COMPANYSPEAK

"Every cooling tower needs to be designed uniquely"

In the face of a modest growth with price fluctuations, labour availability issues, and shrinking timelines are some of the many issues the cooling towers industry must deal with, **Gactel** has braved it over a period of decades in the business. **AK Pandey, General Manager, Operations, Gactel Turnkey Projects**, interacts with **Projects Info**.

What is the expected growth in the cooling towers segment?

The global market for cooling tower is expected to exceed $1.7 billion this year. World cooling tower market is to maintain a modest CAGR of just over one percent over the 2001 to 2010 period.

- No of cooling towers for 11th Five Year Plan is 145.
- No of cooling tower requirement for 12th plan is 218.

What are the types of cooling towers, and structurally, how are they different from other speciality structures in material and specs?

Major RCC types are Natural Draft (ND) and Induced Draft (ID) (fan assist) cooling towers. While ND towers are tall, hyperbolic structures with shell and internal grillage columns, ID cooling towers are framed structures with wall cladding and deck slab with foundations supporting rotary equipment.

The hot water supply duct or tank is at the water distribution level to which riser pipes supply water from the pump. It could be referred to as a special type of work due to its typical shape and dynamic loads of equipment at the top. Gammon has been constructing this type of structure for the past 75 years.

On average, a cooling tower cell for power plant application would be about 15-20 m high. However, on specific conditions with water basin placed above ground, the height could increase further.

Certain specific functional aspects which separate this type of structure from other normal structures would be;

a) Design of structure with minimum water fall on them and the wall to provide optimum thermal impact.
b) Minimum area obstructed by the structural support members so as to allow maximum free path for air and water.
c) Provide safe and easy access to the internal equipment like fan, gearbox, heat transfer media and water distribution pipes so that maintenance could be easily carried out by the purchaser.
d) Critical structural to rotary equipment frequency parameters.
e) Space provision within the available space limits for proper electrical and instrumentation erection at the same time provide for sufficient movement for maintenance.
f) This type of structure could be as long as 200-250 m long with a large number of identical cells thereby construction has to ensure absolute water tightness in the basin and structure up to water distribution level.

Which type of contract does your company execute?

We execute turnkey projects related to cooling tower and other related fields and generally these contracts are lump sum in nature. It essentially means concept to commissioning all aspects related to cooling tower civil construction, mechanical–electrical–instrumentation supply and erection, commissioning and PG testing. We also undertake supply of FRP prefabricated towers which are generally called package towers.

What are the major construction-related challenges in cooling towers?

- Construction of cooling towers itself is a major challenge as generally each cooling tower is tailor made for the particular process requirement and the tower has to be designed keeping in mind on the land available for siting of the tower, the direction of wind at peak load periods and the position of each tower with respect to others in a multi-cell tower. Hence, it would not be technically and economically advisable / to replicate the towers from one place to another. Hence every tower has to be designed uniquely.
- The increase in the per unit capacity of the power plant being constructed today with limitations in space availability has increased the ratings of the rotary equipment required for the process. Large sized fans, gearboxes and motors with higher ratings seem to be the order of the day, thus one of the challenges is to design and construct this structure to withstand the rigours of such high torque and heavy vibration causing loads.
- Shortage of labour and resources due to boom in construction industry.
- We are catering to this requirement by planned strategies in the field of skilled manpower (both site and head office), implementation of suitable mechanisation. Increased effort in better coordination within the overall project team of purchaser, consultant and us thus resulting in increased efficiency in approvals and decision making, specific long time vendor management programme, Internal restructuring to suit the requirement of high volume outputs, increased concentration towards safety and quality and of course increased resources in this direction.

Speed in construction could be critical in large projects. Have you been able to address that issue?

Over the years, we have formed special groups of skilled technicians having expertise in specific work related to cooling tower like shuttering, reinforcement work, concreting work and mechanical erection works requiring special erection skills, as well as a large pool of supervisory staff and sub contractors.

We have mechanised many of the activities by providing critical equipments like tower cranes, placer booms, suitable batching plant with transit mixers, mobile cranes and suitable excavation machinery.

We have created small groups responsible to execute projects with increased sense of focus and motivation. Such teams focus on reducing the time spent on engineering issues which could be substantial.

We have embarked on a vendor management programme to emphasise the need to provide quality equipment on time to the site. This programme with reputed vendors ensures the regular interaction between senior functionaries of the organisations involved apart from interaction with the manufacturing unit thus reducing time due to wrong interface.

We are increasing the awareness of absolute safety within our organization and associated partners and we have inducted highly trained and committed personnel with a view to reducing accidents and thus automatically reducing down time at work site. Similarly we are continuously inculcating an individual commitment towards quality which results in smooth construction and loss of time.

We also have the advantage of having developed our overall engineering expertise in this field so that time delays on outsourcing has been completely shelved.

Availability and use of porta cabin and other type of ready made structure helps a lot in saving of mobilisation time. We also ensure that a majority of our working force including sub contractors are being constantly engaged by us to prevent erosion of skilled labour base. We have also tied up with reputed transporters to ensure that the supply of construction material and finished goods to site is not hampered due to logistical problems.

We have created an exclusive cell for expediting the projects from our end.

We suggest construction alternatives like using precast wall blocks, precast members and use of FRP composites in parts of the cooling tower to our clients to help improve the time factor.

What are some of the other issues you have to deal with?

- We have observed that there is a lot of price fluctuation in the market and this coupled with the condensed time frames causes uncertainty in the financial success of an undertaken project hence we always suggest a proper escalation clause to ensure proper justice to all participants of the project.
- Civil contracts construction cost are in direct relation to the soil data, In many of the contracts the values are not given with the contract and are also subject to verification after award and in case of high fluctuation the contractors suffers financially.
- Some part of the total payment to be made to contractor is withheld and paid only after commissioning; however most of the time in spite of readiness of the tower, the power plant is unable to generate the required heat load for commissioning and hence payment due to the contractor is delayed.
- Increased high security at plant sites: This phenomenon anyway is observed even in our day to day life. At present security is consistently under increase and becomes a huge challenge to match shrinking time frames.
- Wherever water and power is not made available at site by the client conducive environment is not available to give momentum to the project.
- Layout and siting of the cooling tower location is many times revised and changed due to project requirement, such delays leads to delay in completion of cooling tower.
- Extra items claims are generally decided after the contract is completed leading to cash flow related issues.

Major projects by Gactel

- Executing 26 large cooling tower projects all over India project ranging form 3,000 Cum/Hr to 70,000 Cum/Hr.
- Refurbishment and cooling tower restructuring jobs for capacity enhancement.
- Major sectors: Refineries, power plant, sugar industries, fertilizers etc to name a few.
- Certain recent projects being completed or under completion include Haldia petrochemicals , Indian Oil Haldia refinery, IOCL Gujarat Refinery, BORL – Bina, Anpara C TPP for LANCO Power, Monnet ISPAT, STERLITE GROUP, ADANI group, ONGC Hazira, OMPL , BHEL, etc.