iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** VII **Month of publication:** July 2019

DOI: http://doi.org/10.22214/ijraset.2019.7199

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 7 Issue VII, July 2019- Available at www.ijraset.com

A Review Paper on Enhancing Durability & Compressive Strength of Concrete by using Nano Silica

Nayan Shingare[1], V.C. Patil [2]
[1] *PG Research Scholar,* [2]*Assistant Professor, Civil Engineering Department, JSPM's ICOER, Wagholi, Pune, Maharashtra, India*

Abstract: ***The draw on of nano material in concrete is in advance growing interest in the construction industry. Studies have shown that concrete containing nano particles has established enlarged strength, durability and reduction of pore in the concrete due to the pour filling properties of the nano materials. This also conclusion in better confrontation to deterioration of the steel reinforcements. Hence, the nano materials are cooperative to recover the life of the building. The utilize of bulky amount of cement produce ever-increasing CO2 emissions and also consequents the conservatory effect. The nano resources are use in order to condense the cement content in the concrete mix. Nano material represents one of the most exceptional advances in concrete technology during the most recent decade. Due to its precise properties, nano materials may include the important growth of the quality of the concrete structure and open up new fields for the application of concrete. Nano material is spread all more than the world with a steady amplifies in number of function. Nano materials are deliberately shaped and designed with very exact properties related to outline, size and exterior properties. The main use of nano materials in concrete is to enlarge the strength. Nano Silica produces high compressive strength concrete. It also provides high workability with compact water cement ratio.***

Keywords: Nanomaterial, Concrete, Nano Silica (NS), Compressive strength.

I. INTRODUCTION

Nano technology is largely energetic investigate areas that contain a numeral of control including civil engineering and construction materials. Nanotechnology is the considerate, manage, and reorganization of matter on the command of nanometers (i.e., less than 100 nm) to generate materials with essentially new properties and function. There are many likely areas where nanotechnology can profit construction engineering like its application in concrete, structural composite, covering materials and in nano-sensors, etc. Nanotechnology goods can be used for aim and construction processes in a lot of areas. The nanotechnology generate goods have unique quality, and can considerably fix current construction problems, and may change the obligation and organization of construction procedure. The recent developments in the study and direction of materials and process at the nanoscale tender the great view of producing new macro materials, properties and goods. But till date, nanotechnology application and advance in the construction and building materials field have been jagged.

II. LITERATURE REVIEW

P.Vasanthi (2017) [1] The employ of nano materials in concrete is acquisition growing thought in the construction industry. Studies have exposed that concrete contain nano particles has established improved strength, durability and decrease of pores in the concrete due to the pour filling property of the nano materials.

Nishant Sharma (2017) [2] The progression of appropriate nano technology and its essentialness in structural building exercise is shown in this paper for growing idea. Nanotechnology manages considerate, domineering and domineering matter at the level of individual atoms in the scope of 0.1–100 nm (10-9 m).

Hasan Biricik, Nihal Sarier (2014) [3] The structural description of cement mortars, impregnate with nano silica (NS), silica fume (SF) and fly ash (FA), were moderately considered using Fourier change infrared spectrometer (FTIR), thermo gravimeter-differential thermo gravimeter (TG-DTG) and scanning electron microscope (SEM). The automatic strengths of the specimen were resolute at early (7th day) and standard (28th day) curing ages.

Davoud Tavakoli, Ali Heidari (2013) [4] The nearby study investigate the concurrent use of nano-SiO2 and silica fume in concrete. In command to such a purpose, silica fume in way of 5 and 10 percent and nano-SiO2 in measures of 0.5 and 1 percent were replaced with cement and totally eight mixture tactics for action the compressive strength and water absorption experiment. At last,

©IJRASET: All Rights are Reserved

the grades showed that using such materials improve the merits of concrete. Using both 10% silica fume and 1% nano SiO2, as a cement replacement, resulted in 42.2% increase in compressive strength in comparison to control sample. Also, it was understood that the concurrent use of these materials is more powerful than their single use.

Yuvaraj Shanmuga Sundaram, Dr. Sujimohankumar (2013)[5] This paper deal with the revise of Nanotechnology testing in Civil Engineering which include the growth, compensation and boundaries of Nano concreting technology. For falling carbon production during cement urbanized fly ash is used as a substitute in ordinary Portland cement which is term as Portland pozzolana cement(PPC), this inclusion relatively increase the workability and the deterioration resisting capacity in concrete, but this substitute of fly ash in the ordinary Portland cement deviate the concrete strength subsequently.

Patel Abhiyan S., Rathod Hiren A.,Neeraj Sharma D (2013)[6] The paper focus on question like: What is nanotechnology? What can nanotechnology denote for the construction industry? Are there currently any commercialized goods in construction that make utilize of nanotechnology? Construction can be distinct as a procedure of converting the essential civil engineering raw materials to the final civil engineering creation.

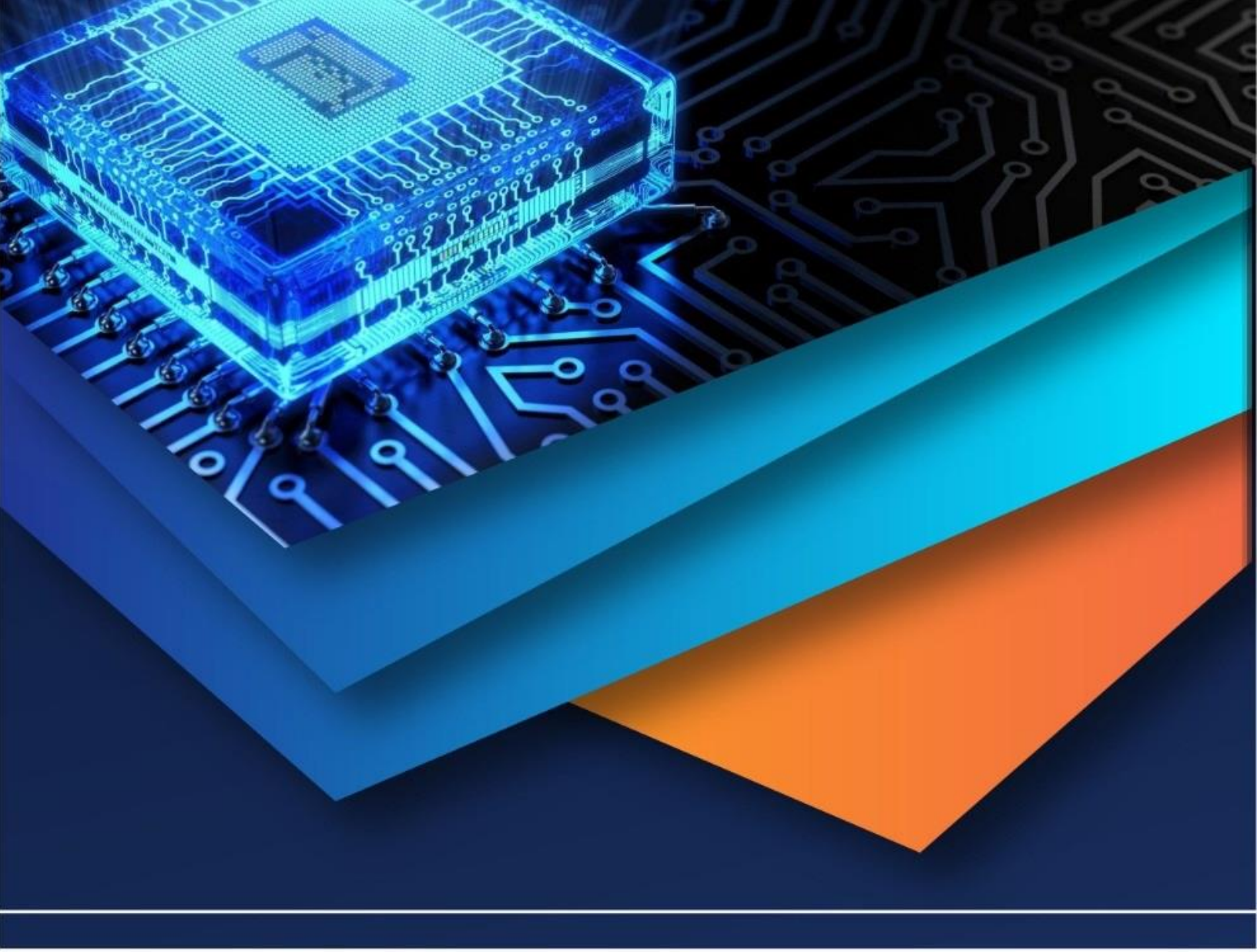
III. CONCLUSION

By studying all this literature studies we came to conclusion that there is a number of published works on Nano materials. But on durability of concrete very less work has been done. Various experimental studies have been carried out using silica flumes but at what proportion the material should be use is not done. It is found that only on one proportion the experimental work is done in the above literatures. However, very less research is found on compressive strength & durability of concrete. Comparative analysis on higher grade of concrete has not seen using Nano silica. So using various proportion of Nano silica in concrete by replacing cement will give different results & from that which proportion is the best for increasing the durability of concrete can be determine.

REFERENCES

[1] Balaguru, P. N. (2005), “Nanotechnology and Concrete: Background, Opportunities and Challenges.” Proceedings of the International Conference application of Technology in Concrete Design.
[2] Boresi, Arthur P.; Chong, Ken P.; Saigal, Sunil. Approximate Solution Methods in Engineering Mechanics, John Wiley, New York, 2002, 280 pp.
[3] Balaguru, P.; and Shah, S.P. Fiber Reinforced Cement Composites, McGraw-Hill, New York, 1992, 530 pp.
[4] “Concrete”, Wikipedia, http://en.wikipedia.org/wiki/Concrete.
[5] Srivastava D.; Wei, C.; and Cho, K. “Nanomechanics of carbon nanotubes and composites.” Applied Mechanics Review, 56, 2003, 215-230.
[6] LI, G. Properties of high-volume fly ash concrete incorporating nano-SiO2. Cement and Concrete Research. 34. 2004. P. 1043 – 1049.
[7] P.Vasanthi et al /International Journal of ChemTech Research, 2017,10(3): 693-698.
[8] Condit, P.M., Performance, process, and value; Commercial Aircraft Design in the 21st century ,wright bros lecture in aeronautics world aviation congress, 1996.
[9] Mc Carty, J.E., and Roeseler, W.G.; Durability and damage tolerance of large composite primary aircraft structure; NASA CR 3797; 1984
[10] McCarthy, M.J. & DHIR, R.K. Development of high volume fly ash cement,2005
[11] Roeseler, Schmidt, Beattie, Roeseler, Culp. Long, McGeerandWallae; The case for transport sail craft; AIAA/SAE paper 96-5611; world aviation congress, LAX 1996

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)