



INDUSTRIAL TECHNOLOGIES PROGRAM

Implementation of a TMP Advanced Quality Control System at a Newsprint Manufacturing Plant

When Augusta Newsprint and the U. S. Department of Energy (DOE) performed a plant-wide energy efficiency assessment at the mill, it became evident that improving the efficiency of the Thermo Mechanical Pulp (TMP) process could result in substantial energy and cost savings. This project tested a process control method that provides real time and online predictive models and modifies control actions to maximize quality and minimize energy costs. Using software sensors, the system can predict difficult-to-measure quality and process variables and make necessary process control decisions to accurately control pulp quality while minimizing electricity consumption.

Augusta Newsprint's Thermo Mechanical Pulp (TMP) mill is one of two pulp mills that feed two high speed Newsprint Machines. The pulping process is energy intensive and can change due to the conditioning of the chips and the operation of the rest of the TMP process, primarily the rate at which fibers are rejected and re-refined. The project involves installing control systems in the mainline refiner, reject refiner, and screen room. These systems help to control specific energy and blowline consistency to achieve and maintain desired freeness and fiber length. Software sensors are used in these areas to predict production rate, throughput, blowline consistency, and pulp quality.



Benefits for Our Industry and Our Nation

- Increased efficiency and reduced energy consumption for TMP mills
- Increased pulp quality
- Reduced usage of supplemental Kraft pulp

Applications in Our Nation's Industry

The new method of control has allowed Augusta Newsprint Company to optimize the operation of its TMP mill for lower energy consumption and lower pulp quality variance, demonstrating a technology that can save energy in American pulp and paper production.

Project Description

Goal: The primary goal for this project was the reduction of energy consumption for the mill. Energy savings were to be \$1.12 million per year after complete implementation; this is judged on a quarterly basis using a sliding scale of energy usage versus pulp quality. In addition to the energy savings; a goal of 40% pulp quality variance reduction was set. Other anticipated and recognized benefits were increased pulp quality and reduced usage of supplemental Kraft pulp.

The TMP mill is comprised of eleven 12,000 horsepower refiners. These refiners, in three stages, take wood chips from approximately 1" x 1" x 1/4" to individual pliable fibers. This project tested an advanced, model predictive multi-variant controller that works with the mill's existing distributed control system. A detailed steady state and dynamic simulation was developed of the mill operation from the chip pile through the pulp mill. Because Advanced Quality Control requires that the regulatory control elements and control loops are designed, implemented, tuned and maintained correctly, a complete evaluation of the applicable regulatory loops was performed.

Results

- Achieved a savings of ~ 3.5% for the total mill, or \$1.25 million per year at 2001 energy prices.
- Based on the performance of the control system, a pulp quality variance reduction goal of 40% was established by the mill.
- The control system led to increased pulp quality and reduced usage of supplemental Kraft pulp.
- The production rate of the TMP mill increased (though many other factors in the mill assisted in these results, e.g., chemical additions, pulp quality targets and various energy reducing projects in the mill.)

Project Partners

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A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.



U.S. Department of Energy
**Energy Efficiency
and Renewable Energy**
Bringing you a prosperous future where energy
is clean, abundant, reliable, and affordable

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