A Study on Effect of Coastal Erosion in Dakshina Kannada using Remote Sensing Technique

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Abstract- *Coastal erosion being one of the most dynamic processes occurs when wind, waves and long shore currents move sand from the shore and deposits it somewhere else. This dynamic process occurring in Nethravathi-Gurpur estuary, Mulki-Pavanje estuary and Udyavara estuary over a period of time is efficiently and accurately analysed using remote sensing technique by using topographical map of 1969 and IRS image of 2000 with the aid of GIS software. The vector layers generated with the help of Arc Map software are integrated and significant changes are demarcated on the maps. On the whole the overall dynamic changes occurred in and around the estuary points of Dakshina Kannada and Udupi Districts have been studied under this project. The geological pattern, meteorological parameters, salt water intrusion and aquifer characteristics of the study area are also covered under this project.*

Keywords- Coastal Erosion, Remote Sensing, GIS, Estuary.

I. INTRODUCTION

Every land mass on Earth has miles of coast at the interface between the hydrosphere and the lithosphere. Natural forces such as wind, waves and currents are constantly shaping the coastal regions. The combined energy of these forces moves land materials. The landward displacement of the shoreline caused by the forces of waves and currents is termed as coastal erosion. It is the loss of sub-aerial landmass into sea or lake due to natural processes such as waves, winds and tides, or even due to human interference. While the effects of waves, currents, tides and wind are primary natural factors that influence the coast the other aspects eroding the coastline include: the sand sources and sinks, changes in relative sea level, geomorphological characteristics of the shore and sand, etc. other anthropological effects that trigger beach erosion are: construction of artificial structures, mining of beach sand, offshore dredging, or building of dams or rivers.

Coastal erosion occurs when wind, waves and long shore currents move sand from the shore and deposits it somewhere else. The sand can be moved to another beach, to the deeper ocean bottom, into an ocean trench or onto the landside of a dune. The removal of sand from the sand-sharing system results in permanent changes in beach shape and structure. The impact of the event is not seen immediately as in the case of tsunami or storm surge. But it is equally important when we consider loss of property. It generally takes months or years to note the impact of erosion; therefore, this is generally classified as a "long term coastal hazard".

II. PHYSIOGRAPHY AND GEOLOGY OF THE STUDY AREA

The study areas considered in this work includes two major regions viz. Mangalore and Udupi which is a part of undivided Dakshina Kannada district.

Mangalore is located at 12°87' N 74°88' E with the Arabian Sea in the west and the Western Ghats in the east. It is being one of the major cities on the Karnataka coast gaining economic importance due to urbanization and industrialization. The Netravathi and Gurpur (N-G) rivers encircle the city by flowing around its south and north respectively and debouch into the Arabian Sea at its southern side. It is estimated that out of 290 Km length of Karnataka coastline, about 80 km (27.5%) is vulnerable to severe erosion during the SW monsoon. The areas covered under this region for our study purpose are mainly Netravathi-Gurpur and Mulki-Pavanje estuary and the climate of these two estuaries is same as that of the Dakshina Kannada district. Udupi coast in Karnataka state, along the west coast of India, selected as a study area, is well known for sandy beaches, aquaculture ponds, lush greenery, temples and major and minor industries. It lies between 13°–13°45' north latitudes and 74°47'30''–74°30' east longitudes, the length of the coastline is 95 km, and is oriented along the NNW–SSE direction. It is vulnerable to accelerated sea level rise (SLR) due to its low topography and its high ecological and touristy value. The area covered under this region for our study purpose is Udyavara Estuary. Mangalore city is located in the confluence of Nethravathi and Gurupura rivers. It is bound in the east by the Western Ghats and in the west by the Arabian Sea. It has an average elevation

BEHAVIOUR OF MECHANICAL PROPERTIES OF ULTRA-HIGH PERFORMANCE CONCRETE WITH STEEL FIBRES AND MINERAL ADMIXTURES

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Abstract

The present experimental work is taken to study the strength properties of UHP-FRC. The locally available materials are used for making UHPC with steel fibers from manufacturer and low water binder ratio is adopted with hyper-plasticizer as admixture. The effect of presence of coarse aggregates on strength of UHPFRC is evaluated in comparison with UHPFRC without coarse aggregates. The present work also studies the effect of using mineral admixtures namely GGBS – Ground Granulated Blast Furnace Slag and Silica fumes replacing the cement by weight. The fine aggregate content of the mix is replaced with Manufactured Sand (M-Sand) and Quartz sand. The steel fibers are used in both the mixes that are mix with without coarse aggregates. The strength characteristics of the mixes are studied, adopting particle packing density approach. The characteristic of the materials determined using the standard procedure as per relevant codes of practice. The design mix is arrived by taking a reference mix from the literature, revalidating its properties and modifying the mix suitably. The workability of mixes is evaluated as per EFNARC 2005. The compressive strength, flexural strength and spilt tensile strength of UHFRC with and without coarse aggregates are assessed.

Keywords *— Steel Fibers, Rheology of UHPC, High Strength, Mineral Admixtures*

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1. INTRODUCTION

Concrete is the premier construction material around the world and most widely used in all types of civil engineering works and it is a man made product, essentially consisting of cement, aggregates, water and admixtures.Concrete is the most popular and most economical construction material. The concrete technology has evolved significantly in recent years resulting in the development of Self Compacting Concrete, Fibre Reinforced Concrete, Geopolymer Concrete, Light weight concrete and so on. The main criteria for concrete to be used as a main construction material are strength characteristics, durability parameters and most importantly the performance of concrete. The rapid growth in construction industry is resulted in demand for new materials which satisfy the requirements of strength, durability and performance. The structures should be constructed at the faster rate, reducing self weight and making them earthquake resistant. The result is material like Ultra High Performance Concrete. Ultra High Performance Concrete – UHPC is the concrete, which is manufactured with low water cement ratio, which results in high strength. The materials of design mix are so proportioned that, there will be higher reduction in the porosity which not only enhances strength, but also increases durability by reducing permeability fluids. The materials used include cement, mineral admixtures like GGBS, Silica Fume and metakaolin, fine aggregates – Manufactured Sand and Quartz sand, coarse aggregates, super plasticizers and water.

2. MATERIALS AND PROPERTIES

2.1 Cement

The ordinary Portland cement 53 Grade with specific gravity of 3.15 is used.

2.2 Sand

The locally available M-sand having specific gravity of 2.65 conforming IS 383-1987 is used for this study.

2.3 Micro Silica Fume (MSF)

It is a byproduct of producing silicon metal or ferrosilicon alloys. Micro silica consists primarily of amorphous (crystalline) silicon dioxide (SiO2). They have stable SiO2 content and high Pozzolanic Strength Activity. According to SiO2 content, Micro silica range from 90% to 97%.

2.4 Metakaolin

It is the most abundant natural minerals which is produced by heat- treating kaolin. Kaolin is a fine, the term kaolin is derived from metakaolin which is typically contains 50-55% SiO2 and 40-45% of AL2O3. Metakaolin particles are generally one half to five microns in diameter, larger than silica fume particles, it is of white color.

STUDY OF FRESH PROPERTIES OF UHPC USING VOLUME PASTE APPROACH

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Abstract

The packing density approach is used to calculate the UHPC mix required for the study. The Particle Packing Approach is adopted to minimize the volume of cement paste by minimizing the volume of voids in concrete. The present experimental study is on the rheological behaviour of four design mixes UHPC in which two mixes are with coarse aggregates of 12.5mm downsize and other two mixes are without coarse aggregates. The behaviour in fresh state of each mix is studied by varying the paste content. The two mineral admixtures used in all the mixes are 10% micro silica and 5% metakaolin replacing cement by weight. Manufactured Sand (M-Sand) and quartz sand are used as fine aggregates. Quartz sands consist of particle size ranging from 150micron to 45micron. 1% to 2% Steel fibres are used in all the mixes to resist shrinkage cracks in concrete mix. Paste content for each water binder ratio (0.3, 0.26, 0.22) is calculated using particle packing mix approach The fresh properties of UHPC Slump test, J ring, L-box test, V-funnel test and U-box tests are conducted as per EFNARC 2005 for different paste content. Corresponding 3 day and 28 day of compressive strength for the each paste content is determined and achieve compressive strength of 119.5MPa for mix without coarse aggregate and 105.36 mix with coarse aggregate.

Keywords: *Packing Density, Paste Content, Rheological Behaviour, Compressive Strength.*

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1. INTRODUCTION

Now a day's concrete is second highest material consumed by human after water and food. Use of advanced materials in the concrete led to the development of Ultra high performance concrete. It is effectively used in the high raise building, nuclear power plant and infrastructure. Use of UHPC reduces the self weight and reduces the total load.

The UHPC consists of combinations of different mineral admixtures, chemical admixtures which help in adopting low water binder ratio, fine aggregates, with or without well-graded coarse aggregates and discrete fiber reinforcement. The compressive strength of UHPC is greater than 120MPa and tensile strength is greater than 5MPa. UHPC is not a self compacting concrete but it shows the rheological properties namely fillability, flowability and segregation resistance of Self Compacting Concrete.

This paper is on the rheological behaviour of two design mixes of UHPC in which one mix with coarse aggregates of 12.5mm downsize and other mix without coarse aggregates. The two mineral admixtures used in all the mixes are 10% micro silica and 5% metakaolin replacing cement by weight. Manufactured Sand (M-Sand) and quartz sand are used as fine aggregates. Quartz sands consist of particle size ranging from 150micron to 45micron. 1% to 2% Steel fibres are used in all the mixes to resist shrinkage cracks in concrete mix.

Paste content for each water binder ratio (0.3, 0.26, 0.22) is calculated using particle packing mix approach. The behaviour in fresh state of each mix is studied with corresponding paste content. The fresh properties of UHPC Slump test, J ring, L-box test & V-funnel test are conducted as per EFNARC 2005. The fresh behaviour of UHPC such as passing ability, filling ability of fresh UHPC is evaluated. The corresponding 3 day and 28 day compressive strength for the each paste content is determined.

2. MATERALS

2.1 Cement

53 grade of ordinary Portland cement confirming to IS: 12269 – 1987. It has the specific gravity of 3.15.

2.2 Micro Silica

It is the waste product silicon metal or ferrosilicon alloy industries. It mainly consists of SiO_2 about 93.5%. The specific gravity of micro silica is 2.2. Chemical constituents are shown in Table 2.1

Table 2.1 Chemical Constituents of Micro Silica

5Name of the Composition	Percentage of Contents
SiO_2	93.58%
Fe_2O_3	0.25%
Al_2O_3	0.20%
CaO	0.38%
MgO	0.49%
others	5.11%

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Analysis And Design Of Multi-Storeyed Reinforced Concrete Building Using CYPECAD

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Abstract

Every human has desire to own comfortable house and on an average, generally one spends his two-third of lifetime in the house. Therefore there is an increased trend towards the construction of multi-storeyed buildings for residential as well as for non-residential purposes in the urban areas. Hence nowadays the building construction has become a major work which indicates the social progress of the county. In order to compete with the ever growing competent market it is very important for a structural engineer to save time. It is emphasized that any structure to be constructed must satisfy the need efficiently for which it is intended and shall be durable for its desired life span. But in the modern scenario, it is not possible to analyze sophisticated structures manually, as even a structure of modest proportion involves many skills and literally hundreds of different operations. This calls for the use of specialized software packages for the efficient planning, analysis, design, drafting, estimation and project management. "CYPECAD" is one such software which has been used for analysis of complicated structures more efficiently and rapidly. The present project deals with the analysis and design of a multi storied residential building of G+4 consisting of 8 apartments in each floor using "CYPECAD".