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**ROLE & BEHAVIOR OF CHEMICALS IN MODERN CONSTRUCTION
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ABSTRACT

The research topic task is to gather and review the role and behavior of chemicals in modern construction materials that are used in different construction projects and latest construction chemicals that are being used in this creation new modern world.

The World of today is growing faster than earlier due to new technologies that are being discovered and develop by many scientists from different technological fields, Construction chemicals are playing a more important role than earlier to meet the demands of high strength, durability, economy and sustainability of tech-infrastructure that are beautifying our new modern world of today.

The research paper work includes all practical and methods, also materials and characterization of its properties.

KEYWORDS: Chemicals, Modern Construction and Materials.

INTRODUCTION

Construction chemicals constitutes a very wide range of products that are used in every stage of construction right from foundation until the final, and finishing levels of civil engineering works-be it in the building works, infrastructure, irrigation, transport or any other type of construction work. So any advancement in construction techniques or process has to have a corresponding effect on construction chemicals.

Globally, high-tech infrastructure and mega constructions have become a present need to step up towards the creation of the contemporary world. This has made it easy for high performance, better quality materials for construction which are being shake with the latest chemical technology for building next -generation infrastructure.

To meet high demand, the need for faster eco-friendly construction is becoming the key. Construction chemicals are playing a great important role than earlier to meet the demands of high strength, durability, economy and sustainability of concrete structures. The need for good construction chemicals is further witnessing a significant growth of the rising awareness about construction quality and technological advancements.

A variety of construction chemicals are used in most large-scale construction projects as well as projects as special design and engineering, depending on their specific desires. These materials include concrete admixtures, surface treatment, waterproofing, grout, floor topping, coating, sealer and floor hardening. Therefore, the high demands for construction chemicals increase to cover the creation of infrastructure, high-rise buildings and industrial plants. In addition, construction chemicals also cover the renovation, repair and rehabilitation of such large-scale projects. In fact, renovation and repair make up a substantial volume of construction chemical sales in many countries on continent.

LITERATURE REVIEW

Construction Chemicals Overview

Construction chemicals, as the name signifies, are chemical compounds used in construction activities be it residential, non-residential or non-buildings. These compounds belongs to a place specialty segment of the chemical industry and can be used either in existing construction projects to speed up the work or in new construction projects to give durability and strengthen the structures .The importance of using construction chemicals are far more than the increase in the cost of the project which is 2-5%.Certain chemical products help in reducing the quantities of cement and water used in the construction works. These compounds impart chemical as well as physical properties in applications such as cross-linking or phase change (from liquid to solid). Construction chemicals are useful for high quality concrete and for promoting the improvement of concrete performance. They also increase the life of construction work and provide additional protection from environmental hazards (**As stated by FICCI, May 2014**). Based on end useful applications, these compounds can be broadly classified into five categories as shown below.

Examples of construction chemicals are:

- i. Concrete –Admixture
- ii. Water Proofing -Chemicals
- iii. Flooring -Compounds
- iv. Repair and Rehabilitation
- v. Lignobased
- vi. Polyurethane based
- vii. Epoxy & floor hardners
- viii. Cementitious repair mortars
- ix. Sealants
- x. SNF & SMF based
- xi. Bitumin based
- xii. Polyurethane coatings
- xiii. Polymer repair mortars
- xiv. Grouts
- xv. PCE based
- xvi. Polymer - SBR, Acrylic
- xvii. Polyurea based
- xviii. Epoxy based resin mortars
- xix. Adhesives

A representative picture of the chemicals is as below.



Concrete Admixtures



Waterproofing



Flooring



Repair & Rehabilitation



Adhesive & sealants



Epoxy Tile Grouts

Admixtures

Cement is commonly used as binding material in construction. For concreting, cement is mixed with crushed rock, sand and water in specific proportion to produce concrete. For better results, good workability, high strength, and good finishing, cement or mortar admixtures are used. Chemical admixtures are added to the mix immediately before or during mixing. Admixtures are primarily used;

- To reduce water content in concrete.
- To increase compressive strength and durability parameter of concrete.
- To enhance the workability and giving more transportation and placing time.

Flooring

Flooring compounds are mostly epoxy and polyurethane based. Industrial flooring compounds are used to fulfill various industrial needs such as hardness, load impact, chemical deterioration, moisture penetration, strengthening of damaged floors, as well as improving the aesthetic appeal of the floor. They are also used to provide certain special features such as friction, static resistance, and resistance to fire, antibacterial properties, and so on.

Waterproofing agents

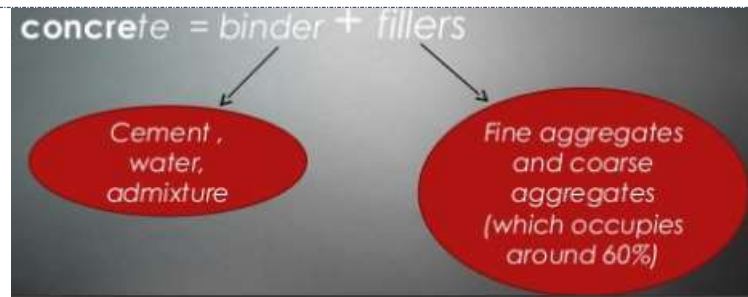
Waterproofing caters to various end useful applications with products based on bitumen, PU and polymers like SBR & Acrylic. These compounds are available in liquid, solid, slurry and two-component coating forms. Waterproofing compounds are designed to prevent water infiltration. These compounds or membranes can be extremely effective when applied on the exterior of a foundation system. Application of the proofing compounds can be done by implant treatment i.e. either dipping or spraying or by low-pressure spraying on the surface.

MATERIALS & METHODOLOGIES

Mixing of Concrete

It is simply defined as the mixture of cement, fine aggregate, coarse aggregate and water, admixtures.

- Concrete used on work is specified according to IS 456 (2000) or any other country specifications.
- It is one of the very important and widely used materials in construction industry.
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Cement: It fills up voids existing in fine aggregates, it provides high strength and plastic properties to the concrete mixture.

Fine aggregate: The particle which passes from IS sieve 4.75mm and should be retained from 75micron is known as fine aggregates.

It should not contain any organic material. The main important of fine aggregate is to fill-up voids existing in coarse aggregates.

Coarse aggregate: The particles which are retained through IS sieve 4.74mm is known as coarse aggregates. Coarse aggregates should be hard and strong to give enough strength and durability to concrete.

Water: Water acts as lubricant for the aggregates and provides good workability to the concrete. The good quality concrete depends on the quality and quantity of the water content.

Admixture: Admixtures or additives as required by situation, constituents added to concrete or mortar modifies its properties immediately before or after mixing.

RESULTS & CONCLUSION

Generally, from this research paper study, I summarized the following conclusions.

- 1) The gathered information from different latest journals, scientific reports and day to day new technological ideas about construction chemicals, after all resources I found that chemicals have great contributions and positive impact in construction industries.
- 2) The research paper study from all experiments done ,I concluded by mentioning the role and behavior of chemicals in modern construction materials in different techniques that will show the life expectance of any kind of construction projects, such as;
 - Performance and enhancement
 - Improvement of long-term strength& durability
 - Concrete admixtures provide physicals as well as economic benefits.i.e by reducing the required quantity of cement and make concrete economical.
 - They enhance the workability of concrete during construction work.
 - Admixtures impart early strength in concrete.
 - Admixtures reduce the early heat of hydration and overcome thermal cracking problem in concrete. If there is a more heat of hydration then cracks can propagate in fresh concrete.
 - Chemicals improve the resistance against freeze-thaw effect on concrete.
 - Some chemicals act as anti-bacterial agents when are applied on buildings.

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