

CERTIFICATE

This is to certify that the major project report entitled “**Compatibility Analysis of Cement with Super-plasticizer**” is bonafide work of under-signed, submitted in partial fulfillment of the requirement for the award of the degree of master of engineering (structural engineering) in the department of Civil and Environmental Engineering, Delhi College of Engineering, Bawana road, Delhi.

This project has been carried out under the Guidance of Er. AMIT KUMAR SHRIVASTAVA (Assistant Professor) and Dr. MUNENDRA KUMAR (Assistant Professor), Delhi College of Engineering, Delhi-110042.

I have not submitted the matter or part of it embodied in this report to any other University or Institution for award of any Degree or Diploma.

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This is to certify that the statement submitted by the student is correct to best of our knowledge and belief.

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ACKNOWLEDGEMENT

It is my great pleasure to have opportunity to acknowledge and express my heartfelt gratitude to everybody who helped and supported emotionally and technically in completion of this project work.

I would like to express my gratitude to my Guides, Dr. Munendra Kumar and Er. Amit Kumar Shrivastava, for their support, patience, and encouragement throughout my Project work. Their continuous inspiration made me successful in completion of this minor project work. They kept me boosting by giving their valuable time. It is not often that one finds a guide that always finds the time for listening to the little problems and roadblocks that unavoidably crop up in the course of performing research. Their technical and editorial advice was essential to the completion of this dissertation and has taught me innumerable lessons and insights on the workings of academic research in general.

My thanks also goes to the Head of the Department, Dr. A.K. Gupta for his valuable support, comments and encouragement which made the presentation and contents of this dissertation possible.

Last, but not least, I would like to thank my father for his understanding for getting the apparatus fabricated in time so that my work is completed in time. His support and encouragement was in the end what made this dissertation possible.

I would also like to thank Mr. Adarsh Kumar for his assistance and time to time suggestions and thoughts.

I am also thankful to all my colleagues, friends and well-wishers for their unconditional support, motivation and encouragement for this work.

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ABSTRACT

Super-plasticizers have made concrete to reach very high strength and fluidity. Apart from the multitude of chemical admixtures, a number of different types and brands of cement are also available in the market today. With the increasing number of types and brands of cement, as well as variants of the water-reducing chemicals, there are issues that arise related to the compatibility between these two ingredients of concrete. Consequence upon the above; various manufacturers from both the fields have emerged with wide variety of products to serve different purposes of clients of construction world.

Admixtures with many desirable characteristics to serve varied requirements are available in market has created confusion among the users, as there are varied cements with different composition. The cement composition and its properties vary broadly in the world; it has not become an easy task for admixture manufacturer to 'match' its brand products with any specific type of cement. At the same time, no cement manufacturer suggests any specific brand of admixture, which will be most suitable and compatible with their product. As such, it has become very tedious job for users/ clients to select the appropriate combination of cement and admixture to serve his purpose.

Moreover, during the use of super-plasticizers in concrete, there may exist some problems of incompatibility of cement- super-plasticizer; irregularity of slump and loss in workability. Therefore, it becomes an essential part that each admixture combination with cement should be evaluated before it can be practically utilized. All the above problems create a need for research and test of various super-plasticizers with the renowned brands of cement. This study is a step to determine the solution against this difficulty to select the most efficient couple of cement- super-plasticizer.

The cement or super-plasticizer compatibility has not yet been thoroughly understood. Most users apply a trial-and-error approach to these chemicals, often resulting in an unfortunate negative experience and/or low cost-effectiveness, which produce a bias against admixtures in general. This is basically due to an incomplete understanding. Up to now, there have been very few incentives to invest time, effort and money to solve this kind of problem. This study will provide ready to use data and reference to the industries and construction world.

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NOMENCLATURE

C1	PPC Based Cement 1
C2	PPC Based Cement 2
C3	PPC Based Cement 3
C-SP	Cement – Super-Plasticizer couple
PCE	Poly Carboxylate Ether (PCE)
R	Correlation coefficient
R^2	Coefficient of Determination
SNF	Modified Sulphonated Naphthalene Formaldehyde
SNP	Sulphonated Naphthalene Polymer
SP	Super-plasticizer
W/C	Water-Cement ratio