

Modulus of Elasticity of Two-Stage (Preplaced aggregate) Concrete

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ABSTRACT

Two-stage concrete is characterised by a higher proportion of stone aggregate therefore the variation in aggregate content influences significantly its mechanical properties. As the stone particles are in close contact the applied load is transmitted from particle to particle while the grout is simply held in the interstices. Thus, the mechanical characteristics of the two-stage concrete in failure conditions are dissimilar from the ordinary ones. So far there has been no background information on evaluating the elastic modulus of the two-stage concrete. This paper presents the results of experimental testing of two types of stone aggregate and three different mix proportions of grout. On the basis of these results a relationship between the elastic modulus and the compressive strength of two-stage concrete is statistically elaborated.

Key Words: Aggregate, Compressive strength, Grouting, Modulus of elasticity, Two-stage concrete.

1 INTRODUCTION

High density concrete, may contain high cement, which is characterized by an increase in creep and shrinkage. Because of the high density of aggregates, there will be a noted tendency to segregation. To avoid this, the two-stage method of concreting is adopted.

While concreting the mass structures (of at least 0.5 m in size), in the open air and especially under water in places hard to reach (e.g. in zones of great thickness of reinforcement), and where there is enough stone aggregate, it is useful to apply two-stage concrete [1]. This method is also useful for shielding constructions to prevent radiation hazards [2].

The modulus of elasticity is particularly important from the design point of view in plain or reinforced concrete, since it can describe the concrete mechanical behaviour. The elastic modulus