



Effectiveness of Locally Available Superplasticizers on the Workability and Strength of Concrete

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Abstract

Though Super Plasticizers (SP) are well-known chemical admixtures which are added into concrete to enhance the workability and achieve higher strength while reducing the water content. But the rapid increase in different SP in Pakistan has created confusion on the effectiveness of SP. This experimental study was carried out to study the effect of locally available SP on the workability and compressive strength of M15 grade concrete. Three different SP were utilized, with dosage ranging from 0.5% to 2.5% with an increment of 0.5%. The water-cement ratio remained constant at 0.5 for all samples. Based upon the results, all three SP increased the workability as well as strength of concrete. The optimum dosage was determined to be 1.5% to 2.00% for all three SPs used in this research work. BASF 561 was determined to be more effective, as it achieved the maximum workability as well as compressive and flexural strengths.

Keywords: Superplasticizers; Compressive Strength; Flexural Strength; Workability; Locally Available; Pakistan.

1. Introduction

Construction industry plays a significant role in uplifting the socio-economic development of any country [1]. Concrete is the most widely used building material in the construction industry [2] due to which it is considered as the backbone of any country's infrastructure [3], therefore, lack of such infrastructures becomes a barrier in the development of a country [4]. Concrete has vast applications ranging from the construction of foundations, retaining walls to bridges, dams and other structural members. Due to its availability and durability, concrete's popularity has been on the rise and has become the most widely used building material in the world [5]. But due to the rising demand for special qualities, conventional concrete has been lacking to satisfy this need. Therefore, researchers attempted to produce such special features and qualities with the use of chemical admixtures. In fact, the development and utilization of chemical admixtures in civil engineering applications has been one of the most important innovations of the 20th century, as these chemical admixtures not only help in reducing the cost of construction, enhancing or modifying the properties of hardened concrete but also ensuring quality during mixing, transporting, placing and curing [6, 7]. According to ASTM C494 [8], the chemical admixtures are classified into seven categories as shown in Table 1.

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