

Technology Fact Sheet for Mitigation
Sector Industry
Sub sector industrial process- cement
Technology: Using Pozzolans in Cement Industry ⁱ

A.1 Introduction

Pozzolan is a material which when combined with calcium hydroxide, exhibits cementitious properties. Pozzolans (the technical term is cement extender), are commonly used as an additive to Portland cement concrete mixture to increase the long term strength and to reduce the material cost of concrete.

Pozzolan is a siliceous or aluminosiliceous material which is highly vitreous. Pozzolans materials can be added to cement to extend its volume without a significant loss of properties. Generally Pozzolans materials do not require pre-processing and therefore can save very significant quantities of energy and lower CO₂ emissions when supplementing regular cement.

Modern use:

Modern pozzolanic cements are a mixture of natural or industrial pozzolans and clinker of Portland cement, the high alkalinity of pozzolans makes it especially resistant to common forms of corrosion from sulphate. Once fully hardened it may be stronger than Portland cement only, due to its lower porosity, which also makes it more resistant to water absorption.

Some laboratory tests were carried out in Italy and industrial testing took place in Africa and India to Pozzolanic Material Activators (PMA's)

Low dosage (LD) of PMA between 300-500g/t

High dosage (HD) of PMA between 800-1200g/t

The results of industrial tests in the Table (1)

Table (1) : Industrial Trials, Pozzolan and fly Ash base cements-strengths MPA

Time	30% of Pozzolana in Africa			26% of Pozzolana in India		
	Blank	LD	HD	Blank	LD	HD
24 hr	12.1	14.8	16.2	14.3	17.4	19.2
2 days	17.5	20.0	22.4	24.7	27.3	29.9
28 days	34.1	38.6	40.1	45.9	50.4	52.0

Source: J. Bogerd, Italy (2011)

A.2 Technology characteristics

The availability of clinker substitutes is sufficient to allow the cement –to- clinker ratio to be reduced to 0.7 globally, theoretically enabling a saving of a further 15 tonnes of thermal energy. The global intensity of cement production could be reduced by 0.9GJ/t of cement produced, with significantly higher saving possible in many countries and regions (IEA2010). As calculated by the IEA2008 in total the savings potential for blended cements amounts to 300 Mt CO₂ to 450 Mt CO₂ by 2050.

A.3 Country specific / applicability

Pozzolana is found in Sudan in Bayoda desert in north Sudan and Darfur in west Sudan. So the technology could easily be applied due to presence of natural material. The Pozzolana

should be grinded and added to clinker after the ignition of lime stone and the added per cent could be 15- 35%. To be applied in building sector

A.4 Status of technology in country

The technology is new and has not been properly introduced in Sudan.

A.5 Barriers

- lack of research to know the specification of type of Pozzolana that exist in Sudan
- lack of awareness within the private sector mainly the cement factories, to use Pozzolana to reduce cost and emission.
- Lack of information regarding its applicability in building in Sudan compared to normal cement.

A.6 Benefits to economic / social and environmental development

This Pozzolanic cement is more environmentally friendly, it reduces GHG emissions and it also reduces the cost of industry.

A.7 Costs

Adding Pozzolana is assumed to reduce the cost in cement industry but exact information was not available

A.8 Others

Generally using Pozzolana will lead to huge saving in terms of costs and CO₂ emissions, thus generating vast opportunities business to create long-term growth in competitive and sustainable setting.

ⁱ This fact sheet has been extracted from TNA Report – Technology Needs Assessment for Climate Change Mitigation - Sudan. You can access the complete report from the TNA project website <http://tech-action.org/>