LAFARGE NORTH AMERICA

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COMPANY BACKGROUND

Lafarge North America is a French-based company and a global leader in the manufacturing of building materials including cement, aggregates, concrete and gypsum. Lafarge operates at more than 1,963 production sites in 78 countries and is currently ranked as the number one cement manufacturer in the world. Of its €16.2 billion in sales in 2010, 59.7 percent came from cement. The facility located in Buffalo, Iowa is part of the Lafarge cement division and is capable of producing more than 1 million tons of cement annually. The facility operates 24 hours per day, seven days a week, 52 weeks per year.

PROJECT BACKGROUND

The plant's compressed air system was the primary focus of the project. This system was engineered to operate with the capacity of two compressors. However, a backup compressor has since been brought on line to maintain minimum pressure requirements. The goal of the project was to identify inefficiencies in the system and formulate standard operating procedures so that the third compressor may be shut off.

INCENTIVES TO CHANGE

The availability of compressed air directly affects production at Lafarge. Incorrect or inefficient use of compressed air is expensive and is unregulated in most areas. It is important that a company know the amount of compressed air being consumed in an application. Otherwise, the system may be unable to maintain minimum pressure requirements, resulting in equipment damage and costly downtime.

Allowing an excessive number of air leaks to form in a compressor system may also result in bringing extra compressor capacity on line.

Monitoring when and where compressed air is used would enable Lafarge to optimize efficiency of the compressed air system, reduce operating costs and increase reliability. In order to accomplish this, Lafarge hosted a 2011 intern.

RESULTS

Regulate Open Blowing: At a cost of $0.11 per 1,000 cubic feet, compressed air is one of the most expensive utilities at Lafarge and should therefore be used efficiently. Open blowing is commonly used to clean areas or maintain material flow. When open blowing is utilized, more than 7 percent of the system's capacity is dedicated to each application that uses it. If engineered nozzles were used in the same applications, this dedicated capacity could be decreased to less than 2 percent. Open blowing should never be used to clean an area and a log should be kept to track the amount of money spent to maintain material flow.

Implement Electric Blowers: Venturi blowers use high-cost, high-pressure compressed air to move large volumes of air. These blowers are scattered throughout several locations in the facility. Blowers are most commonly used to ventilate an area or to cool equipment and personnel. Because high volumes of air are needed for these tasks, it is essential to choose the most cost-effective system. Installing electric-powered blowers with comparable capacity to venture blowers would be approximately 97 percent more efficient than the present system.

Fix Compressed Air Leaks: As part of the compressed air audit, a leak survey of the plant air system was performed using an ultrasonic leak detector. It was discovered that approximately 7 percent of the system's capacity is lost to air leaks. Allowing air leaks to develop decreases the amount of air available to critical production applications. If these leaks become excessive, extra compressor capacity must be brought on line or purchased. It will be much more cost effective to fix air leaks and to develop a scheduled leak detection plan in order to minimize problems.

Lower Dryer Purge Rate: For pneumatic equipment to function properly, it is vital that the compressed air being used is dry. Exhaust purge dryers use valuable compressed air to regenerate their desiccant beds and maintain necessary dew points. The minimum specified amount of compressed air should be used to accomplish this task efficiently. The dryer's purge rate has been increased from the manufacturer's specifications since it was installed. Lowering the purge rate during the regeneration cycle would save money and increase usable system capacity.

CONVENTIONAL AIR POLLUTANTS AND GREENHOUSE GASES DIVERTED IN STANDARD TONS

Total for all sectors					
CO_2	SO_2	CH_4	N_20	CFC	PM-10
592.05	3.05	19.27	0.03	6.92	0.07

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
REGULATE OPEN BLOWING	$16,400	390,500 KWH	ONGOING
ELECTRIC BLOWERS	$3,560	84,780 KWH	ONGOING
FIX AIR LEAKS	$13,200	314,280 KWH	IN PROGRESS
LEAK MANAGEMENT PLAN	$10,100	240,470 KWH	RECOMMENDED
LOWER DRYER PURGE RATE	$8,000	190,476 KWH	IN PROGRESS