Holtec Consulting

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Virender K Batra, Dy Managing Director, Holtec Consulting Pvt Ltd shares his views with **Sandeep Sharma** about his company and services offered cement plant life cycle, pricing, new technology, energy efficiency measures, industry response, challenges faced, verticals and geographies, sector outlook, expansion plans. Edited Excerpts...

Tell us about Holtec Consulting, services offered to the cement sector and your core competencies?

Holtec, incorporated in 1967, is an ISO-certified, international engineering & management consulting company, uniquely positioned to service the entire range of consulting needs of the global cement industry. In addition to its cement coverage, the company also provides services to sectors such as Captive Power, Highways & Bridges and Structural Steel Detailing.

Holtec Consulting's services cover all three phases in the life cycle of the industry.

- Services in the Project Generation Phase include Country Studies, Investment Opportunity Studies, Due Diligence Assignments, Databasing Services, Strategic Location Services, Geological/ Geo-Technical/ Hydrological Investigations, Feasibility Studies, Market Studies, Manpower Planning, Environmental Studies, Execution Planning, Finance Facilitation, etc.
- Services in the Project Implementation Phase include Computer Aided Deposit Evaluation & Mines Development, Basic Engineering, Equipment & Service Procurement, Detailed Engineering (spanning Civil/ Structural, Mechanical, Process, Electrical, C&I, Captive Power Plant & Waste Heat Recovery Systems, etc), Contract & Project/ Construction Management, Inspection, Commissioning, Market Entry strategies, MIS development, etc.
- Services in the Operations Phase including Technical Audits, Benchmarking, Performance Enhancement, Asset & Resource Management, Waste Utilization, Business Consulting (covering Markets, Human Resources, Information, etc), Civil/ Structural Assessment, Plant Operations & Maintenance (O&M), Asset Management, etc.

Holtec's ensemble of over 800 clients includes cement manufacturers, equipment & service providers, infrastructure developers, funding bodies, research institutes, etc in over 80 countries. Since its inception, Holtec has delivered significant value to its clientele by executing over 3,600 multi-functional consulting assignments through its highly qualified staff with over 6,400 man-years of rich experience, through its Indian and overseas operations.

Would you take us through the cement plant lifecycle? Where does your role start in this process?

The cement plant lifecycle can be broken into 3 phases, viz., Project Generation Phase, Project Implementation Phase and Operations Phase.

Our role starts when a owner starts their planning process to set up a cement plant, expand through the engineering & construction phase and extends to plant commissioning, commercial production, O&M as well as optimization of operations throughout its life.

TECHNOLOGICAL DEVELOPMENTS IN THE CEMENT INDUSTRY

Developments in Unit Operations

- Mining: Increasing use of surface miners wherever suitable; utilization of marginal grade limestone by multi-screening to reduce silica and adding calcareous industrial waste for enriching lime; improved drilling & blasting operations through better drilling geometry and explosive technology; choice of larger and more fuel efficient mining & transport equipment, etc.
- Crushing: Utilization of larger crushers capable of handling 1.5 m x 1.5 m boulder sizes; throughputs exceeding 2000 tph for a product size of 75 mm which is acceptable to technologically advanced, raw grinding systems downstream.
- Raw Grinding: Adoption of larger (motor sizes ~ 7000 KW) and more energy efficient VRMs, with capacities up to 750 tph, with longer roller/ table lives and improved material bed development; throughput augmentation through higher residues acceptable by technologically advanced, pyro processing equipment. In recent times, projects have been offered individually powered, 6-roller (motor sizes, 6 x1400 KW), VRMs which could achieve grinding capacities up to 750-800 tph.

Pyroprocessing:

- Pre-heaters: 6-stage, twin string pre-heaters with clinkering capacities up to 10,0000-12000 tpd; increased cyclone efficiency from 92 - 96%; reduction in l/d ratio in cyclones resulting in a pressure drop reduction from 700 to 450 mm WG and a tower height reduction of 10 m; reduction in the total air requirement from 1.6 to 1.45 Nm3/ kg clinker; improvement in fan efficiencies from 72 - 80%.
- Pre-calciners: Degree of calcination pegged at 94% to prevent the onset of liquid phase; calciner to kiln fuel ratio of 70:30; increased residence time from 2 to 5 seconds to improve combustion efficiency of fuel mix would result in more acceptable NOx values.
- Kilns: Redefinition of operating parameters - volumetric loadings upto 6.0 tpd/ m3, thermal loadings upto 5.5 Gcal/ m2/ kg clinker, filling % of 14-16 and kiln speeds upto 5.5 rpm; low primary air, multi-channel burners using sophisticated weighing systems; better refractory life through use of improved refractory technology and greater raw material homogeneity & controlled burning conditions; raw mix compositions are also undergoing a change with induction furnace produced slag being used to the extent of 8% and high carbon fly ash.
- Coolers: Increased adoption of new generation (e.g. Cross Bar/ Pendulam/ “walking-floor”) coolers resulting in increased cooler efficiency from 68-72%, a drop in air requirement from 1.8 to 1.6 Nm3/ kg clinker, a temperature increase of secondary/ tertiary air to 1,000 ºC, increase in cooler loading to 45 t/ m2 and significantly reduced installation time by about 20%.
- Finish Grinding: In view of their overall cost (capital and operating) effectiveness, large VRMs, with grinding capacities upto 325-350 tph for Pozzolanic Cements ground at 3,500 Blaine, seem to be the flavour of the new decade.Technology developments, including metallurgical interventions for reducing wear rates, formation of stabilized clinker beds, etc, seem to have helped their cause. The use of Roll Presses has also received a fillip, particularly after the improvements effected in the material quality of liners giving a life of 14000 hrs.
- Packing & Despatch: To meet increased demands, increased adoption of 240 tph, twin discharge, 16 spout packers; to address variable market demands and despatch modes of rail/road, flexibility in the despatch section are being significantly enhanced through appropriate automation. Adoption of Bag Applicators and auto truck loaders as well as highly mechanized wagon loading systems to achieve 4 hour loading of entire rake are being increasingly adopted by Indian plants.

Developments in Other areas of Plant Technology & Operation

- Automation, Instrumentation & Plant Control Systems aimed at reducing human intervention, automated maintenance and better process measurement & control including use of automated sample transport and Robo Lab. This includes new technologies such as intelligent MCCs, serial bus architecture, satellite communications, etc.
- Material Handling Systems targeted towards achieving higher capacity, smaller area requirements and lower wear rates. The latest developments in this area include bulk rapid loading systems for coal, clinker etc as well as use of captive jetties for coastal transport to optimize freight costs.
- Integrated Quality Assurance Systems to ensure alignment to International Standards such as EN-197; market demands for higher 1-day strengths (by interventions in C3S and product fineness), quicker initial setting (through C3A and gypsum interventions), darker product colour (intervention in C4AF and minor constituents), etc are assuming increased importance. Increase use of Cross Belt analysers for coal as well as raw materials is also a step in this direction, with increasing sizes of the plants.
- Operations Research and Statistical Tools are being increasingly used in optimizing logistical applications such as the management of vehicle queues (seen mainly in limestone transport and cement despatch), transportation/ transshipment operations, etc.
- Significant interventions are being made in equipment choice, maintenance practices, materials’ management and other associated systems, targeted at enhancing plant/ equipment availability; larger plant/ equipment sizes and the consequent high opportunity cost of downtime are drivers that are enhancing the relevance of such interventions.
- With environmental norms getting more stringent technology development & acquisition are being harnesses to keep pace; e.g. possible lowering of dust emission norms, from 50 mg/ Nm3 to 10 mg/ Nm3 are resulting in the increased adoption of hybrid filters; the pressure to reduce CO2 emission are unleashing a variety of clean technologies & practices such as cogeneration of power using waste heat, incineration in cement kilns of waste materials to meet the dual objectives of waste disposal & cost reduction, separation of CO2 from kiln exhaust gas and its utilisation in value products, etc. Other latest initiative in this direction have been use of continuous online pollution monitoring system directly connected to the computers of CPCB; and use of measures for monitoring and controlling of Sox.
- Energy efficiencies: A variety of technological initiatives, targeted towards effecting significant improvements in energy consumption are underway. As against current “best” values of 680 kcal/ kg clinker and 65-70 kwh/ t of blended cement, these initiatives are expected to result in thermal energy consumption dropping to 665 kcal/ kg clinker and electric energy consumption to about 60 kwh/ t of blended cement.
- Alternate fuels: while lignite, pet coke, automobile tyres, baggasse, rice husk, etc have been around for some time now, several plants are already using/ currently investigating hospital refuse and municipal waste as workable alternatives.

How far you are active in the O&M segment of cement plants in India?

Indian cement industry generally believes in self-operation, primarily due to availability of local skills for O&M of cement plant. Outsourcing of O&M is prevalent in a number of West Asian countries where local skills & labour for cement plant O&M is not available and they need to get it from other countries like, India, Pakistan, Egypt, Philippines, Sri Lanka etc. We have been involved in O&M for a 6,000 tpd cement plant and a split Grinding unit in Saudi Arabia for over 4 years and are pursuing similar opportunities elsewhere.

Based on your price forecasting model, where do you see retail prices of cement heading in the near to medium term and why?

With lower capacity utilizations and rising operating costs, the current sales revenue is generally just about adequate for a cement player to cash break-even. The next year would continue to see lower capacity utilizations, possibly in the sub-80% range. This could create a downward pressure on price. On the other hand, cost pressures, particularly those for process and transport fuel, are expected to escalate, and will in turn, exert upward pressure. Thus, there is a likelihood of prices increasing marginally in order for the higher leveraged companies to sustain operations. Despite the marginal price increase envisaged, EBIDTA % could still come under some pressure, especially for companies who have not invested in cost optimization initiatives.

What's your take on the level of technology being adopted by Cement producers in India?

In our view, technology, by itself, is meaningless in the context of adding value. It is its customized application, in a specific environment, that actually determines its success. Thus, while a particular technology can add immense value in a specific situation a competing alternative may be more suitable in another. Other than the physical benefits derived through the use of a particular technology, its cost-effectiveness, the intrinsic capability of the client to harness/use it effectively and a host of other criteria determine its actual appropriateness. At the same time, we can proudly say that in terms of technology, the Indian cement industry deploys the best of the technologies available and in many cases has been in the forefront to adopt latest technologies. This is reflected in terms of energy consumption, kiln productivity, operating hours/year, pollution control levels, etc.

What kind of energy efficiency measures do you recommend to your clients in India? In percentage terms, what can be the overall savings in production cost?

Energy costs in India are one of the highest in the world. The Indian cement industry has always been at the forefront to adopt energy conservation measures. Holtec has always initiated practices to assist the Industry in adopting following measures:

- Energy efficient crushing and grinding systems
- Energy efficient Pyro systems
- Energy efficient material conveying systems
- Use of High efficiency motors and fans
- Production of higher percentage of blended cements

Latest efforts in this direction have been to install Waste heat recovery based power plants that could meet upto 25% of the power requirements of an integrated plant. Holtec has also been involved in execution of over 15 projects in India and another 5 outside India.

How is the industry response to your solutions and services? Please share with us details of your role in some of the prestigious cement plants in India.

Having been associated with creation of over 270 mio t/a of cement capacity in India as well as in 24 other countries through our full range of project consulting services from concept to commissioning, we lead any other Indian or international consultant. This is apart from over 3,500 other individual service assignments that we have executed to date in India and 84 other countries, for over 800 clients including bilateral and multilateral funding institutions. This achievement itself reflects the faith of the industry in Holtec's holistic approach to solutions and their continued association with us.

In India, we have worked with almost every cement group with repeat business coming in from major players like Jaiprakash Group, UltraTech, Dalmia Group, Holcim, Lafarge etc. For instance, we have been associated with the Jaypee group since their first entry into the cement industry till now in creation of nearly 40 mio t/a of capacity, including those projects which are currently under execution.

Which are the verticals and geographies most likely to drive demand for cement in the near and medium term?

Cement demand is primary from three segments:

1) Housing 2) Infrastructure, and 3) Industries

While the housing demand continues to grow at more or less steady pace, it is the second and third sectors that get largely influenced by economic sentiments and government policies. Factors that could contribute to growth of cement demand could be:

- Stable Political leadership with clear focus on growth
- Clear sectoral growth policies leading to long term investment planning by players in industrial and infrastructure areas
- Development of our rural areas bringing growth and employment opportunities closer to rural population
- Development of large numbers of growth nuclei to arrest migration of population from rural areas to already congested cities and thereby creation of infrastructure near the new centres

What kind of role do you see for the Government to boost demand for cement?

At a general level, the industry would like stable economic policies, rationalizing of taxation and lowering of interest rates leading to positive growth sentiments and increase in GDP, GFCF and thereby construction related investment. This would enable the industry to systematically plan its capacity expansions and focus on ways to meet cement demand.

At an industry level, cogent policies to own mines & coals blocks, as also those associated with land acquisition, are desired. This would ease the setting up of cement plants within acceptable gestation periods, generate acceptable returns to stakeholders and keep debt related cash outflows low – in turn, influencing cement prices downwards.

CHALLENGES FACED BY INDIAN CEMENT INDUSTRY

The coming years would continue to pose various kinds of challenges on the cement industry. Some of these along with their possible mitigation measures are:

- Dwindling of natural resources is a serious cause for concern. Among these, limestone, fossil fuel and water, if not conserved, could definitely inhibit the long-term growth of the industry. The onus of conservation, till now, has generally been technology-based and, therefore, largely driven by equipment suppliers. Wasteful practices need much higher attention and cement producers must pick up the baton on directly arresting these in the course of normal operations. With the life of cement grade limestone reserves being limited to the next 40 years or so, initiatives to use poorer grades appear imminent; despite conventional wisdom, high quality limestone imports are, possibly, inevitable.
- Cost reduction imperatives would remain a dominant concern over the next 2-3 fiscals during which price pressures are expected to prevail. Till now, performance enhancement initiatives have largely been directed towards addressing energy efficiencies, equipment availability and input material costs.
  - Adequate attention has, only been recently directed at one of the largest components of delivered cost, viz. input & output freight. The benefit of addressing this is particularly high in countries with a large geographic area and low consumption density (tons consumed per sq km of area). An analysis of the components of the final delivered cost of cement shows that 40% is constituted by production costs, 25% by the transport costs of inputs & outputs and 35% by direct & indirect taxes. Optimization of transportation logistics, spanning modes, nodes and routes, is thus an area deserving a higher degree of focused attention.
  - The potential for reducing costs in non-equipment related domains, e.g. material inventories, consumable consumption rates & tariffs, financial expenses, etc. has still not been adequately harnessed.
- Given the exponential growth in cement capacity, a shortage of skills is being incessantly faced. Initiatives that need greater attention include:
  - Lower human dependency through increasing automation as well as creating and nurturing outsourcing options
  - Training and exposure to operations in more developed economies.
  - Modifications in operating practices targeted towards reducing headcount.
- Given the acute shortage of domestic coal and the increase in costs in imported coal, alternate fuels would continue to receive enhanced attention and could provide 7-10 % of the total thermal fuel requirements by FY 2015-16. The usage of gas, especially in plants enjoying logistical proximity to gas resources, could well become a reality. While Greenfield plants would setup captive power plants to ensure reliable power supply, the existing plans would consider use of alternative fuels and also installation of Waste Heat Recovery systems to keep costs under control.
- With pre-project activities, such as land acquisition and statutory clearances, being expected to consume more time, the gestation period in the future is likely to be in the range of 5-7 years. Industry players could attempt to bring down actual construction time by employing more steel in civil engineering structures.

A regulatory body to ensure adherence to Indian Standards by all concrete producers (commercial and captive) would help the industry to ensure quality concrete is made available to all end users. With such an intervention, the industry could then further educate its customers on concrete production and usage. Malpractices followed by small-scale concrete producers would come to an end and prices narrow down within an acceptable band. This could impel more cement producers to forward integrate into the RMC industry and serve their customers better.

Can you comment on the Cement Sector Outook for FY2013-14?

Cement consumption is expected to sustain in the range of 7%-8%, taking estimated cement consumption in FY 2013 from around 255 mio t to 270-280 mio t in FY 2014.

There is also a strong likelihood of players announcing Greenfield capacity additions, in order to ensure plants are operational by the time cement consumption overtakes capacity (around FY 2019). Possible pre-conditions for these announcements to be translated into action would include a lowering of interest rates and expeditious action on statutory clearances. The likelihood of Private Equity Firms playing a higher role to fund specific cash-strapped companies would increase. M&A activities are also likely to accelerate, particularly with larger cement players having an opportunity to acquire plants under financial pressures. Capacities may go through exchange of ownership.

On the technology front, efforts to utilise Alternative Fuels and install Waste Heat Recovery are initiatives which are likely to become much more widespread.

Going forward, what are your immediate and long term plans for expansion in India?

We will strive to continue supporting the cement industry by leveraging our large global experience to deliver world-class services across the entire cement plant lifecycle that are required to meet the unique challenges of the Indian industry. We expect to constantly improve the quality, integration and breadth of our services to offer the best value-proposition to our customers. We also intend to work closely with the industry to increase operating efficiencies, lower operating costs, find alternatives to traditional fuel (coal), set up waste heat recovery systems, etc., all areas where our global experience in improving the efficiency of plants will enable us to provide more holistic and creative solutions to improve the Indian Cement Industry's bottom-line.