



PumpLines

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New Mixer Reduces Energy Costs and Chemical Consumption at Pulp Facility

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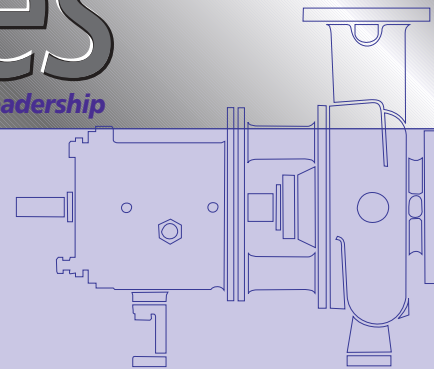
In a drive to reduce manufacturing costs, the Alabama River Pulp Company, took a look at its bleaching process. Replacing two older chemical mixers with one new mixer developed by Goulds Pumps increased mixing effectiveness, lowered chemical consumption and greatly reduced the energy required to run the bleaching process.

The Alabama River Pulp plant is a large pulping complex located along the Alabama River in Perdue,

Alabama. It consists of two mills, pulping hardwood and softwood respectively. Each mill produces about 400,000 tons per year of bleached kraft pulp. The mill's major processes consist of continuous digesters, bleach plants, drying machines, chemical recovery plants, and associated washers and screens.

The pulp industry uses a variety of chemicals in the bleaching of pulp to make white paper. Manufactured or purchased chemicals add significantly to the cost of papermaking. Consequently, chemicals along with energy, are prime targets for cost reduction programs in making market pulp.

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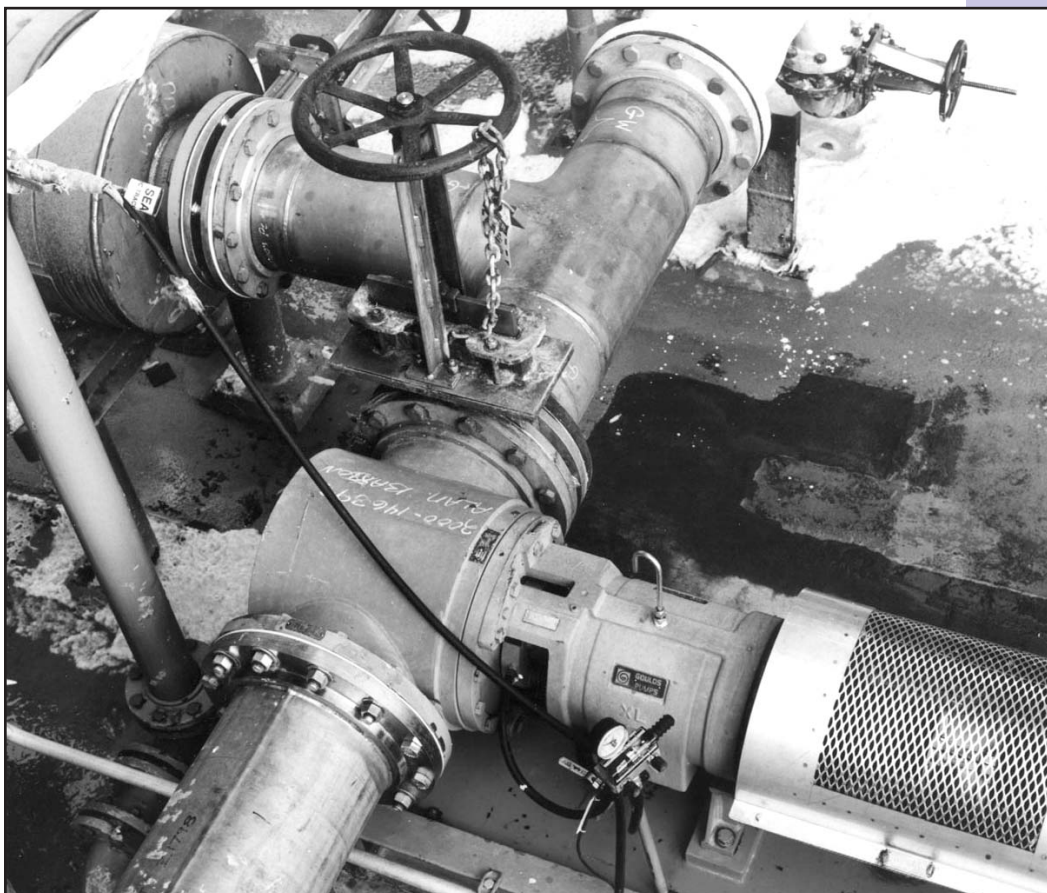
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The Goulds Optimix mixer introduces a lot of shear into the pulp fluid, mixing a small amount of chlorine dioxide molecules widely and evenly throughout the stock.

Mixer...

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In 2000, the Alabama River Pulp plant began to look at improving manufacturing processes in an effort to reduce overall manufacturing costs. When the plant switched to 100 percent chlorine dioxide bleaching from using both chlorine and chlorine dioxide, a number of changes were made in the entire bleaching process - including the mixers at the front end of the process. According to Bob Amend, Fiber Line Manager at the plant, "Our bleaching process was using two mixers. We were having maintenance and metallurgical problems with the mixers." Ilkka Seppa, an engineering consultant for medium consistency pulp manufacturing, suggested that the plant provide a trial for a new mixer from Goulds for the bleaching process.

As Tony Chastain, Sales Engineer for Goulds Pumps explains, "Pulp is a wood product. In producing a white fiber from the wood product, the pulp is put through a multi-stage bleaching process. The more effectively you can mix the chemicals you are adding, the less you have to use and the more consistent product you can produce. The mixers used by Alabama River Pulp were old consuming a lot of horsepower."

To avoid chemical waste, a pulp mill removes water from the pulp prior to bleaching. The resulting thick pulp, known as medium consistency pulp, resists any attempt to mix with chemicals due to the nature of the dense fiber matrix. To promote chemical mixing, mechanical mixers are used to disperse the chemicals. Conventional large blade agitator mixers are not effective in medium consistency pulp. The blade speed is too slow to generate the energy needed to separate fibers within the flocs of pulp to allow contact with the chemicals. Unless the fibers are separated allowing chemical contact, mixing will be ineffective. Ineffective mixers require pulp mills to add excessive chemicals leading to residual chlorides and reduced pulp brightness.

Chastain says that, "The new Goulds mixer introduces a lot of turbulence to the pulp. You may have several thousands of gallons of stock per minute going through the mixer and you have a fairly small amount of chlorine dioxide molecules that you are trying to distribute widely and evenly throughout the stock." In addition, to thorough mixing, one of the characteristics of chlorine dioxide is that it vaporizes at 55°F. With the stock at about 170°F, "They want to get the fibers and the chlorine dioxide next to each other and start the bleaching process before the chlorine dioxide flashes to a gas," says Chastain.

Producing the World's Most Effective Mixer

In the development of the new mixer, Goulds Pumps launched an exhaustive program to produce the world's most effective medium consistency mixer. It was felt that to be highly effective, mixing must take place in three planes simultaneously. The Goulds design creates pulp turbulence in a horizontal, axial and vertical plane through a unique method trademarked as DoubleShear™.

David Peschell, Global Marketing Manager for the Pulp & Paper Industry for Goulds Pumps says that, "This is accomplished with a special rotor spinning within a fixed casing with internal baffles or blades, aided by a unique premixing injection of chemicals into the intake flow of the mixer."

The mixer casing uses angled internal vanes that move pulp from front to back inside the casing helping to promote turbulence and mixing. The in-line casing design is bolted into the pulp line allowing simple installation with the least amount of pressure drop across the mixer.

Within the casing is a special rotor, shaped with angles that move pulp laterally and axially as the rotor turns. The holes in the rotor promote pulp flow through and around the rotor, creating a turbulence to mix chemicals at a very highly effective level. The result is a level of mixing that is not possible with any other mixer in the world.

Lowering Raw Materials, Energy, and Maintenance Costs

Chlorine dioxide used in the bleaching process is made on site. Ilkka Seppa is a medium consistency consultant for Alabama Pulp. He noted that, "Chlorine dioxide is pretty expensive; about 35 cents per pound. Alabama River Pulp was able to reduce the use of chlorine dioxide by several pounds per ton." In a plant that produces in excess of 2,600 metric tons a day of pulp, 365 days a year, the chemical savings are significant. Bob Amend, Fiber Line Manager for Alabama River Pulp noted that, "We greatly reduced our chemical costs on the front end of the bleach plant. We had big chemical savings right off the bat."

The reduction in chemical usage also creates savings after the manufacturing process. According to Seppa, with the new mixer, the plant is reducing the chemical loading in the wastewater streams going into the water treatment plant.

In replacing the two older mixers with one Goulds mixer, the plant reduced its horsepower requirements by approximately 70%. The two original mixers used in the bleaching process

required 700 horsepower combined. The new mixer is powered by a single 250 horsepower motor. According to Seppa, at a typical pulp plant, per horsepower costs average about \$240 per year. The energy savings alone is over \$100,000 per year.

As for maintenance issues, Amend recalls that, "We basically installed the Goulds mixer, turned it on, and have not had any problems with it. We've had problems with all our other mixers. As for reliability, it's been an awesome piece of machinery. For us, it has saved a tremendous amount of money in both its mixing efficiency and in its reliability. It is heavy duty."

Seppa also notes that the original mixers had a number of maintenance problems associated with them. "Since the installation of the new mixer, there have been no maintenance issues at all, no vibrations or any other problems."

Improvement in Mixing Efficiencies

Chastain notes that the Goulds mixer was installed at the end of 2000. The end result he said, is that, "the plant is now producing whiter pulp with greater efficiencies and less chlorine dioxide added."

"We measured the mixing effectiveness of the new Goulds mixer at 96.5 percent," says Seppa. "That can be qualified as an excellent mixer. The older mixers were at 90%. When we originally looked at replacing the mixers, we would have considered keeping the same level of mixing effectiveness as a success. But in this case, we even improved on that efficiency; and that surprised us."

The Goulds developed mixer is marketed, sold, and serviced in the Americas by GL&V Pulp Group under the trademark TRI-O™.

Goulds Pumps markets the mixer as OptiMix' in all other markets globally. ■■■

