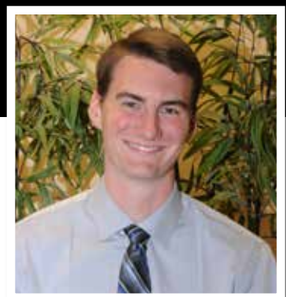
SHEARER'S SNACKS



MICAH RAMBO
MECHANICAL ENGINEERING
IOWA STATE UNIVERSITY

COMPANY PROFILE

Shearer's Snacks is a privately owned, award-winning snack food manufacturer and distributor based out of Massillon, Ohio, and has facilities in five states as well as Canada. Shearer's Snacks products include potato chips, tortilla chips, pretzels, cookies, crackers, pork rinds, puffs and curls, and whole grain rice crisps. The facility in Burlington, Iowa, operates three shifts, 24 hours per day, seven days per week. More than 800 employees help produce their privately labeled saltine crackers, sandwich crème cookies, and wire-cut cookies.

PROJECT BACKGROUND

Compressed air is widely used throughout the plant because it is safe, reliable, and sanitary. While air system leakage does not contaminate the working environment, it does create an unnecessary demand increase and causes excess work for the compressors resulting in additional energy usage. Increased efficiency of the compressed air system could lead to lower costs and decreased energy usage.

INCENTIVES TO CHANGE

Shearer's Snacks is committed to making the best products at the most competitive price. Along with this commitment is the desire to reduce the environmental impact of its manufacturing processes. The Burlington facility is striving to reduce its total electrical energy usage by 3 percent per year. Increasing the efficiency of the compressed air system could decrease the electrical energy usage resulting in cost savings, emission reduction, and the achievement of sustainability goals.

RESULTS

Compressed Air Leaks: Compressed air is beneficial for the food industry because leaks in the system are neither hazardous nor harmful; however, these leaks put an artificial demand on the air compressors. A compressed air audit was conducted to evaluate compressed air usage, identify leak locations, and assess compressor storage. Eliminating leaks in the compressed air system could reduce the electrical energy demand by 15 percent.

Air Receiver Tanks: Air storage is a vital part to the compressed air system. Receivers can be used to cool air and condense water vapor prior to entering the dryer, which results in decreased dryer load. Placing air receivers near high-use applications can supply excess air when needed and protect the application from demand fluctuations. These storage tanks could also reduce the pressure drop caused by the compressed air lines, which would decrease demand on the compressors.

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
COMPRESSED AIR LEAKS	$36,041	672,012 KWH	IMPLEMENTED
AIR RECEIVER TANKS	$7,564	132,880 KWH	RECOMMENDED
COMPRESSOR ROOM VENTILATION	$2,129	37,400 KWH	RECOMMENDED
REGENERATIVE BLOWERS	$16,082	301,309 KWH	RECOMMENDED

Compressor Room Ventilation: The compressor room contains all of the compressors, filters, dryers, and storage tanks. Due to the heat generated from the compressors and dryers, the room temperature can vary drastically from outside ambient temperatures. Air is easier to compress when it is at a higher pressure, a lower temperature, and when it is less humid. Installing a large industrial fan in the room could help equalize the temperature and the pressure allowing easier compression of the air resulting in a decrease in the electrical energy usage of the compressors.

Regenerative Blowers: Some applications require large amounts of compressed air to clean product prior to packaging. The operating costs of some applications could be drastically reduced by utilizing a dedicated high-efficiency blower. Because high velocity and not high pressure is required for these applications, a blower can provide a large air output at lower pressure for a fraction of the cost compared to traditional compressed air methods.

ESTIMATED CONVENTIONAL AIR POLLUTANTS DIVERTED IN METRIC TONS

For Implemented and In Progress Recommendations

TOTAL FOR ALL SECTORS						
CO_2	NH_3	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC
358.41	0.00	0.69	0.10	0.08	1.41	0.03

ESTIMATED GREENHOUSE GASES DIVERTED IN METRIC TONS

TOTAL FOR ALL SECTORS			
$MTCO_2e$	CH_4	N_20	CFC
402.67	13.23	2.20	2.15

ESTIMATED CONVENTIONAL AIR POLLUTANTS DIVERTED IN METRIC TONS

For Recommendations in Recommended Status

TOTAL FOR ALL SECTORS						
CO_2	NH_3	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC
251.52	0.00	0.49	0.07	0.05	0.99	0.02

ESTIMATED GREENHOUSE GASES DIVERTED IN METRIC TONS

TOTAL FOR ALL SECTORS			
$MTCO_2e$	CH_4	N_20	CFC
282.57	9.29	1.54	1.51