

EXPERIMENTALLY OBTAINED CONCRETE DESIGN MIXES UTILIZING MATERIALS CHARACTERISTIC OF COCHABAMBA

Francisco Aguirre, Orlando Rojas, Janen I. Calle y Álvaro M. Moscoso

ABSTRACT

With the increase in concrete production due to ongoing expansion of the construction industry in our country, rigorous studies must be undertaken in order to better take advantage of local resources and also to improve understanding with regards to material strength and durability. To address these questions, this paper reports on the study of concrete design mixes materials commonly available in Cochabamba. To start, the percentages of fines and water were varied, to obtain a mortar with adequate cohesion for a given slump. Once de mortar was obtained, three concrete mixes were prepared: one rich, one normal and the last poor in cement. Finally regression analysis was used to develop theoretical expressions relating the concrete strength, water-cement ratio, amount of aggregates and the amount of cement. These relationships were then expressed graphically as concrete design mix curves. These are the diagrams used in the most prestigious companies selling ready-mixed concrete and are typically kept as proprietary information. On the basis of the design mix information obtained experimentally, a concrete mix was prepared for a design strength of 29 MPa after 28 days, and resulted in an average strength of 30.5 MPa during resistance testing.

Keywords: Design Mix Diagrams, Packed Aggregates, Concrete Slump, Porosity.