

Mass Concreting in Dams with DAGLOCS Composition

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Abstract — In mass concreting a vast amount of concreting is done for heavy structures such as dams, Bridges, etc., for making the structure bearable to the strength. In the mass structures as the time passes many of the changes occur because of the different constraints which generally occur in the day-to-day environment, so keeping in mind all these different effects the research work is done on the mass concreting for making the state-of-the-art structure. In this research work many of the control measures are applied to sustain the different unviable effects which impacts the strength of the mega structures and also it can cause much of the harmful effects to the structure. In these structures the changes in the temperature are also considered from every direction of the structure, because these structures resist the temperature in all seasons, these structures may be anywhere either in the desert region or in the muddy area or in the water filled portion of the land. For the mass concreting structures different experimental studies are conducted to justify the proper establishment of load bearing structures at the required region of the land.

Keywords: Cracking, Dam Foundation, Admixtures, Silicamate, Mass Concreting

I. INTRODUCTION

The provision for the Dam construction starts with the making a stable and durable structure to withstand the high load bearing capacity to sustain the load of the vast amount of water. In the Dam construction every directional force which are applied on the dam structure are considered it may be either longitudinal or it may be in the transverse direction. In these structures construction heat of hydration is considered in the priority order because when the mass concreting is conducted in a structure then it is but obvious that the temperature of the structure will rise, and this rise of temperature will take place due to the orderly chemical reaction which happens in order to build the strength of the concrete structure. The construction of these structures is completed according to the international standards of the construction which is accorded on behalf of the standard measures. These standard measures are applied according to the different experimental studies conducted on the concrete blocks which are created during the construction of the mega structures. During the concreting blocks are created of specified dimension to find the experimental values of the characteristic strength of the concrete. During the mass concreting two different type of shrinkage are also found which are named as autogenous and drying shrinkage, these shrinkages result in the minor to major spacing in the dam structure. In this research work we will also find the proper solution of the cracking which is generated due to the mass concreting

II. LITERATURE REVIEW

A. Title of Paper: Mass concreting in dams with DAGLOCS Composition.

In this article research work is enlisted that how the DAGLOCS composition helps in the casting of the dam's structure with the methodology of mass concreting in such a manner that no any harmful effects are developed in the dam structure. This composition is designed in such a way that no any undesirable changes are seen due to casting of the concrete composition. In any concreting methodology, expansion and shrinkages are seen due to the wetting of the casted concrete, after the concrete composition is casted on the site then due to drying and also due to the varying temperature differences in the environmental conditions.

B. Mass Concreting: Implementation in dams.

Concreting is done in the dams according to the required conditions so that no any undesirable cracking its seen. In these structure with the help of mass concreting many of the volumetric changes are seen, so avoiding those undesirable changes DAGLOCS composition is used, with the help of this composition many of the undesirable changes are overcome such as, the volumetric expansion with the help of coconut shell which helps in the expansion of the whole volume without altering the characteristic strength. The steel scrap fiber helps in the expansion of the volume because when the temperature rises of the surrounding environment the concrete starts expansion.

C. Dams Foundation: The provision for bearing the loads in the structure.

The Bureau of reclamation helps to identify the different variations differences of the temperature expansion of the volumetric structure. DAGLOCS composition helps in bearing the load of the volumetric structure without changing the shape of the concrete. In this concrete composition the steel scrap fiber is used which helps in sustaining the characteristic strength of the concrete and maintaining the load bearing capacity of the Dam structure. In the dam structure many of the outlet openings are provided, so due to the volumetric expansion it's been a cause of concern that no any expansion will be seen in the outlet openings. The whole load bearing capacity of the structure is directed towards the foundation of the dam.

III. METHODOLOGY

In the methodology section of this research work the things are discussed in brief about the cracking which rises during the expansion of the volumetric structure of the dam. In this section different aspects are also discussed such as the use of different special components which helps in the overcoming of undesirable changes in the volumetric structure. The timing of the chemical reaction between the concrete composition is varied with the help of a special type of

plasticizer. The whole methodology of Dam structure depends on the variations between the time differences of the chemical reaction in the concrete mix.

A. Cracking due to heavy concreting:

In the heavy structure, since many of the cracking are seen cracking so for reducing those cracking plasticizer Diisodecyl Phthalate is used as a plasticizer which reduces the water content from the concrete mix, so not much of the water content used for maintaining the water cement ratio. This DAGLOCS composition is suitable for the mass concreting of the dam structure, because the different constituent materials which are used in this composition are exemplary in their work performance. The water cement ratio plays vital role in the working of volumetric expansion in the dam structure.

B. Provision for Mass Concreting:

During the mass concreting a reaction take place which is also known as exothermic reaction, in this type of reaction the heat releases from the structure due to the chemical reaction which is happening in the concrete mix as a part of strength development process of the Dam structure. The Dam is a big structure so it requires a lot of amounts of concrete to develop the strength for load bearing of the structure.

The casting of this structure completed in a way that a lot of sections are created, so that the volumetric expansion in the concrete structure takes place in a part wise manner, which helps in the reduction of the cracks which develops during the aftermath of concreting processes.

C. Special effects of admixtures:

During the mass concreting event we also require adhesive property in the concrete mix, so for recalling this adhesive property we are using silicamate. This silicamate is used as an admixture in this concrete composition to improve the bonding property of the composition.

This material is used to improve the different constituents of the material's bonding strength and improving the characteristic strength of the concrete mix. It helps in the retainment of the strength of the load bearing standards of the dam structure. It is quite easily available in the market within a standard cost of the admixture. In the connection with the plasticizer Diisodecyl Phthalate this admixture plays an important role for making the get-together strength of the concrete mix.

IV. EXPERIMENTAL RESULTS & ANALYSIS

The experimental study of this research work shows the results according to the analysis of the different experiments on the mass concreting system with the different aspects according to the requirement of the dam structure. The various components of the dam structure are also considered during the analysis of the mass concreting system which results in the improvement of the different characteristic property of the concrete mix. It also results in the improvement of those properties which are hard to reach up to the standard measures. It helps in the enhancement of the some of the basic properties of the concrete mix.

Firstly, we will focus on the results of the admixture which is mixed in the constituent materials of the concrete mix. It helps to improve the strength between the different small particles of the concrete composition and maintaining the specified distance between the tiny particles of the composition. It results in the standard improvement of characteristic strength of the concrete mix.

In this analysis of plasticizer, it is seen that plasticizer play an important role to control the water cement ratio and also it reduces the water requirement for the concrete mix. It is but obvious that when the water cement ratio is in the standard zone of the international standard then the characteristic strength and the durability and feasibility of the concrete mix will be up to the mark.

V. CONCLUSION

Considering the complete research work which is being conducted on the mass concreting of the dam structure is highly suitable for the use in the big structures with the help of DAGLOCS composition. it is also justifiable statement to mention that DAGLOCS composition is made in such a way that no any special improvement is required for reducing the cracking and shrinkage problem which generally arise in the heavy structures due to the mass concreting of the different concrete constituent materials. In this mass concreting system of dam structure, it is also necessary to mention that this composition uses different desirable constituents such as plasticizers and admixtures in the appropriate ratio to maintain the characteristic of the concrete mix.

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