Concrete is the most widely used artificial construction material in the world and it is second to water as the most utilized substance on the planet. A tremendous infrastructure development has taken place in the country (throughout the world) and making of the concrete for higher strengths and higher durability to cater to the requirements are significant. The concretes are prepared by blending with various admixtures to cater to the advanced needs and requirements. The addition of admixtures in the concrete and preparation of the blended concrete have paved the way to make the best use of the available admixtures, mix proportioning and other factors to produce the concrete satisfying the higher performance requirements.

Admixtures are the chemical compounds in concrete other than cement, water, fine aggregate and coarse aggregate and mineral additives that are added to the concrete immediately before or during mixing to modify the properties of the concrete. The addition of the admixture will improve the properties of the concrete and also it should be taken care that it should not adversely affect the performance of the concrete. By the addition of admixtures, the workability of the concrete is improved, the durability and
strength of the concrete is improved, the initial setting time of the concrete is increased and sometimes it retards the initial setting time of the concrete etc.

Based on the literature review, it was observed that the admixtures such as fly ash, silica fume, rice husk ash, calcium nitrate etc., put in combination, will give better high performance and multi component concrete which can be used in the most adverse conditions. And based on various and repeated trials, it was observed that by the replacement of the admixtures in the following proportions of 15.0% fly ash, 10.0% silica fume, 10.0% rice husk ash and 3.0% calcium nitrate with the cement, durability properties and strength properties of the concrete were improved.

To obtain necessary data, several cubical concrete specimens, cylindrical concrete specimens and reinforced concrete wharf specimens were prepared and laboratory tests have been performed to determine the various important properties of the concrete. The importance of the various admixtures such as fly ash, silica fume, rice husk ash, calcium nitrate etc., were studied and analyzed. The optimum percentage of admixtures that gave good mechanical and durability properties results based on trial and error method were selected.
The mechanical properties of the concrete such as compressive strength, tensile strength, flexural strength etc after 28 days, 56 days 90 days, 120 days and 180 days were determined. The durability properties of the concrete such as permeability, sulphate attack, chloride attack, chemical attack, corrosion studies etc after 28 days, 56 days 90 days, 120 days and 180 days were determined. Then the results obtained were compared with the results of the concrete properties and that of the conventional concrete.

It was found that in spite of low water cement ratio for M30 grade of the concrete, a better workability was observed with the replacement of the various admixtures. A required compaction factor was obtained for both the grades of concrete. There is no segregation observed in the concrete prepared by using admixtures. The water absorption was reduced in the concrete specimen prepared with the addition of the admixtures. It may be finally concluded that by the replacement of the admixtures in the following proportions 15.0% fly ash, 10.0% silica fume, 10.0% rice husk ash and 3.0% calcium nitrate with the binding material cement, the pore structure, strength properties and durability properties of the concrete were significantly improved.