TECH MANTRA

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Vol. I - No. 4

RR Nagar Cement Plant
Tamilnadu

Jayanthipuram Cement Plant
Andhra Pradesh

Ariyalur Cement Plant
Tamilnadu

Alathiyur Cement Plant
Tamilnadu

TECHNICAL MAGAZINE

MADRAS CEMENTS LTD
RAMCO CEMENT

TECH MANTRA

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Contents **Page No.**

Grateful acknowledgement is made to the following individuals for their assistance in contributing to this issue of TechMantra

Mr. Hingwe & Mr P.M.Ramasubramaniam of Jayanthipuram Plant

Mr Ajit Kumar Paul & Mr Sabyasachi Kabiraj of Kolaghat Unit.

Chairman's Message

Dear Friends

Greetings from Ramco !

At Madras Cements Ltd it has been our motto to achieve perfection in all our endeavors by ensuring excellence, commitment and integrity, to create value for our customers and loyalty to our investors. Armed with a strong conviction we have proved that hard work and focus always pays off.

As part of these efforts recently we have commissioned new cement plants, grinding units & packing terminals at various strategic locations with an objective to further reduce the cycle time of cement supply to various construction projects. Our cement terminal at Kolaghat in West Bengal commissioned during February 2010 will cater to the customers in the eastern part of the country.

We have been propagating good construction practices through our interaction with the construction community.

India as a country is forefront in knowledge but we need to focus on deployment of innovative technology. Continuous evolution of construction technologies encompassing materials, structural systems, construction techniques will enable architects and engineers to accomplish engineering feats. Although all of us are aware of the concept of sustainability but its implementation needs a push from all stakeholders. Sustainability is to be taken seriously and must be made compulsory. Economy, Quality, Progress and Safety remain the four prime factors that need to be kept in mind and weighed accurately while taking decision over the specifications for each component of a structure. Quality and Safety are the two areas often relegated to the bottom rung of priorities. There is a lot of hesitation in switching over to new materials. New techniques, if adopted, can lead to sound and economical structures. Many times the tendency is to earn profits by compromising over the soundness of structural components that get hidden under attractive finishes.

Mason's dictum still prevails in the present era when the construction industry has entered a revolutionary phase. Computer-aided-design, efficient and versatile machinery, highly sophisticated equipment, tons of kinds of concrete, varieties of cement and steel and eco-friendly substitutes to the conventional materials are fast playing a pivotal role in changing the construction scene around the world. Yet, in India, the old and traditional line is being toed. The result is wastage, leakage, cracks, dampness, efflorescence and termite attacks. There is an urgent need of reviewing various practices in vogue and finding right alternatives to them. For fulfilling this objective we call upon all the professionals from the Construction industry to contribute their experiences to TECHMANTRA so that all of us can learn from each other.

Small Innovative steps taken by each construction professional can have a multiplier effect on the Indian Construction Industry.

P.R.RAMASUBRAHMANEYA RAJHA
Chairman & MD

Strength And Durability of Fibre Reinforced HPC Structural Elements - Part 2

(Part 1 of this article was published in our earlier issue No. 3)

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Dept. of Civil Engineering,
National Institute of Technology, Calicut.

5.0 Studies on permeability of SFR – HPC composites

As permeability is an important durability factor, an attempt has been made to study the permeability of High Performance Concrete with and without fibres.

This experimental investigation consists of two phases. In the first phase, the effect of addition of micro-silica on the permeability characteristics of high strength HPC has been investigated, and the optimum dosage of micro-silica to improve its impermeability was found. In the second phase, the effect of addition of both micro-silica and steel fibres on the permeability characteristics of SFR-HPC composites has been investigated.

Experimental Programme

In order to study the permeability characteristics of SFR-HPC composites, a total of 84 numbers of standard cylindrical concrete specimens of 100 mm diameter and 100 mm long were cast using the design mix proportion for both the phases of investigations. The main variables considered are:

For phase I

(i) 5 different percentages of micro-silica, namely, 0.0%, 2.5%, 5.0%, 7.5% and 10.0%

For phase II

(i) 3 different values of aspect ratio of steel fibres, namely, 50, 75 and 100, and

(ii) For each aspect ratio, 3 different volume frac tions of steel fibres, namely, 0.5%, 0.75% and 1.0%.

The details of casting and testing are presented elsewhere [33]

Test Results

Test results obtained for both the phases of investigations are presented in Table 8.

Discussion of Test Results

Since the permeability study has been conducted in two phases (effect of micro-silica in the first phase and effect of steel fibres in the second phase), the results obtained for these two phases of investigations are discussed one by one.

Table 8: Results of permeability test

Phase	Type of concrete	Micro-silic a, (% by weight of cement)	Aspect ratio of fibre	Volume fraction of fibre, %	Co-efficient of permeability, 10^{-10} cm/sec
Phase I	High strength HPC	0.0	0.0	0.0	44.53
	Micro-silica modified high strength HPC	2.5	0.0	0.0	41.15
		5.0	0.0	0.0	25.72
		0.0	0.0	0.0	16.09
		10.0	0.0	0.0	33.55
Phase II	SFR-HPC composites	7.5	50	0.50	12.43
				0.75	9.78
				1.00	8.71
			75	0.50	9.36
				0.75	6.24
				1.00	5.43
			100	0.50	6.93
				0.75	4.80
				1.00	4.27

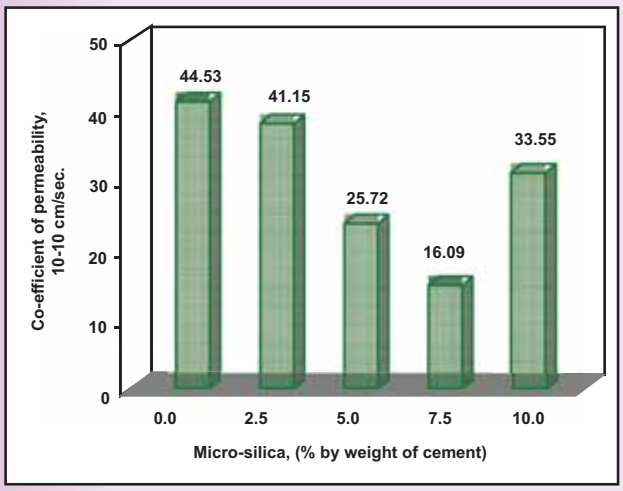

Fig. 17: Variation of co-efficient of permeability with different micro-silica content in concrete

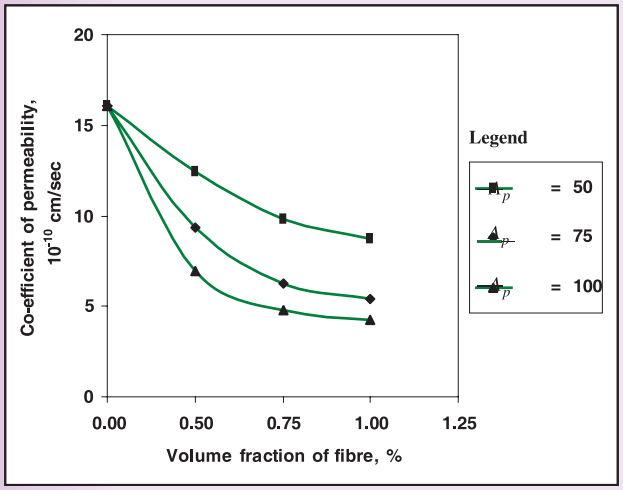

Fig. 18: Plot of co-efficient of permeability Vs volume fraction of fibre

Effect of micro-silica

It can be seen from Table 8 that the addition of micro-silica to the high strength HPC up to a certain level reduces its co-efficient of permeability significantly. When micro-silica is added beyond that level, there is no further reduction in the co-efficient of permeability. The value of co-efficient of permeability of high strength HPC specimens with 7.5 % of micro-silica is 16.09 x 10^{-10} cm/sec. This value is about 63.86 % less when compared to the value obtained for concrete without micro-silica. This indicates that by adding 7.5 % of micro-silica to the high strength HPC, its permeability can be reduced by about 64 %. This reduction in permeability is due to the *filler-effect* and *pozzolanic reaction* achieved due to the addition of micro-silica. These effects reduce the porosity which in turn reduces the permeability of concrete.

It can also be seen from Table 8 that the addition of micro-silica more than 7.5 % does not reduce the co-efficient of permeability further. This is due to the *problems associated with workability* of concrete when the level of addition of micro-silica exceeds 7.5 %. Due to this workability problem, the concrete specimens could not be properly compacted and finished. This might have resulted in large number of entrapped air in the specimens and hence increased the porosity of concrete. This may be the reason for not achieving any further reduction in the values of co-efficient of permeability when the level of addition of micro-silica exceeds 7.5 %.

Effect of steel fibres

From the Table 8, it can be seen that the addition of steel fibres to the micro-silica modified high strength HPC reduces its co-efficient of permeability further. The co-efficient of permeability achieved by adding steel fibres having an aspect ratio of 100 and a volume fraction of 1.0 % was 4.27 x 10^{-10} cm/sec. This value is about 73.46 % less compared to the value obtained for the micro-silica modified high strength HPC, and about 90.41 % less compared to the value obtained for the high strength HPC. This shows that by adding steel fibres to the micro-silica modified concrete, its permeability could be reduced further by about 74 %. Thus, an overall reduction in permeability by as much as 90 % could be achieved by adding both micro-silica and steel fibres to high strength HPC.

Fig. 18 shows the variation of co-efficient of permeability for different volume fractions of fibres. From this figure, it may be noted that for a given aspect ratio of steel fibre (i.e. for given fibre length), the co-efficient of permeability decreases as the volume fraction of fibre (i.e. fibre content) increases. However, the rate of decrease of co-efficient of permeability decreases with increase in fibre content in the concrete. The reduction achieved in permeability with the introduction of steel fibres in concrete may be due to reduction in plastic and drying shrinkage cracks.

Findings

Based on the experimental investigations reported in this chapter, the following conclusions are drawn:

1. Addition of 7.5 % of micro-silica to the high strength HPC reduces its permeability by about 64 % and further addition of steel fibres having an aspect ratio of 100 and a volume fraction of 1.0%, reduces the permeability again by about 74%. Thus, addition of both micro-silica and steel fibres to the high strength HPC reduces its permeability by as much as 90%.

2. For a given aspect ratio of steel fibre, permeability of SFR-HPC composites decreases as the fibre content in the composite increases. The rate of decrease of permeability, however, decreases with increasing fibre content.

Studies on SCC and SFRSCC

The following sections give brief details of investigation carried out on steel fibre reinforced self-compacting concrete and additional details are available elsewhere [34-39].

Strength and behaviour of SFRSCC flexural elements

In order to understand the strength and behaviour of SFRSCC structural elements under flexure, 20 beams of size 100 × 150 × 1200mm were cast, out of which two were plain SCC beams without fibres. The variables in this study were aspect ratio (15, 25 and 35) and percentage of volume fraction (0, 0.25, 0.5 and 0.75) of steel fibres. First crack load and the post cracking behaviour were found to have improved due to the addition of fibres. A marginal improvement in the ultimate strength and a marked improvement in the first crack load were observed. The addition of fibres has enhanced the ductility and toughness significantly. As the models from literature showed discrepancy with the test results in flexure, a model was proposed to evaluate the flexural resistance of SFRSCC. The proposed model is in good agreement with the test results. In addition to this, one of the existing models for conventional SFRC (Swami et al model) was also modified to predict the ultimate moment of steel fibre reinforced SFRSCC beams and the experimental results were comparing satisfactorily with the model. Predictions were also made on the first crack load from first principles. A method was proposed for predicting the spacing and width of cracks. Limit states of serviceability with regard to cracking and deflection were also found for flexure. It was observed that deflection is the limiting criteria for SFRSCC beams in flexure. A model was also proposed for determining the load-deflection behaviour of SFRSCC beams under flexure, which compares satisfactorily with the experimental values.

Strength and behaviour of SFRSCC under shear

In order to understand the strength and behaviour of SFRSCC structural elements under shear, 22 beams of size 100 × 150 × 1200mm were cast. Out of these, two were plain SCC beams without fibres and two were of conventional shear reinforcement. These beams were cast for comparing the shear strength of beams with and without fibres and with stirrups. First crack load and the post cracking behaviour were found to have improved due to the addition of fibres. A marginal improvement in the ultimate strength and a marked improvement in the first crack load were observed. The addition of fibres has enhanced the ductility and toughness significantly. The ultimate shear strength predicted from Ashour et al model compares satisfactorily with the test results. Hundred test results from literature including experimental results of this work were analysed using various models available in literature and a proposed model. It was observed that the proposed model may be used for arriving at the shear strength of SFRSCC as well as SFRC beams based on lower bound prediction such that predicted shear strength is always lower than the experimentally obtained one. It was also observed that conventional stirrups could be replaced with steel fibres for carrying the same load.

Compressive constitutive behaviour of confined SFRSCC

For obtaining the strength and behaviour of SFRSCC compression elements, 14 columns of size 200 × 200 × 1100mm were cast for which the variables were the volumetric ratio of confinement (0.8,1.0 and 1.2%) and the volume fraction of steel fibres (0,0.25,0.5 and 0.75%). Out of these 14 columns, two were cast with the maximum spacing of ties permitted by Indian Standards to study the effect of fibres on very low confinements. The addition of fibres has enhanced the ductility and toughness significantly. Compressive constitutive behaviour of SFRSCC obtained from the model proposed was found to compare satisfactorily with the test results.

Application of SFRSCC to beam-column joints

An attempt has been made to apply SFRSCC to beam column joints to verify the application of SFRSCC to areas of highly congested reinforcements. The variables considered in this study were the volume fraction of steel fibres (0, 0.25, 0.50 and 0.75%). The optimum volume fraction for better performance in terms of strength and ductility was found to be 0.50%. In all the cases, flexural failure of beams occurred which indicate a ductile failure of beam-column joints. The application of SFRSCC was found to ease the situation where congestion of reinforcement was a major problem.

Conclusions

The findings of the above studies indicate that the addition of steel fibres to high performance concrete improve not only the strength characteristics but also the ductility, energy absorption capacity and durability significantly. Hence steel fibre reinforced high performance concrete appears to be a useful composite in the case of structures which are subjected to seismic/ impact/ blast loadings and expose to severe environment. Studies on Steel Fibre Reinforced SCC indicate that additional steel fibres to SCC improve many of the engineering properties of conventional SCC. By using SFRSCC spacing of hoops provided in columns can be increased without reduction in the strength and ductility. This reduces congestion of reinforcement in beam column junctions, which in turn eases the construction difficulties.

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PREVENTING CRACKS IN CONCRETE

Non Structural Cracks

These cracks do not affect the structural stability of structures. However they can be prevented by the following measures:

1. Richer Concrete mix is prone to cracks. Drying shrinkage is higher in case of richer mix. Proper mix proportioning will reduce incidence of cracks in concrete.

2. More the water content, more the shrinkage. Low slump concrete has lesser chance to crack.

3. Accelerators in concrete increase shrinkage thereby increasing cracks

4. Proper curing will prevent quick evaporation of water from the concrete surface. It is important that curing is started immediately after the final setting time of concrete especially during summer seasons.

5. Presence of excessive finer particles in concrete will increase the consumption of water in concrete which increases cracking.

Structural Cracks

Structural cracks are more serious in nature and can be prevented by the following measures:

1. These cracks could occur due to the settlement of formwork during concreting. This settlement may not be detected by the naked eye, hence care needs to be taken to ensure that formwork is stable.

2. Structural cracks may also occur due to inadequate steel reinforcement (as concrete is strong in compression and weak in tension)

About Madras Cements Ltd

Madras Cements Limited the flagship company of the RAMCO GROUP has a manufacturing capacity of 10 million tones per annum.

Cement Plants are located at the following places:

1. **Ramasamy Raja Nagar, Virudhunagar District, Tamil Nadu**
2. **Alathiyur, Ariyalur District, Tamil Nadu**
3. **Govindapuram, Ariyalur District, Tamil Nadu**
4. **Jayanthipuram, Kumarasamy Raja Nagar, Andhra Pradesh**
5. **Mathodu, Chitradurga District, Karnataka**

A view of our Alathiyur Plant in Tamil Nadu

View of Ariyalur Plant in Tamil Nadu

The grinding plants are located at the following places:

1. **Uthiramerur, Kanchipuram District, Tamil Nadu**
2. **Valapady, Salem District, Tamil Nadu**
3. **Kolaghat, Purba Medinipur District, West Bengal**

The Packing plants are located at the following places:

1. **Kumarapuram, Aralvaimozhi, Kanyakumari District, Tamil nadu**
2. **Pochampally Road, Malkapur, Nalgonda District, Andhra Pradesh**

Uthiramerur grinding unit, Kanchipuram District, Tamil Nadu

The only Company in the Indian Cement Industry to win the Four Leaves Award (instituted by Centre for Science & Environment) for leadership in technology and energy efficiency,leadership in point source and fugitive dust control and for leadership in utilization of waste material.

Other awards won by the company includes:

1. National Award for Energy Conservation
   Confederation of Indian Industries
2. Best Energy Efficient Unit
   National Council for Cement and Building Materials
3. Corporate Performance Award
   Economic Times
4. Best Improvement in Energy Performance
   International Congress on Chemistry of Cement
5. The Analyst Award
   The Institute of Chartered Financial Analysts of India
6. Best allround Industrial performance
   Federation of AP Chambers of Commerce & Industries

7. Visvesvariah Industrial Award
   All India Manufacturers Organisation
8. Business Excellence Award
   Industrial Economist
9. Export Performance Award
   CAPEXIL
10. State Safety Awards
    Tamil Nadu & AP Governments
11. Good Industrial Relations Award
    Tamil Nadu & AP Governments
12. Mine Safety Awards
    Government of AP

Ramco Research Development Centre (RRDC)

Facilities at RRDC

Mr. Guptha, HOD along with Engineers from Dept of Civil Engineering, Goa Engineering College visited RRDC to have a look on analytical facilities

Officials from A&AM Corporation, Japan who are the technology supplier for Ramco Industries Ltd., in Calcium Silicate Board manufacturing visited RRDC to have a technical interaction.

A view of our Packing Plant at Kumarapuram, Kanyakumari District, Tamil Nadu

Chemical Studies:

RRDC has the following facilities for chemical studies:

1. Inductively coupled Plasma Spectrometer: Rapid chemical analysis of about seventy five elements in a short time.
2. Bomb Calorimeter for estimating calorific value of various fuels
3. High temperature Furnace to study the burnability of various raw mixes
4. Photometer to study the phosphate content in all raw materials
5. Flame photometer to study the alkali content in all raw materials.

Mineralogical and microstructure studies:

The following are the facilities available for mineralogical and microstructure studies

1. ***X-Ray Diffractometer for understanding*** the mineralogy of materials.
2. ***Differential Thermal Analyser & Thermo Gravimetric Analyser gives*** the thermal changes of materials under heating
3. ***Surface Area Analyser for analyzing materials*** having microporous nature
4. ***Mercury Intrusion Porosimeter (MIP)*** which helps in analyzing the pore size distribution & porosity of blended cements & concrete
5. ***Particle Size Analyzer*** for analyzing particle size distribution of fine materials
6. ***Optical Microscope*** for studying the phase formation of clinker and limestone
7. ***Rapid determination of Chloride Permeability*** for studying the permeability of concrete
8. ***Various instruments fro testing aggregates*** like Crushing Value Apparatus, Length gauge, thickness gauge, density bucket etc
9. ***Non destructive testing instruments*** for concrete like Ultrasonic Instrument, Concrete test hammer, rebar locator Profometer, Water Penetration apparatus etc

Jayanthipuram Cement Plant

Jayanthipuram Cement Plant, located in the Krishna District of Andhra Pradesh has a cement manufacturing capacity of 3.65 million tones per annum.

The Plant since its commissioning in the year 1986 has introduced various technological initiatives some of them which are as follows :

- For Quality Control & Assurance the Plant has state of the art facilities like Optima Blending Control System, Online Cross Belt Analyser (Gama Matrix), X-ray Analyzer, X-ray Defractometer, Alpine Particle Size Analyzer etc
- The Plant is equipped with SF Cooler, Vertical Pregrinding mill with 3 way separator, Ramco Fuzzy Logic System, Rotoscale for Kiln feed weighing system
- For Pollution Control the Plant is equipped with bag house for Pollution Control, facilities for monitoring online ambient air quality, mobile vacuum cleaner, mobile road sweeper

The plant is also equipped with slag mill for the manufacture of Portland Slag Cement.

The Captive Mines of the Plant has obtained several awards in Mines Environmental and Mineral Conservation Week.

CMD & ED(F) with senior officials at Jayanthipuram Plant after paying respects to our revered founder Shri P.A.C.Ramasamy Raja

Ramco Cement In West Bengal

Kolaghat Cement Unit

MADRAS CEMENTS LTD., Kolaghat unit has adopted the latest technology with sophisticated control equipment ensuring consistent-quality of Cement. The unit commenced production on February 2010.

The plant is located in Kolaghat in the district of Purba Medinapur.The Plant is in close proximity to the customers in the states of West Bengal, Assam, Orissa. The facility is well connected by road through NH – 41 & NH -6 & to rail through main Howrah Kharagpur broad gauge line.

Portland Pozzolona Cement is being manufactured from the Plant. The installed Capacity of the plant is about 1 MTPA (Million tones per annum).

Clinker is being ground with gypsum & flyash into a fine powder for the manufacture of Portland pozzolana cement. It is important to obtain a certain specific surface for the finished cement so that hydration can take place and concrete strength develops within a reasonable time. In addition to the specific surface, also the particle size distribution influences the strength properties especially the late strength.

The mill is partitioned with level controlled diaphragm with large centre opening. The diaphragm allows the desired particle size to pass to second chamber resulting better grinding efficiency. Particles which are too coarse to pass the screen are returned back to first chamber for further grinding. The grinding is affected by grinding media. For first chamber, large grinding media from 90 to 60 mm is used. A charge consisting of 50, 40, 30, 25 and 20 mm steel balls is used in second chamber for fine grinding.

At the outlet of the mill, the ground material flows through an outlet grate to the high efficiency separator by mechanical conveyors, for fine separation as grinding system is closed circuit mill. Grinding in close circuit makes it possible to obtain the desirable particle size. Cement produced in closed circuit mill has narrow particle size range and the quantity of 3 to 30 microns fraction is more in comparison to open circuit mill, resulting in to more late strength. The mill ventilation air carries a small portion of the fine material, which is dedusted in Bag filter.

Finished product with separator air is passed through aeroclone where most of the finished product is separated and stored in cement silos with the help of mechanical conveyors.

Cement is stored in two cement silos, extracted, bagged by two electronic rotary packers of capacity 240 TPH each consisting of 16 spouts with an accuracy of +50 gm and -0 gm, and shipped by trucks.

Chairman in conversation with Hon'ble Chief Minister of West Bengal Shri Buddhadeb Bhattacharya at Writers Building, Kolkata

Chairman at our recently commissioned Kolaghat Cement Unit

Cement Testing at Kolaghat Unit

Kolaghat Cement Unit
West Bengal

Workshop on Good Construction Practices at various locations in West Bengal.

Construction Professionals interacting with Technical Services team at Kolkata

A view of the audience at Durgapur

Construction Professionals at Burdwan

From the Business Line dated 25h May 2010

Madras Cements will spend Rs 630 cr to raise capacity

To set up 85 MW captive thermal power unit.
Powering ahead

Decision to go for captive thermal unit to address the high-power cost

The company also has 185.59 MW of wind power generation capacity

Madras Cements Ltd plans to invest Rs 630 crore to expand its cement production capacity.

The company will set up a second unit with a capacity of 2 million tonnes per annum (mtpa) at Ariyalur. This will take its total production capacity to 12.49 mtpa from the present 10.49 mtpa, according to a company release. The expanded capacity will be in place by June 2011. Madras Cements has five cement factories across Tamil Nadu, Andhra Pradesh and Karnataka.

The investment is part of over Rs 940 crore of capital expenditure the company has planned for the current year. It will also invest Rs 310 crore to establish 85 MW of captive thermal power plant capacity. This includes a 60-MW unit at Ariyalur and a 25-MW plant at RR Nagar.

Captive thermal unit

The company officials said that the decision to go for captive thermal unit was to address the high power cost. The prevailing shortage of power in the State resulted in the company using high cost diesel-powered generators. Captive power plants will help bring down the power cost significantly. The company also has 185.59 MW of wind power generation capacity.

Funding will be through internal accruals and bank loans which have been tied up, the official said.

Madras Cements invested Rs 596.27 crore in fixed assets during 2009-10, including adding 4 MW of wind generation capacity. It has also set up a grinding plant of 0.5 mtpa in Kanchipuram District; 0.5 mtpa grinding unit at Salem; and a 0.95-mtpa grinding unit at Kolaghat, West Bengal; and one 120 tonne per hour packing plant each near Hyderabad and Nagercoil. These will facilitate Madras Cements reach its markets more aggressively.

Cement production during the year increased to 80.26 lakh tonnes (lt) against 65.26 lt during the previous year. Sale of cement was higher at 79.54 lt (65.28 lt).

--Business Line dated 25th May 2010

Myths And Realities In Concrete

During our interaction with construction professionals we come across various queries on concrete. Many of such queries are myths, and we are making an attempt to demystify them in order to impart right knowledge on concrete.

No.	Myth	Reality
I	Higher the compressive strength of concrete better is the quality, hence high grade OPC is essential to achieve them.	• Even low grade cements can be used to develop high strength concretes. • Given the same grade of concrete, the concrete made of low grade cement is more durable than that with high grade cement.
II	High grade cements offer higher strength concretes and thus the structures are durable.	• The relation between strength and durability is not linear. • The durability of concrete with high grade cements is hampered due to following technical realities: a) High grade cements are associated with rapid hydration releasing heat and lime rampantly. b) Hydration of high grade cements results in considerable quantities of surplus calcium hydroxide, which either leaches and leave porosity in concrete or creates conducive environment for deleterious chemical reactions with pollutants if left in the concrete matrix. c) High heat of hydration results in micro cracking causing harm to the durability.
III	Higher the quantity of cement (OPC), higher the strength and, in turn, higher the durability.	• Higher the input of OPC higher the heat of hydration and higher the lime leaching, hampering the durability. • It is not the quantity of cement (OPC) but the quantity of cementitious input that decides the durability. • Strength achieved through controlling the water cement ratio is more desirable than increasing the cement content. • By properly selecting materials, proportioning the mix and using compatible chemical admixtures (plasticisers and superplasticisers), high grade concrete can comfortably be designed, simultaneously protecting the durability of concrete.
IV	Residential construction requires concrete with high compressive strength like M40 grade etc.	• Residential construction does not require high grade concrete unless and otherwise specified. • General requirement is concrete of M20 grade and certain structural members like beams and columns could be of M25, M30 grade concrete. • In the construction of high rise buildings concrete high grade may be required and it needs to be specially designed keeping in view various requirements of construction practices.
V	Use of blending materials like fly ash is not needed in concrete	• Blending of fly ash in concrete is very much essential because it converts the surplus Ca(OH)2 into strength rendering mineralogy through pozzolanic reactions. • The most economical route to enhance durability in concrete is through the blending materials like fly ash and GGBS in concrete
VI	Fly ash is inert and does not enhance any of the properties in concrete.	• Fly ash is not inert but has dormant pozzolanic characteristic that gets activated to chemically react with calcium hydroxide, in the presence of moisture at ordinary temperatures, to form compounds possessing cementitious properties. • The reactive silica and alumina of fly ash react with surplus calcium hydroxide in cement matrix, thereby densifying the cement gel. • The densified cement gel makes the cement paste impermeable thereby enhancing durability of concrete. • Fly ash plays two roles in concrete: reactive portion participates in the pozzolanic chemistry contributing for secondary mineralogy and coarse and crystallineportion acts like micro aggregate filling the pores. Both these phenomena contribute for impermeability of concrete eventually helping to enhance the durability of concrete.

Collaboration with Construction Professionals: Major Events

Construction Professionals from Chengelpet, Tamil Nadu

Construction Professionals of Chengelpet along with members of **Chengelpet Licensed Surveyors Association** visited our RRDC to discuss about various perspectives on Cement and Concrete.

MES (Military Engineering Services) Meeting at Bangalore

All India MES Council Meet was held at Bangalore where in the Bangalore team of Madras Cements Ltd participated.

Additional Director General – DRDO unveiling MES diary during the All India MES Council Meet. Also seen along with him is GM- Mktg, Madras Cements Ltd

The stall set up during the MES Council Meeting at Bangalore

Redecon – 2010 Meet at Bangalore

Redecon 2010 organised by Association of Consulting Civil Engineers was held at Banglaore in which there was active participation by Madras Cements Ltd. Ramco Dry Mix range of products were also exhibited during the event.

Ramco Cements/Dry Mix Stall during REDECON 2010

Construction Professionals from Mallapuram, Kerala visited our Alathiyur factory in Tamil Nadu.

Alathiyur Plant : Visit of Construction professionals from Mallapuram, Kerala

Shri Madan Mohan – Senior General Manager, Madras Cements Ltd inviting construction professionals from Malapuram to our factory at Alathiyur.

IIT Madras – CEA Fest ' 10

IIT Madras & Civil Engineering Association organized CEA Fest, an annual technical event in which the budding Civil Engineering Professionals from various Engineering Colleges participated. Technical Services personnel of Chennai from Madras Cements Ltd participated in the event.

Civil Engineering Students of IIT, Madras at the stall of Ramco Cement during CEA Fest' 10

Tiruvallur Engineers visit to RRDC

Engineers from Tiruvallur visited our RRDC & interacted with our scientists of the Research centre

Engineers from Tiruvallur during their visit to RRDC

Construction professionals from Tiruvallur during the technical presentation at RRDC

Engineers from Mahindra World City, Chennai

Engineers from Mahindra World City visited our RRDC for discussion on various aspects of Cement & Concrete

Engineers from Mahindra World City during their visit to RRDC

Various Types of Cements

Type of Cement	IS Code
33 Grade Ordinary Portland Cement	IS 269
43 Grade Ordinary Portland Cement	IS 8112
53 Grade Ordinary Portland Cement	IS 12269
Rapid Hardening Portland Cement	IS 8041
Portland Slag Cement	IS 455
Portland Pozzolana Cement (Flyash Based)	IS 1489 : Part 1
Portland Pozzolana Cement (Calcined Clay Based)	IS 1489 : Part 2
Hydrophobic Cement	IS 8043
Low Heat Portland Cement	IS 12600
Sulphate Resisting Portland Cement	IS 12330
Masonry Cement	IS 3466

Ramco Cement & Dry Mix Range of Products
Major Projects & Customers

M/s Jain Housing, Chennai

M/s Jain Housing has used our Dry mix range of Products for their project "Jain Nakshatra" at Chennai

Project : Jain Nakshatra

Dry Mix Products used : Ramco Super Plaster Plastering Compound
Ramco Super Fine white cement based putty

M/s Akshaya Private Limited, Chennai

For their project at Chennai they have been associated with Madras Cements Ltd for dry mix range of products

Builder : M/s Akshaya Private Limited

Project : Metropolis

Architect : M/s Ashwin Alva Associates

Dry Mix Products used : Ramco Super Plaster Plastering Compound

M/s Shri Krishna Builders, Chennai

M/s Shri Krishna Builders, a reputed builder based at Chennai has been using our Dry Mix range of products for their project at Chennai

Builder : Shri Krishna Associates

Project : Madura Gardens

Architect : M/s Santosh Associates

Dry Mix Products used : Ramco Super Plaster Plastering Compound

Hygreeva Enclave

Project Name	:	Hygreeva enclave
Project Location	:	Khammam, AP
Project Cost	:	4.00 crores
Propreitor	:	K.Anjali
Structural Engineer	:	Balaji Engineers
Architect	:	PRV Prasada Rao
Cement used	:	Ramco Cement

Pavan Sai Cold Storage, A.P.

Pavan Sai Cold Storage in Khammam has used RAMCO Cement for their project

Project	: Pavan Sai Cold Storage
Location	: Madhira, Khammam
Cost	: 4.50 crores
Propreitor	: V.Surendar
Structural Engineer/Architect	: Vashista Architects K.Panakalu

Mehala Carona Spinning & Ginning, A.P.

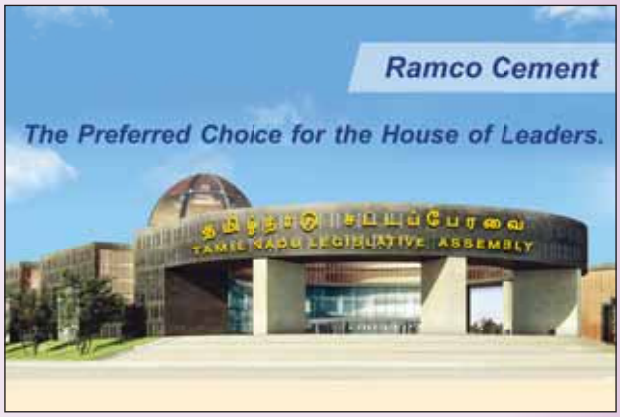
Project	: Mehala Carona Spinning & Ginning
Location	: Boyapalem, Guntur Dist, AP
Cost	: 10 Crores
Contractor	: Murali
Structural Engineers / Architect	: Kumaravelu
Cement used	: Ramco Cement

Water Theme Project, Kerala

Ramco Cement is being exclusively used for the water theme project coming up in North Kerala.

Tamil Nadu Assembly & Secretariat Building Complex

We are privileged to be associated with Secretariat Building Complex as one of the major cement supplier.



The state of the art green architecture in the heart of Chennai - Secretariat Building

Ruchi Realty Holdings Ltd is executing a Project – Active Acres in **Kolkata.** The project costing about Rs 200 crores is being executed by Ahluwalia Contracts (India) Ltd. Ramco Cement is being used in the project.

Working Safely with Concrete

(From the website of Portland Cement Association)
http://www.cement.org

Concrete is easy to work with, versatile, durable, and economical. By observing a few basic precautions, it is also safe-one of the safest building materials known. Over the years, relatively few people involved in mixing, handling, and finishing concrete have experienced injury. Outlined below are some simple suggestions-protection, prevention, common sense precautions-useful to anyone working with portland cement and concrete.

The jobsite should be adequately marked to warn the public of construction activities. Fences, barricades, and warning signs can be used to restrict public access. And the work area should be kept clean and uncluttered to minimize hazards to workers. Remember: safety is the job of everyone onsite.

Protect Your Head and Eyes

Construction equipment and tools represent constant potential hazards to busy construction personnel. That's why hard hats are required on construction projects. It is therefore recommended that some sort of head protection, such as a hard hat or safety hat, be worn when working any construction job, large or small.

Proper eye protection is essential when working with cement or concrete. Eyes are particularly vulnerable to blowing dust, splattering concrete, and other foreign objects. On some jobs it may be advisable to wear full-cover goggles or safety glasses with side shields. Remember that sight is precious. Protect the head and eyes by using proper safety equipment and remaining alert.

Protect Your Back

All materials used to make concrete-portland cement, coarse aggregate, sand, and water-can be quite heavy even in small quantities. When lifting heavy materials, your back should be straight, legs bent, and the weight between your legs as close to the body as possible. Do not twist at the waist while lifting or carrying these items. Rather than straining your back with a heavy load, get help. Remember to use your head, not your back.

Let mechanical equipment work to your advantage

by placing concrete as close as possible to its final position. After the concrete is deposited in the desired area by chute, pump, or wheelbarrow, it should be pushed-not lifted-into final position with a shovel. A short-handled, square-end shovel is an effective tool for spreading concrete, but special concrete rakes or come-alongs also can be used. Excessive horizontal movement of the concrete not only requires extra effort, but may also lead to segregation of the concrete ingredients.

Avoid actions that cause dust to become airborne. Local or general ventilation can control exposures below applicable exposure limits; respirators may be used in poorly ventilated areas, where exposure limits are exceeded, or when dust causes discomfort or irritation. Avoid prolonged exposure to dust.

Protect Your Skin

When working with fresh concrete, care should be taken to avoid skin irritation or chemical burns. Prolonged contact between fresh concrete and skin surfaces, eyes, and clothing may result in burns that are quite severe, including third-degree burns. If irritation persists consult a physician. For deep burns or large affected skin areas, seek medical attention immediately.

The A-B-Cs of fresh concrete's effect on skin are:

Abrasive Sand contained in fresh concrete is abrasive to bare skin.

Basic & Portland cement is alkaline in nature, so wet

Caustic concrete and other cement mixtures are strongly basic (pH of 12 to 13). Strong bases-like strong acids-are harmful, or caustic to skin.

Drying Portland cement is hygroscopic-it absorbs water. In fact, portland cement needs water to harden. It will draw water away from any material it contacts-including skin.

Clothing worn as protection from fresh concrete should not be allowed to become saturated with moisture from fresh concrete because saturated clothing can transmit alkaline or hygroscopic effects to the skin.

Waterproof gloves, a long-sleeved shirt, and long pants should be worn. If you must stand in fresh concrete while it is being placed, screeded, or floated, wear rubber boots high enough to prevent concrete from getting into them.

The best way to avoid skin irritation is to wash frequently with pH neutral soap and clean water.

Placing and Finishing

Waterproof pads should be used between fresh concrete surfaces and knees, elbows, hands, etc., to protect the body during finishing operations. Eyes and

skin that come in contact with fresh concrete should be flushed thoroughly with clean water. Clothing that becomes saturated from contact with fresh concrete should be rinsed out promptly with clear water to prevent

continued contact with skin surfaces. For persistent or severe discomfort, consult a physician.

When working with fresh concrete, begin each day by wearing clean clothing and conclude the day with a bath or shower.

Source :Website of Portland Cement Association

Mobile Van Services

For fixing an appointment on Mobile Van Services relating to Concrete please contact our Civil Engineers of Technical Services Department at the contact numbers given below.

Kerala

Ernakulam : Er. Sreenidh :
Mobile No. 9447956705

Andhra Pradesh

Hyderabad : Er. Srinivasa Rao :
Mobile No. 9849912321

Tamil Nadu

1. Chennai : Er. Bilal/ Er. Shankar : 9500052416/ 9500052413
2. Villupuram : Er. Karthikeyan : 9445006885
3. Madurai : Er. MuthuGanesh : 9442642340
4. Trichy : Er. Athimoolam : 9629099067
5. Salem : Er. Chidambaram : 9629701194

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Articles in soft copy can be sent to akp@madrascements.co.in

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