability and economy.

This paper presents an effort to highlight the use of Laterized concrete i.e. the replacement of conventional sand by laterite soil for Normal Strength Concrete (NSC). For the purpose of the experimental study, M30 grade of concrete has been chosen. The percentages of replacements are 15%, 20%, 25% and 30% by weight of laterite soil. Tests were carried out for compressive strength and split tensile strength of concrete for all substitution levels of fine aggregate at a curing period of 3 days, 7 days and 28 days. The experimental work revealed that compression strength increases at later stages with usage of laterite soil. Moreover the experimental work showed that 20% replacement is optimum for NSC i.e. M30 grade.

Key Words— Concrete, Compressive strength, Laterite, Sand, Laterized Concrete

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ANALYTICAL STUDY ON STRENGTHENING OF RC BEAMS WITH COMPOSITE MATERIALS BY ANSYS SOFTWARE

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ABSTRACT

This paper deals with study of the behaviour of RC beam using different types of rebar materials such as steel and composite. RC beams can be retrofitted by FRP. FRP is one of effective technique for retrofit of beam, number of FRP available in current market namely CFRP, GFRP, KFRP, ARAMID, BORON. For analysis of steel and composite materials we are using CFRP&GFRP materials by ANSYS software for obtaining good results. In this paper we are showing solution for both steel reinforcement beam and FRP beam, and parameters calculated are displacement, shear stress, flexural strength and also graph is plotted between stress v/s strain

Keywords – Ansys , composite element , FRP , Finite element analysis

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SEISMIC RESISTANCE OF HIGH-RISE CONCRETE SHEAR WALL BUILDING WITH HYBRID COUPLING BEAM

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ABSTRACT


Current design provisions in the ACI Building Code for reinforced concrete (RC) coupling beams in earthquake-resistant structures require substantial reinforcement detailing to ensure a stable seismic behavior, leading to reinforcement congestion and construction difficulties. As a design alternative, the use of high-performance fiber-reinforced cementations composites (HPFRCCs) in coupling beams with a simplified reinforcement detailing was experimentally investigated. To validate this alternative, four coupling beam specimens were tested, including an RC control specimen detailed as per the 1999 ACI Building Code. A precast construction process was proposed for the HPFRCC coupling beams in this study. This construction alternative would lead to significant savings in time and workmanship at the job site, and provide good material quality control. Results from large-scale tests demonstrated the superior damage tolerance and stiffness retention capacity of HPFRCC coupling beams. It was also observed that diagonal reinforcement is necessary to achieve large displacement capacity.

Keywords: Hybrid coupling beams; concrete shear wall ; load; shear strength; tension.


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CONTENTS

PAPER ID	TITLE OF THE PAPER	Page. No.
SASC01	STUDY OF BEHAVIOR OF WASTE PAPER SLUDGE ASH CONCRETE	1
SASC02	SEISMIC EVALUATION OF MULTI STORIED BUILDING USING E-TABS	2
SASC03	SEISMIC PERFORMANCE ANALYSIS OF OUTRIGGER STRUCTURAL SYSTEM WITH DAMPERS	3
SASC04	SEISMIC RESISTANCE OF HIGH-RISE CONCRETE SHEAR WALL BUILDING WITH HYBRID COUPLING BEAM	4
SASC05	PERFORMANCE EVALUATION OF FLAT SLAB AND CONVENTIONAL SLAB STRUCTURE USING ETABS FOR DIFFERENT SEISMICITY	5
SASC06	DEVELOPMENT OF CONCRETE USING LATERITE SOIL AS A PARTIAL REPLACEMENT TO SAND	6
SASC07	ANALYTICAL STUDY ON STRENGTHENING OF RC BEAMS WITH COMPOSITE MATERIALS BY ANSYS SOFTWARE	7
SASC08	"STATIC ANALYSIS OF BRACED TUBE STRUCTURE USING E-TABS"	8
SASC09	ANALYSIS OF RC FRAME BUILDING WITH DIFFERENT TYPES OF BRACES IN VARIOUS SEISMIC ZONES	9
SASC10	"A REVIEW ON EVALUATION OF SEISMIC POUNDING EFFECT BETWEEN THE BUILDINGS"	10
SASC11	SEISMIC EVALUATION OF JUNCTION HOUSE BY USING E-TABS	11


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PERFORMANCE EVALUATION OF FLAT SLAB AND CONVENTIONAL SLAB STRUCTURE USING ETABS FOR DIFFERENT SEISMICITY


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ABSTRACT


In today's construction activity the use of flat slab is quite common which enhances the weight reduction, speed up construction, and economical. Similarly from the beginning conventional slab has got place in providing features like more stiffness, higher load carrying capacity, safe and economical also. As the advancement era began practice of flat slab becomes quite common. In the present dissertation work a G+5 commercial multistoried building having flat slab and conventional slab has been analyzed for the parameters like base shear, storey drift, axial force, and displacement. The performance and behavior of both the structures in all seismic zones of India has been studied. In the present work the storey shear of flat slab is 5% more than conventional slab structure, the axial forces on flats lab building is nearly 6% more than conventional building, the difference in storey displacement of flat and conventional building are approximately 4mm in each floor. The present work provides reasonable information about the suitability of flat slab for various seismic zones without compromising the performance over the conventional slab structures.

Key Words: flat slab, drop, conventional slab, storey shear, storey displacement, axial forces


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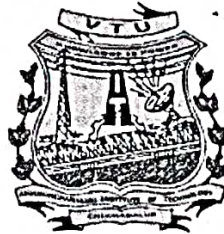

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Development of Self Compacting Concrete by using Alccofine

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Abstract

In the present investigation an attempt has been made to study the rheological and strength characteristics of self-compacting Concrete (SCC) mixes by using Metakoline (MK) and Alccofine (AF) as industrial by-product. The utilization of these treated industrial by-products as cement replacement help to achieve an economical SCC mix. Further the adding Metakoline and Alccofine significant influence in improving the properties viz: rheology, setting time and compressive strength. The best approach is to develop a performance based specification of conventional and SCC mixes with Replacement of SCC by 10% constant Metakoline by weight of cement and varying percentage of 9% to 14% Alccofine by weight of cement with optimum dosage of super-plasticizer (SP) and viscosity modifying agents (VMA) & to develop different combinations of SCC Mixes . Further the rheological properties are Slump flow, V-funnel time, L-box; U-box J-Ring etc. and the Hardened properties of developed SCC Mixes in the laboratory after 7 & 28 days curing are studied

Key words: Self- compacting Concrete, Alccofine, Metakoline.

1.0 INTRODUCTION

SCC is highly engineered concrete with much higher fluidity without segregation and is capable of filling every corner of form work under its self-weight by Okamura (1997). Thus SCC eliminates the needs of vibration either external or internal for the compaction of the concrete without compromising its engineering properties. SCC is a fluid mixture, which is suitable for placing difficult conditions and also in congested reinforcement, without vibration. Self – consolidating concrete has recently been used in the pre – cast industry and in some commercial applications, however the relatively high material cost still hinders the wide spread use of such specialty concrete in various segments of the construction industry, including commercial and residential construction.

In order to meet the performance requirements the following three types of SCC are available.

(i) **Powder type of SCC:** This is proportioned to give the required self-compactibility by reducing the water-powder (material < 0.1mm) ratio and provide adequate segregation resistance

(ii) **Viscosity agent type SCC:** This type is proportioned to provide self-compaction by the use of viscosity modifying admixture to provide segregation resistance. Super plasticizers and air entraining admixtures are used for obtaining the desired deformability.

(iii) **Combination type SCC:** This type is proportioned so as to obtain self-compatibility mainly by reducing the water powder ratio, as in the powder type, and a viscosity modifying admixture is added to reduce the quality fluctuations of the fresh concrete due to the variation of the surface moisture content of the aggregates and their gradations during the production.

2.0 MATERIALS AND METHODS

2.1. Cement: Portland cement is one of the most widely used additives for all types of constructional activity. The cement used for the investigation was pozzolona Portland cement (PPC) 43grade. It confirmed to the requirements of Indian Standard Specification IS: 8112-1989.

			PERFORMANCE CONCRETE	
32	ICETSE 266	KIRAN SP	REVIEW ON PROBLEMATIC SOILS STABILIZATION	174
33	ICETSE 277	P ANIL KUMAR	STANDARDIZATION OF NITROGEN DOPED TiO ₂ FOR DYE REMOVAL	184
34	ICETSE 282	NAVEEN KUMAR	DEVELOPMENT OF SELF COMPACTING CONCRETE BY USING ALCCOFINE	192
35	ICETSE 294	T. ANAND KUMAR	NDT BY ULTRASONIC TESTING	199
36	ICETSE 299	SMT. M.ANITHA	STRUCTURAL HEALTH MONITORING	202
37	ICETSE 302	OWUS M. IBEARUGBULEM	STRONG FORM OF EQUILIBRIUM APPROACH TO EXACT SOLUTION OF RECTANGULAR PLATE ANALYSES	211
38	ICETSE 320	DR. SHIJU EASO JOHN	INVESTIGATION OF THE EXISTING SOLID WASTE MANAGEMENT PRACTICES IN ARBAMINCH TOWN	220
39	ICETSE 321	DEVADASS.T	BEHAVIOR OF COMPRESIVE STRENGTH OF CONCRETE WITH PARTIAL REPLACEMENT OF FINE AGGREGATE BY FOUNDRY WASTE SAND	230
40	ICETSE 14	HARISHANKAR N	STUDY ON THE PROPERTIES OF CEMENT MORTAR MODIFIED BY SILICA FUME AND GLASS FIBER	239
41	ICETSE 164	KEERTHANA G	STABILIZATION OF LATERITE SOIL USING PLASTIC WASTE	245

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