

ABSTRACT

This document is an experimental study about the applicability of Mudunuru's thermal plant fly ash in concrete and mortars.

Over 70% of the energy generated in India is produced in thermal plant, 90% of which comes from burning coal. Fly ash is a waste of these thermal plants and nowadays is becoming a serious problem due to its accumulation: 100 million tons per year.

The use of fly ash as an addition in mortars and concrete has been greatly proved in several studies. Roman were the first to use ashes in construction, the Colosseum in Rome, for example, was built with ashes from the Vesubius. In spite of this, each case must be studied individually because there are many different types of ashes and their use must be considered only after a proper characterization.

It is therefore a cooperation thesis" the importance of which consists in the characterization of these fly ash and its application in concrete and mortars. The study was performed by reducing the amount of cement while incorporating different quantities of fly ash. The advantages are: first, you may obtain a cheaper mix due to the reduction in cement in a poor country such as India, and second, it solves the problem of the ash accumulation.

The addition of fly ash in cementitious mixes produces a strength development in later ages. Also, because of the ash spherical shape, the workability of the concrete increases without having to add more water. It is also remarkable the fact that the permeability of the concrete will be reduced leading to an enhanced protection against aggressive agents.

For this study, we analyzed first mortars of 20, 30 and 40% by weight reductions in cement adding on each reduction fly ash ranging from 10 to 33%. Once the efficiency of the addition of fly ash in the mix proved and its behavior analyzed, we tried to optimize the mechanical properties in mortars. As a last chapter of this study, we made masonry mortars using the proportions used in India.

Once the first part of the study finished, we went on by studying its use in concrete. To that aim, the last results were extrapolated and then tests were performed to see its durability and mechanical properties.

Since this was a cooperation thesis, the final goal was not only experimental but also social. Hoping that it can be used as a reference manual, we attached a brief conclusion with a table on how to use these fly ash as a construction material.