CHAPTER 1
INTRODUCTION

1.1 Introduction:

Since 19th century, reinforced concrete has become the most widely used construction material in the world, Its success can be attributed not only to its low cost but also, to its long record of satisfactory performance in service. This good performance includes its durability, which is much superior to that of its main competitors, steel and timber.

Therefore, construction engineers should have some knowledge of the advantages and limitations of commonly used admixtures.

Admixtures vary widely in composition, from surfactants and soluble salts to polymers and insoluble minerals. Generally, they are used in concrete to improve workability, accelerate or retard setting time, control strength development, and enhance the durability to frost action, thermal cracking, alkali-aggregate expansion, sulfate attack, and corrosion of the reinforcement [1].

Admixtures were developed about 70 years ago. High range water reducing admixture “superplasticizers” were introduced in Japan and Germany in 1964.

Now marketed worldwide, water reducing and high range water reducing admixtures are used all over the world [2].

Since the late 1970s, use of a new class of chemical admixture has increased substantially in various segments of the concrete industry [3].

These admixtures are used to significantly increase slump without adding more water or to substantially reduce water content without a loss in slump. Often referred to as a superplasticizer, this material is properly categorized as a high-range water-reducing admixture (HRWRA) meeting the requirements of ASTM C 494 Type F or G [4] or ASTM C 1017 Type I or II [5]. To be categorized as a HRWRA under the requirements of ASTM C 494, the admixture must be capable of reducing the water requirement by at least 12%. As originally marketed in Germany and Japan in the late 1960s, HRWRA consisted primarily of sulfonated condensation products of naphthaleneor melamine. In the early 1980s, work began on the development of polyacrylate-based HRWRAs (Bradley and Howarth 1986) [6]. These materials and other polycarboxylates have now begun to find practical applications in the field ; Okazawa, Umezawa, and Tanaka 1993 [7]; Tanaka and Okazawa 1993 [8]; Nmai, Schlagbaum, and Violetta 1998 [9]; Jeknavorian et al. 1997 [10]; Jeknavorian 1998 [11]).

High range water reducer have been used to produce self-compacted concrete [12]. Johann Plank and others had used polycarboxylate superplasticizers to produce ultra-high strength concrete [13].

Rapid slump loss was a problem in some concrete mixtures. This concern led to the development of new products aimed to maintain workability for longer periods of time. Extended-life HRWRA were developed in the 1980s, which imparted up to 2 h longer working life to concrete, depending on mixture ingredients and environmental conditions. This allowed adding HRWRAs at the batch plant rather than at the job site, reducing wear on truck mixers, and lessening the need for accessory equipment such as truck-mounted admixture tanks and dispensers. The result was an increase in the use of HRWRA in almost all areas of the concrete industry [3].

1.2 Research significance:

This research work aims to evaluate the effect of using an over dosage of Type G as a retempering admixtures on setting time, compressive strength at (1, 3, 7, 28, and 90 days), splitting tensile strength, modulus of elasticity, and durability indices at 90 days ago. The effect of an over dosage was studied for different types of cement. The effect of using, a mix of Type F and Type G, Type C, a mix of Type G and C, and Type G based on polycarboxylic were studied. The question which wants an answer is, shall we use concrete that doesn't set for one day or more?