

FOREST PRODUCTS

Best Practices Technical Case Study

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OFFICE OF INDUSTRIAL TECHNOLOGIES
ENERGY EFFICIENCY AND RENEWABLE ENERGY, U.S. DEPARTMENT OF ENERGY

BENEFITS

- Total annual savings of \$59,000 and more than 1 million kilowatts (kW)
- Reduced power consumption
- Eliminated seldom-used equipment
- Identified and repaired system leaks

APPLICATIONS

Compressed air is not typically viewed as a cost of production, yet the generation of compressed air requires huge amounts of energy. In the United States alone, compressed air systems account for \$1.5 billion per year in energy costs. Optimizing compressed air systems can provide energy-efficiency improvements of 20 to 50 percent.

Consolidated Compressed Air System Reduces Power Consumption and Energy Costs

Summary

In early 2001, the Augusta Newsprint Company undertook a project to consolidate 2 compressed air systems at its facility in Augusta, Georgia. The results are a more streamlined system, added storage capacity, backflow prevention, and the elimination of unused equipment. Numerous leaks were also discovered and repaired. The project produced significant savings in costs and energy use.

Plant Overview

The Augusta Newsprint Mill in Augusta, Georgia, is part of a joint partnership between Abitibi-Consolidated and the Woodbridge Company, Ltd. The mill produces up to 440,000 metric tons of standard newsprint each year from southern pine and recycled newspaper and magazines. The mill has 2 paper machines and employs 380 workers.

Abitibi-Consolidated is a global leader in newsprint and uncoated groundwood papers with ownership interests in 27 paper mills in Canada, the United States, the United Kingdom, and Asia (including its 50-percent interest in Pan Asia Paper Company). The company also has ownership interests in 22 sawmills, 2 remanufacturing facilities, and a market pulp mill. Abitibi-Consolidated supplies products in nearly 100 countries and employs approximately 18,000 people.

Project Overview

Augusta Newsprint operated 2 distinct compressed air systems in its paper mill department and Recycled Newsprint Plant (RNP):

System 1 in the paper mill department consisted of 3 nonlubricated, rotary-screw Atlas Copco ZR5B Compressors rated at 450 horsepower (hp) and 1,977 standard cubic feet per minute each (Figure 1). One compressor served as the primary, the second as the trim, and the third as a hot spare. The 3 compressors shared a common header and maintained the mill's system pressure at 100 ± 0.5 pounds per square inch (psi).

System 2 in the RNP consisted of 2 400-hp Ingersol Rand (I/R) Lubricated Compressors and 1 300-hp I/R Lubricated Compressor (Figure 2). One of the 400-hp compressors served as the primary, while the second was used for trim about 1 percent of the time. The 300-hp unit was a spare and used only when either of the 400-hp units was down for maintenance. The 3 compressors shared a



common header and provided process air at 75 ± 5 psi to a set of pressurized de-inking modules (PDMs).

Augusta Newsprint determined that consolidating the 2 compressed air systems would eliminate the seldom-used 400-hp I/R trim compressor in System 2 and reduce overall power consumption.

FIGURE 1. SYSTEM 1—MILL COMPRESSED AIR SYSTEM BEFORE CONSOLIDATION

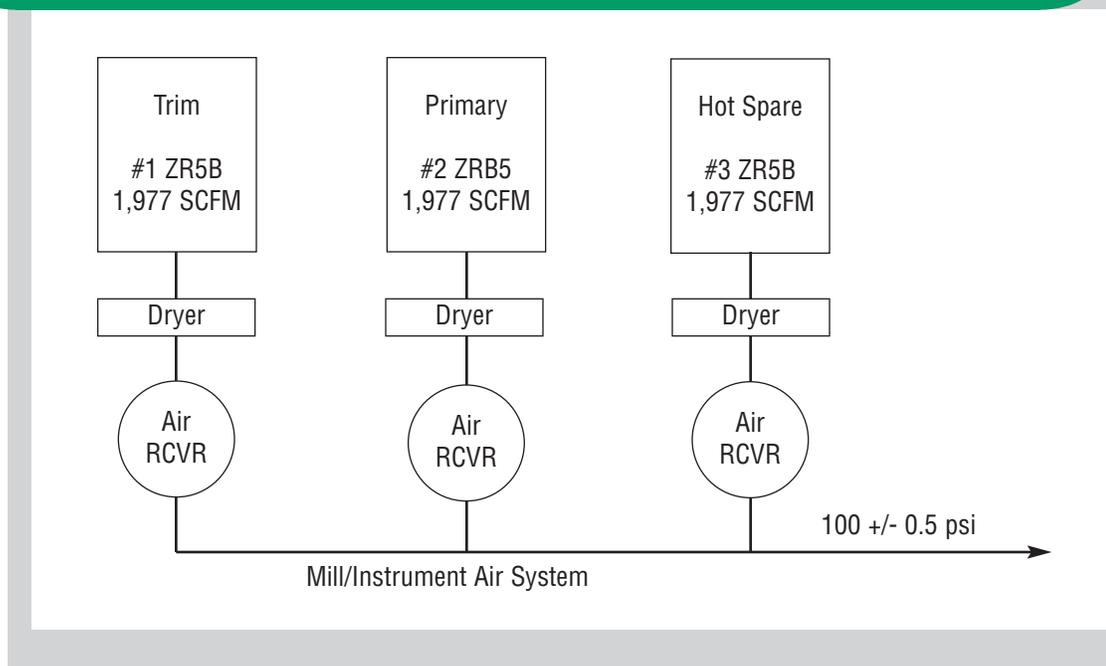
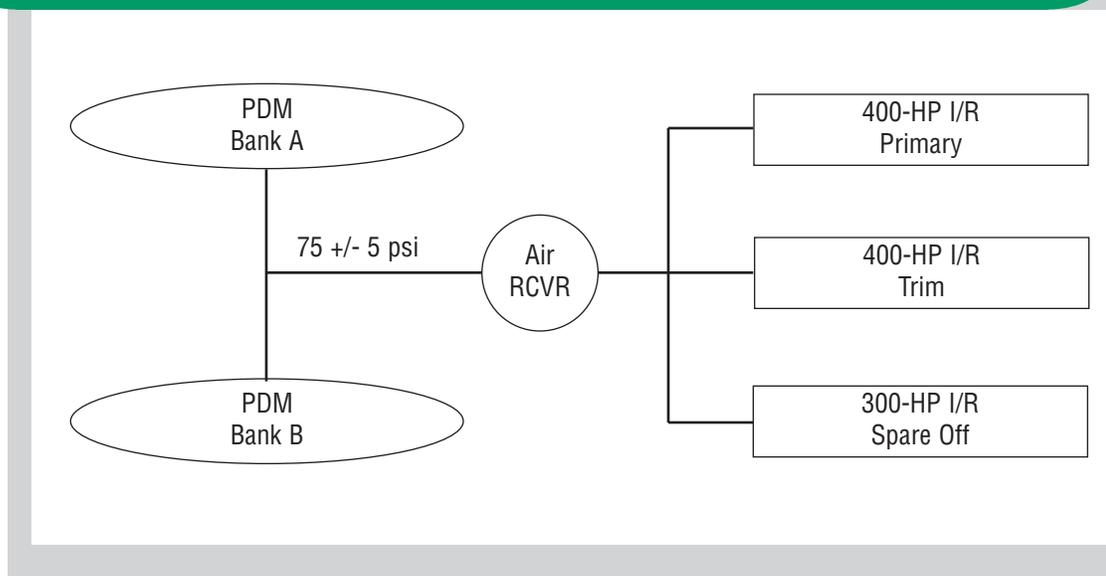


FIGURE 2. SYSTEM 2—RNP COMPRESSED AIR SYSTEM BEFORE CONSOLIDATION

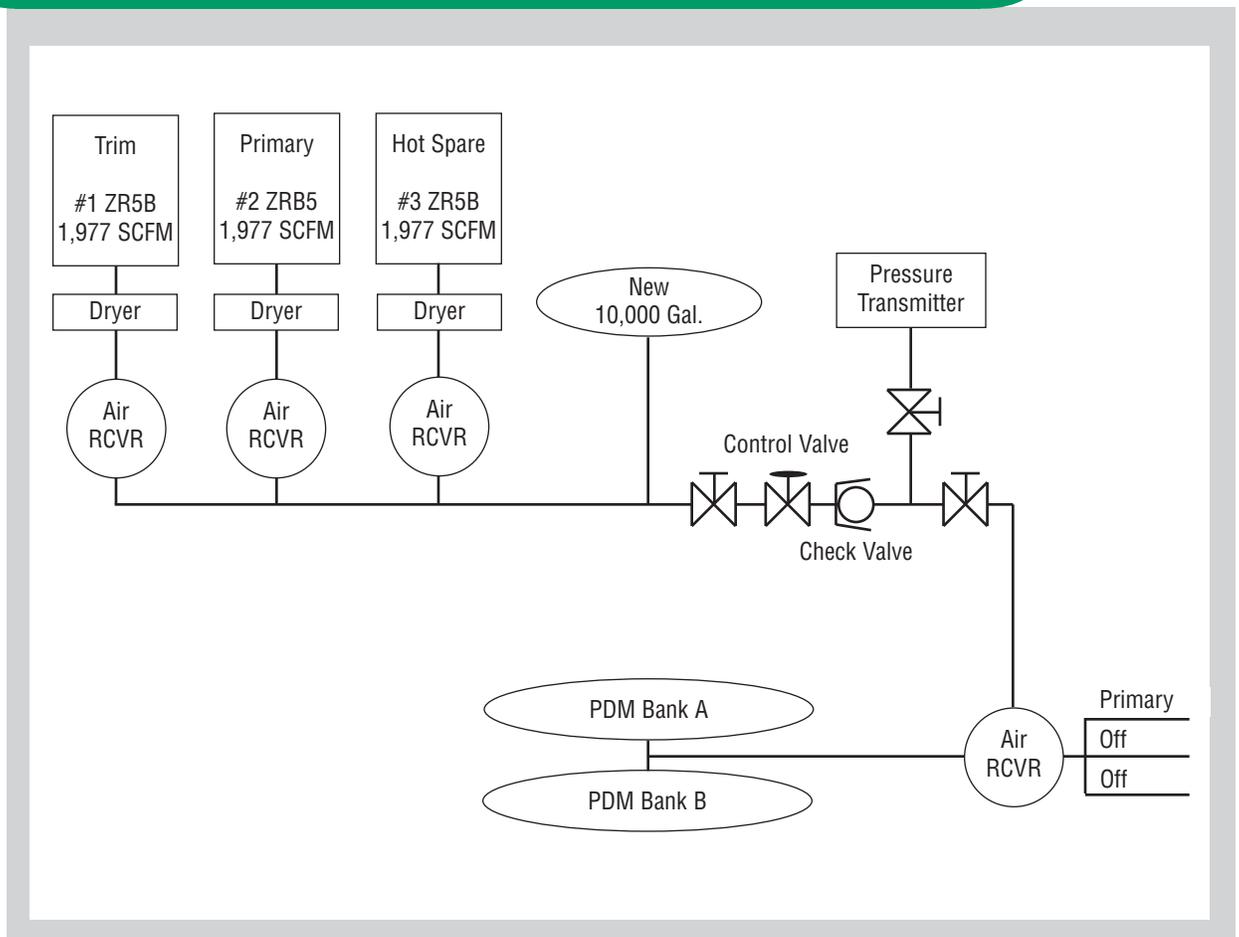


Project Implementation

Figure 3 is a schematic of the new consolidated compressed air system. System 1 is now connected to System 2 via a new control scheme, and the 400-hp I/R trim compressor in System 2 is off-line. The new control scheme consists of a 2-inch control valve, pressure transmitter, and spring-loaded check valve that allows unidirectional airflow from the mill header at 100 psi to the RNP header at 75 psi and prevents dirty air on the RNP side from contaminating the mill air. A new 10,000-gallon receiver tank was also added to the mill side to store air at 100 psi (see photograph, next page). This tank has ample storage to accommodate short-term increases in demand from the PDMs in the RNP.

Another aspect of the project was an audit of the entire compressed air header that identified 51 leaks in the system. These leaks accounted for approximately 600 cubic feet per minute of wasted air. The leaks have been eliminated, adding to the efficiency of the compressed air system.

FIGURE 3. CONSOLIDATED COMPRESSED AIR SYSTEM FOR MILL OPERATIONS



Results

Consolidating the 2 air compressor systems and repairing all the leaks have resulted in an annual energy savings of more than 1 million kW at the Augusta Newsprint Mill. Putting the 400-hp I/R trim compressor in the RNP plant off-line equates to a yearly energy savings of approximately \$34,000,

NEW 10,000-GALLON COMPRESSED AIR STORAGE TANK



and eliminating the system leaks adds another \$25,000 per year for a total annual energy savings of \$59,000. With the project costing a total of \$75,000, the simple payback is 1.3 years.



BestPractices is part of the Office of Industrial Technologies' (OIT's) Industries of the Future strategy, which helps the country's most energy-intensive industries improve their competitiveness. BestPractices brings together the best-available and emerging technologies and practices to help companies begin improving energy efficiency, environmental performance, and productivity right now.

BestPractices emphasizes plant systems, where significant efficiency improvements and savings can be achieved. Industry gains easy access to near-term and long-term solutions for improving the performance of motor, steam, compressed air, and process heating systems. In addition, the Industrial Assessment Centers provide comprehensive industrial energy evaluations to small- and medium-size manufacturers.

PROJECT PARTNERS

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INDUSTRY OF THE FUTURE—FOREST PRODUCTS AND AGENDA 2020

In November 1994, DOE's Secretary of Energy and the Chairman of the American Forest and Paper Association signed a compact, establishing a research partnership involving the forest products industry and DOE. A key feature of this partnership was a strategic technology plan—**Agenda 2020: A Technology Vision and Research Agenda for America's Forest, Wood, and Paper Industry**. Agenda 2020 includes goals for the research partnership and a plan to address the industry's needs in six critical areas:

- Energy performance
- Environmental performance
- Capital effectiveness
- Recycling
- Sensors and controls
- Sustainable forestry

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