"Advanced pyro processing systems have great role for upgrade and new plants."

Kamal Kumar,
Chief General Manager, Holtec

In the present situation, it is better to exploit the available inherent potential in the design margins. Use of composite construction method can reduce time and cost. **Kamal Kumar, Chief General Manager, Holtec,** in conversation with ICR, elaborates on some of the recent developments in pyro processing. Excerpts from the interview...

How do you assess the scope of upgrade in pyro-processing system and potential from new plants in cement industry?

The current economic crisis restricts a manufacturer from big investments in plant. In such a situation, minor investments in retrofit projects and associated short down time to improve the plant operational efficiency gives techno-economic benefits. In retrofitting projects, while upgrading the plant capacity, we proceed to exploiting the available inherent potential in the design margins. In view of this, keeping energy and environment as main target, a potential for advanced pyro processing systems have great role both for upgrade and new plants.

Could you also brief us on the control and optimisation systems offered?

Automation, instrumentation and plant control systems aimed at reducing human intervention, automated maintenance (eg, lubrication) and better process measurement control are the major systems used. This includes new technologies such as intelligent MCCs, serial bus architecture, satellite communications, etc.

A significant portion of the energy requirement can be sourced through utilisation of waste heat from the pre-heater and cooler. What is the scenario in this regard? To what extent the industry is moving toward this direction? And what are the challenges involved?

Waste Heat Recovery (WHR) systems appear to be gaining increasing favour not only in Indian cement industry, but also those in the MENA countries. By providing an avenue for recuperating heat (which would, otherwise, have been lost) and converting it to electrical energy, it reduces the requirement of power from a state-owned utility/captive power plant being conceived/installed at the unit. With consultants such as Holtec offering integrating services including process know how, and several suppliers offering cost-effective and reliable equipment, the number of WHR installations are expected to grow exponentially in the coming few years.

Many a times, a major challenge seems to be an incorrect cost benefit analysis which sometimes leads to huge unexpected cost for the client. What is your take on this? What are the challenges and how these can be overcome?

Normally, if systematic study based on strong and reliable data

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base is done, such a situation would not happen.

What are challenges involved in civil design, especially setting up 6-stage pre-heaters etc?

Considering relatively cheaper and easily available workforce in India, the cement plants still opt for reinforced cement concrete (RCC) construction for the pre-heaters as against the preference for structural steel or composite construction preferred in many other parts of the globe. A pre-heater structure, being the tallest structure in a cement plant, witness maximum construction time period, and are the highest in terms of construction costs as well.

With plant capacities going higher and higher in terms of tonne per day production (8,000 tpd and above), the plan areas and heights of the pre-heater structures have undergone significant increase over the last two decades. The design of six-stage, double-string pre-heaters involves a plan area of more than 1,000 sq m (about 50 x 20 m) and heights of the order of 140 m or so with respect to the average finished floor levels.

The crucial factor for designing these structures calls for optimised results in terms of total concrete volumes (cu m), reinforcement factors (kg per cu m of concrete) and modern execution techniques to minimise the construction time, which in turn, can guide the overall execution period of an entire cement project. Use of modern and mechanised construction practices like slipforming (sliding forms) for the columns, composite slab techniques for the intermediate and roof slabs, etc, help reducing the construction timeframe.

What is the acceptance level for these advanced technology systems from the cement producers? What do you think the major challenges?

With environmental norms getting more stringent, technology development and acquisition are being harnessed to keep pace; e.g., possible lowering of dust emission norms from 50 mg/Nm^3 to 10 mg/Nm^3 is resulting in the increased adoption of hybrid filters. The pressure to reduce CO_2 emission are unleashing a variety of clean technologies and practices such as cogeneration of power using waste heat, incineration in cement kilns of waste materials to meet the dual objectives of waste disposal and cost reduction, separation of CO_2 from kiln exhaust gas and its utilisation in value products, etc.

Energy efficiencies: A variety of technological initiatives, targeted towards effecting significant improvements in energy consumption is underway. As against the 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 660-665 kcal/kg clinker and electric energy consumption to about 60 kWh/t of blended cement.

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Could you shed some light on the areas which need to be focused?

The main areas to be focused are:

Crushing: Utilisation of larger crushers capable of handling 1.5 m x 1.5 m boulder sizes; throughputs exceeding 1,800 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 ~ 6,300 kW) and more energy-efficient VRMs, with longer roller/table lives and improved material bed development; throughput augmentation through higher residues acceptable by technologically advanced, pyroprocessing equipment. In recent times, projects have been offered individually powered, 6-roller (motor sizes, 6 x 2,000 kW), VRMs which could achieve grinding capacities up to 1,000 tph.

Finish grinding: In view of their overall cost (capital and operating) effectiveness, large VRMs, with grinding capacities up to 325-350 tph for pozzalanic cements ground at 3,500-4,000 Blaine, seem to be the flavour of the new decade. Technology developments, including metallurgical interventions for reducing wear rates, formation of stabilised clinker beds, etc, 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 up to 30,000 hr.

Given the enhanced availability of both types as well as sources for technologies, processes and machinery, the need for analysing combinations multiply. Add to this, variables such as input materials and utilities, products, project execution modes, site conditions, etc, the analytical requirements exponentially escalate. ICR