**Case History**

Owens Corning India Ltd. (OCIL), opened its plant in Taloga, India, in August 1998. The plant, located about 25 miles from Bombay (also called Mumbai), makes glass fibers in two forms: chopped-strand mats and rovings.

Chopped-strand mats are sheets of randomly oriented strands bound together. Rovings are loosely gathered fiberglass strands. Both products are used to reinforce plastics. The reinforced plastics—called composites—are then used to make products for the...
transportation, telecommunications, and construction industries. Examples include automobile parts, cable sheathing, and shower enclosures.

According to Greg Morgan, plant leader at Taloja, composites have a bright future in India. "If you look at consumption of composites per capita here, it's less than what it is in other parts of the world," he said. "It was a great opportunity for us to develop a market in India." The Taloja plant also supplies glass fibers to customers in the Middle East, Europe, Australia, and the Asian Pacific.

No supervisors required

From the beginning, Owens Corning planned the Taloja plant to be "world class," Morgan said. It began with the workers. "We probably have the most highly educated workforce in any of our plants in the world," Morgan said. "On average, our operators have 2 years of college education, and many have had 3 years of college." All the operators also have previous electrical and mechanical experience.

Well-educated operators are a big advantage, Morgan said, because their knowledge enables them to handle in-process maintenance and minor equipment change-outs, in addition to operating the equipment. Those abilities, in turn, enabled OCIL to eliminate plant supervisors and distribute authority broadly. At Taloja, there are only three levels of authority. This is a new concept in India, Morgan said. "It is probably as new and as exciting to India as anything we've done. And it allowed us to bring in very modern, very sophisticated equipment to do our job."

Born in the USA

The Taloja plant began in the United States, where engineers at OCIL's parent company, Owens Corning, designed the Taloja plant and specified its equipment. The plant has three main areas. First is the batch area, where ingredients are brought together. Second is the furnace and forming area, where glass is made and fiberized. Third is the fabrication area, where the chopped-strand mats and rovings are produced.

After getting the equipment ready, OCIL worked with an Indian joint venture partner and other Indian companies to help find workers and to install, install, and operate the equipment. Here is a look at how the plant batches dry ingredients to the furnace.

Stocking the ingredients

The glass fibers are made from four major ingredients and several minor ingredients. The major ingredients include silica, clay, and limestone.

All the ingredients arrive at the plant in bulk bags, also called flexible intermediate bulk containers (FIBCs). Bulk bags were a new approach for many of OCIL's vendors. "They were used to dealing with 50-kilogram bags," Morgan said, "but this is a large facility, so we didn't want to do it that way."

Workers transfer the bulk bags from the trucks to bulk bag unloaders. Workers then line the bottom of the bag, allowing the contents to drop through a chute into a pneumatic conveyor that transports the ingredients to the correct bin. Workers in the batch house wear protective masks, but dust isn't a problem. "I was really concerned about that," Morgan said. "When you're handling that many bags, the dust could be a problem. Our batch houses perform well. We have very little dusting."

To ensure that the incoming ingredients meet OCIL's specifications, each shipment is tested in the plant's laboratory. OCIL had some early quality problems with the shipments, Morgan said, "but once we got [the quality] worked out with our suppliers, we've had no problems at all."

Batching non-stop

The major ingredients are kept in storage bins that hold 70 to 260 cubic feet of material, and each bin has a bin actuator at its outlet. The bin actuators include a top section that is bolted to the bin and a bottom section that is connected to the top section by forged steel hangers. A seamless rubber sleeve spans the gap between the two sections and isolates the bin from vibration. A direct-drive motor mounted on the lower section powers a gryator that creates vibration. The vibration, the shape of the bin actuator, and internal baffles ensure that the material flows consistently from the storage bins in a first-in, first-out manner.

Directly under each bin is a weighing and feeding system, which may include a live-bottom bin. The live-bottom bins act as buffer storage vessels and have vibratory bin actuators similar to those on the other bins.

The weighing and feeding system transfers the ingredients to a blender in the batch house basement. Next, a pneumatic conveyor sends the mixture to the furnace area for further processing. This process is repeated 24 hours a day, 7 days a week.

Reliable feeding

According to Morgan, who has worked at Owens Corning 26 years, the Taloja plant is the first to use this batching technology to proportion glass fiber ingredients. Previous plants used single-ingredient scales. The new approach has performed well at Taloja. "It's been great," Morgan said. "From day one, [the batching system] has operated very well, with tolerances that are as good as anything we have anywhere in the world. We do also have a backup system since this was our first system like this."

In addition to its accuracy, the batching system is reliable. In fact, the system is so reliable that "one shift per day, we let it run on its own," Morgan said. "The entire batch system is tied into our furnace control system, so we can monitor the batch house."

The batching system is "as good as anything we have anywhere in the world," says the plant leader.

And the contractors at the plant help, too. "We let them deal with the specialty equipment," Morgan said. "For things like the furnace control system and the batching and mixing system, there are experts who are better at than we are." Of the 300 workers at the plant, only a few are needed in the batch house. "We had to build something different here as far as an Owens Corning facility," Morgan said. "And so far we've been pretty successful."

PBE International

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The photo shows the live-bottom bins and heavy-duty screw feeders before shipment to the Taloja plant.

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