Quality Control System for Read-Mixed Concrete in Muscat

Nabil Salim Al Bimani

Abstract

The objective of this project is to review and evaluate the quality control systems that exist in the ready mixed concrete companies in Muscat. The quality control system adopted by each company for the materials, fresh and hardened concrete, equipments and technical personnel is assessed. To achieve the objectives of this study, each plant was visited. During these visits, the operations as well as quality control system existing in each plant were observed. In addition to visits, cube samples of different concrete grades were randomly collected at construction sites. The cubes were cured and tested for compressive strength at the age of 28 days at Sultan Qaboos University (SQU) laboratory. Other strength data as well as the quality control system used in the plants were supplied by each ready mix company. A total of 446 cube samples were tested at Sultan Qaboos University and 1172 cube strength results were collected from all the four companies for the different concrete grades. An analysis was carried out to find the statistical parameters for the tested samples as well for the submitted data for each ready mixed concrete company. The quality control system was analyzed by studying the different verification tests and their frequencies were used for each company. The major finding is the discrepancy between results submitted by the companies and the results found from tests carried out by the researcher. It is found in this study that the standard deviation and coefficient of variation for the compressive strength of concrete as submitted by the companies are lower than the statistics found in the study. All the companies satisfy strength requirement as far as the mean strength of concrete is concerned. The standard deviation for the tested samples is between 3.1 and 8.87 N/mm² while for submitted one is between 0.92 and 3.61 N/mm². It is also found that there is no formal independent supervision such as supervision from a government authority. Each company is found to follow its own quality standards, which shows the need to establish a standard even though the strength and workability are maintained. A quality control system for ready mixed concrete in Muscat is proposed, incorporating the existing quality control system in some companies. In addition, the items with quality system which are not properly covered or included are modified and enhanced in order to have a consistent and standardize methods of testing. A recommendation will be to implement a proposed quality control system, with full supervision from an independent authority. The system will regulate the requirement for producing and supplying ready mixed concrete in a freshly mixed and unhardened state.