Made to Batch

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RMC mixers and batching plants are taking on customised roles to suit varied and ever-changing industry needs.

BY Mitalee Kurdekar

Concrete is omnipresent in our built environment – be it in buildings, roads, bridges, railways, or dams. Well-mixed, cohesive concrete having a high strength and durability are key requirements for the construction sector and something that users are always looking for. Yet, user needs are constantly evolving too. As a result, newer concretes with special capabilities are being developed and used today.

One of the latest requirements being witnessed is in high-rise structures or quick-completion projects, where the ability to pump concrete to great heights and at a faster rate with very good flowability is of paramount importance. This has led to the emergence of highly capable Ready Mix Concrete (RMC) and batching plants in present day construction activities.

Evolution of equipment

If one looks at the Indian construction industry, one would agree that the processes are heavily labour intensive and therefore the quality of construction usually suffers due to lack of consistency and uniformity. The pace at which automation was introduced in this industry was very slow until the 1990s, due to the free availability of cheap labour, the sheer number of small developers and contractors and consequent lack of capital investment. Even today the level of mechanisation in this industry is far below that of most developed economies.

However, in the last couple of decades, with the gradual proliferation of large scale developers with their own construction capabilities and supportive/ancillary industries like large scale cement plants, pre-fab bricks and RMC batching plants, the scene in India has undergone a significant change. Modern age developers/contractors look for speed of execution and enhanced quality of work so that projects enjoy quicker turnaround times, thereby offering optimum value for money spent not only by them, but also by their customers. In that sense, the setting up of RMC mixers and batching plants nearer the point of use has become imperative for their overall growth strategy.

VG Sakthikumar, MD, Schwing Stetter Sales and Services, provided an interesting argument for these mechanisation initiatives, saying, “Due to exponential growth in urbanisation and industrialisation, by-products from cement, steel and other industries such as Ground Granulated Blast furnace Slag (GGBS) are becoming an increasing concern for recycling and waste management. At the same time, studies have revealed that the usage of GGBS in concrete as a partial replacement for Ordinary Portland Cement (OPC) has increased the compressive strength, tensile strength, durability and decreased the permeability, embodied energy and cost per cubic metre. Given the numerous advantages of these industrial by-products, RMC industries have partially replaced cement with fly ash, GGBS, ultrafine GGBS or silica fume, which are by-products of other industries. Currently over 40-45% of the concrete supplied by RMC companies in India has a replacement of fly ash and GGBS. The environmental friendliness of concrete can be considerably enhanced if the rate of fly ash utilisation by the concrete industry is accelerated in ash-producing countries.”

Driven by business needs

Most large developers and big project contractors look forward to RMC being delivered at their doorstep in good, flowable condition or being batched on their sites for ready use. Raman Sapru, president, EPC, Omkar Realtors & Developers, offers, “We use weigh batchers at all our projects or source concrete from reputed manufacturers depending upon the size of the project, duration and overall concrete quantity involved in the works. The cost economics governs the choice of sourcing.”

It is heartening to note that the key driver for concrete sales is now quality and other deliverables, rather than merely cost as it was traditionally seen. Hopefully, we are witnessing a shift in perception when it comes to hiring contractors for the implementation of construction jobs solely on the basis of lowest costs.

Present day RMC batching plants in India are of different sizes, defined in terms of their output capability of producing concrete in cubic metres per hour. In terms of batching for mixing, they could use either volumetric or weigh batching processes. Volumetric is more akin to traditional mixing done by manual methods. But other than small jobs, volumetric batching and mixing is not preferred as it lacks consistency for repeat requirements as well as compromises on quality due to difficulty in controlling concrete mass only on the basis of volume of ingredients. Most users in the industry who commit to a high degree of quality in their work ethics prefer weigh batching.

Manish Jain, COO, House of Hiranandani, proclaims, “We prefer weigh mixers. An automated weigh batching system helps in getting mixtures ranging from a small batch to large volumes with increased productivity. The different ingredients are accurately mixed as per the mix design. The batching hoppers are continuously emptied and cleaned after each batch. This helps ensure 100% traceability on mix data and compliance with ISO 9000 quality requirement. The wastage of material is also minimised. Continuous and high vigil supervision is not required either.”

Quality assurance

So how does one ensure that the quality of concrete used and cured in construction is continuously monitored and delivered to the required specifications. Sanjay Saxena, VP & BU head, heavy equipment & concrete, Sany Heavy Industry India, comments, “Sany manufactures batching plants from 30m3/hr to 360m3/hr capacity. Our batching plants meet international standards and are used across many countries. All Sany plants offered in India use the ‘weigh and mix’ concept, as it gives the most accurate concrete output. Our concrete mix designs are specified in weight formats for aggregates & cement. If it is measured volumetrically at the batching plants, there is a chance for variations due to varying densities of materials from site to site and batch to batch. This will lead to errors in the final mix of concrete.”

Adding an Indian context to this, Sailaj Verma, senior VP, KYB-Conmat, suggests, “Weigh mixers are more popular in India as they are apt for the geographic conditions here. India is a country where we have the oldest range of mountains (Nilgiris) and neo-mountains (Himalayas) as well. The soil/rock characteristics vary from one place to another, i.e. specific gravity of the material will change with change in place. Hence, weigh mixers have to be used. This also gives more flexibility to change the mix design depending on the availability of raw material in the vicinity.”

This is imperative from a consumer’s point of view. Echoing Verma’s opinion, Mukesh Jaitley, director, projects, The Wadhwa Group, states, “Weigh mixers are preferred over volumetric mixers, because for a mix design of concrete, one is required to compute the proper density of material since this can vary marginally from one source to the other.”

Sapru too agrees, saying, “We prefer weigh batchers over volumetric mixers for ensuring better quality control. The strength parameters of different grades of concrete can be easily obtained through weigh batchers. In volumetric mixers, there will be wastage of materials in the form of production losses as well as over design of concrete mix. Also, there is no guarantee of obtaining the desired strength as manual feeding of raw materials is involved.”

Tall order

A spurt in high-rise structures in the recent past is only a sign of things to come. Tall structures will only increase with more urbanisation, a trend that brings up the challenge of moving high grade concrete to higher levels smoothly and without compromising on the quality & curing capabilities. Flowability – often referred to as workability in engineering terms – of concrete is therefore a prerequisite in high-rise construction so as to ensure smooth pumping of right grade material at required heights. Plasticizers are used to increase the flowability as some of fine particle ingredients can make the mix sticky and difficult to pump, while retarders are used to delay the settling time of concrete.

Sapru explains, “Different combination of these chemicals, cement, fly ash and water are tried and tested at labs before commencement of actual production in batching plants to obtain the right and pumpable mix. The source of raw materials, water & silt content in sand, fineness of cement and fly ash govern the dosage of plasticizers and retarders. Any small error in quality and quantity of ingredients will lead to either a harsh or a too lean mix, which will be like split milk. Rigorous quality control is a must at each stage, right from the selection of raw materials, chemicals, mixing, and production to transportation and pumping of concrete to high altitudes.”

Of course, pumping of concrete to greater heights has been made easy with the availability of many options from global providers of such pumps and pumping systems through their Indian subsidiaries or collaborators. For example, Schwing Stetter’s new generation rock valve technology and the efficient energy transfer rate of hydraulic system help place stiff high grade concrete at heights above 300m with a flow rate exceeding 35m3/hr in India.

Customer focus

The ability to serve domestic and international markets with competitive products defines the business standard today. Customers lay emphasis on batching plants that offer a great price-performance ratio. Sakthikumar explains, “Customers are looking for newer innovations to help them cut costs. We offer the customer an innovative 30m3 batching plant that will save them 15% on the total installation cost.”

Verma confesses that time has become the essence of any contract. “Faster erection/dismantling of plants is preferred. Our fixed type of batching plant comes in three parts, which are pre-assembled and then transported to site. This makes the plant very compact with very less foundation work. Our mobile plant comes in a single unit and is a plug-and-play type of arrangement. This plant can be towed to a nearby place by a tractor, which makes it very handy for the customer,” he points out.

Outlining his after sales strategy, Mitul Patel, MD, Apollo Inffratech Group, explains, “Skilled operators are required for operating technologically advanced products. Apollo periodically arranges training for their customers as well as their staff. Onsite training and hands-on training is provided to operators.’’

Growth forecast

Given the backdrop of a sluggish infrastructure investment scenario in the past five year plan, the Government of India has set ambitious targets as part of the ongoing Twelfth Plan (FY12–FY17), proposing Rs 56 lakh crore of investment in infrastructure. In the Union Budget, the government has earmarked Rs 2 lakh crore infrastructure investment. The funds are allocated for a broad range of infrastructure projects, including roads, airports, rural infrastructure, and urban infrastructure.

Elaborating on this, Patel says, “The construction equipment market has improved tremendously in the last eight to nine months due to huge road and other infrastructure projects. We can look forward to more growth in 2017, with further pickup in 2018 and 2019. In the current financial year, Apollo Inffratech Group saw a tremendous growth in higher-end batching plant sales, pipe-making machines and self-loading mixers as well as other products.’’

Sakthikumar agrees, ‘‘We are taking advantage of this momentum. The year 2016 has been very good for projects in the roads and highway sector in India. It has offered substantial sale of batching plants for concrete road construction in India. With respect to the new road projects upcoming in India, it is not only time bound, but the customer also looks for equipment which is easy and fast to erect and also to dismantle, assemble, transport and erect from one side to another. We see some gap in our product range with respect to concreting village roads and we will be soon adding newer equipment to fill this gap.”

With most construction equipment manufacturers aligning their product focus to changing – and growing – customer needs, prospects for the construction equipment industry seem quite bright. And with the Government’s backing, infrastructure projects will continue to be on the rise in the near future, mandating the use of more advanced RMC and batching plants, thus paving the way for steady business growth in the RMC and batching plants industry.