

# Benefits of Fly Ash

It was mentioned in the previous post titled “Fly Ash in Civil Construction” that fly ash has gradually been proving to be a cornucopia of diverse benefit over the past decades. Since the most important use of fly ash is its utilisation in fly ash cement, some of the salient benefits of this substance – in that particular role of it – are briefly discussed below.

The most prominent one is obviously the economical benefit that automatically comes with the use of fly ash in cement (OPC). This, being a waste by-product, is of no or negligible cost. Thus, replacing a portion of cement with fly ash in cement concrete saves the cost of the cement replaced. Note that cement is the costliest ingredient of a concrete mix. In other words, if 30% (say) of the required cement quantity in a concrete mix can be replaced by fly ash, virtually the entire cost of that 30% cement would be saved as fly ash can be procured free of cost.

Another benefit of its utilisation in concrete is its indirect contribution to the environment. Production of Ordinary Portland Cement (OPC) contributes to greenhouse effect due to substantial emission of carbon di-oxide. The more the use of fly ash in concrete the lesser the production of OPC is, thus the lesser the carbon emission is. So, this ensures lesser contribution to the serious greenhouse problem.

By reducing cement consumption fly ash also contributes to saving valuable energy needed in the production of OPC.

Use of fly ash also has been found to render concrete more chemical & crack resistant and thus more durable.

Fly ash cement concrete gains strength slowly as compared to OPC delaying stripping of formwork and increasing the curing period. But then, fly ash cement concrete achieves higher final strength.

Unlike cement particles fly ash particles have spherical configuration which naturally results in more workable concrete that is easy to pump, place and compact. It also helps in giving superior finish to a freshly poured concrete surface.

Unlike OPC fly ash do not generate any heat of hydration per se. Hence, by reducing the cement consumption it also contributes to the reduction of heat of hydration in concrete. This makes it an excellent candidate for use in mass concrete work such as dams.

While use of fly ash cement is not quite preferred in prestressed concrete and other reinforced concrete work requiring quicker removal of formwork due to its slower gain of strength (than OPC), it has been found to be quite suitable for use in precast concrete as well in pavement concrete.

Use of fly ash in concrete also results in lesser saggregation as well as bleeding.

Use of fly ash in brick making also is beneficial in diverse ways. As compared to conventional clay bricks fly ash bricks are stronger, more durable and yet more economical. Also, the process of fly ash brick manufacturing results in lesser pollution. Being less permeable as compared to clay bricks dampness related issues are far lesser in case of fly ash bricks than their clayey counterparts.

Source: <http://civilconstructionresourcez.wordpress.com/2012/09/25/benefits-of-fly-ash/>