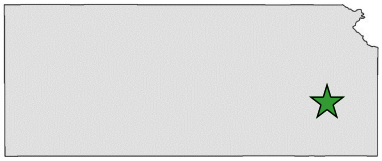
2013 Case Study

Gates Corporation

Intern: Kayla Wehkamp
Major: Environmental Engineering
School: Kansas State University



Iola, Kansas

Company background

Gates Corporation—headquartered in Denver, Colorado, and owned by Tomkins—is an international producer of belts, hose, and hydraulics. The Iola, Kansas, production plant manufactures a variety of hose through several processes. Employing 710 individuals and operating 24 hours a day, five days a week, Gates is a major part of the Iola community.

Project background

Reducing water usage was identified as the main goal of the P2 internship. Through observation, data collection, and conversations with Gates employees, several water-reduction projects were identified. In addition to decreased water use, one energy-efficiency project was also identified and pursued.

Incentives to change

Following one of the driest summers in recent memory in 2012, the city of Iola water supply is dangerously low. Gates wants to do its part to save water and set a goal to reduce water usage by three percent in 2013. As part of that initiative, Gates hired a P2 intern to work exclusively on water reduction throughout the production facility. In 2012, Gates used 32,995,998 gallons of water. In order to reduce usage by three percent, a water-saving goal of 989,880 gallons needed to be met.

Projects reviewed for E2/P2 potential

1. Vacuum pump

Currently, Gates operates nine vacuum pumps to help create a smooth application of plastic and rubber on its hose. Of these nine pumps, one is air-cooled and eight are water-cooled. Seven of the eight water-cooled pumps were found to be tied into the cooling tower return system. However, one pump was draining directly to industrial waste. The 1.5-gpm, water-cooled Nash pump runs 24 hours a day, five days a week, year round and uses 561,600 gallons annually. By replacing the water-cooled pump with an air-cooled pump, Gates would save $2,028.62.

2. Cooling tank

The cooling tank in the 60-ft. pole built area is used to chill the hose after it comes out of the vulcanizer. Currently, the 1,800-gallon tank has no regulation for filling and drains to industrial waste. By installing a flow meter, annual water use of 709,800 gallons was determined. To conserve energy for cooling the water, a float valve would be installed at the minimum height needed to cool the hose. Whenever the water is below that height, more will flow in but excess water is never wasted. To recirculate the water, the drains will need to be rerouted to be tied into the tower return drain. This solution is especially beneficial because it only requires the initial investment cost. After installation, no annual costs will occur. By implementing the float valve and the new drain system, Gates would save $4,008.17 annually.

3. Filter tanks at finish

Water is used to test the pressure rating on each and every hose produced at the Gates facility. Testing is a part of the finishing process, and each method of producing hose has its own finish department. Within this department are various finish tables on which the hose is tested. Because the tables are spread throughout the department, capturing the water proved to be quite a challenge. Although the high volume department used the most water, the water was spread between so many tables, it would be very expensive to capture it. When calculations were executed for the pole-built department, it was found to be a much better candidate for water reclamation. The 200-ft. pole-built area, in particular, produced a large volume of water spread over only two tables. The solution to catch this water was simple: a tank would be installed next to each testing station and the water from testing the hose would be blown into the

tank. A pump and a filter would also be installed, providing the pressure necessary to move the water and a way to prevent small particles from contaminating the water. By implementing this project for just the 200-ft. pole-built department, 293,504 gallons of water would be saved. Annual cost savings for this project would be $1,657.39

4. Hump hose vulcanization
Gates produces hump hose for use in hydraulic systems. Because the final hose is short, they do not need to produce long lengths. For this reason, hose is produced on 12-foot-long pipe. However, the process for making hump hose is the same as making large-diameter hose built on 80-foot poles. Therefore, Gates currently uses a 90-foot vessel to vulcanize the short hose since it is in the same department and minimizes hose transportation. It was observed that a smaller vulcanizer (with less than half the volume of the large vulcanizer) was available for the majority of production time due to its specialized use.

Calculations were completed to determine if cost savings would occur by vulcanizing the hump hose in the small vulcanizer instead of the large one. It was determined that $6,973.20 and 2,100 therms of natural gas could be saved by making the switch to the smaller vulcanizer.

5. Rubber vs. plastic mandrel
At Gates, hose is made around a variety of mandrels, including both plastic and rubber. Managers were interested in seeing which of the mandrel options were more efficient in terms of both time and water use. To monitor the gallons used to remove the mandrel from the hose, flow meters were installed on a high-volume unit. The operators were given a data sheet and a stopwatch, and were asked to record the length of hose, type of hose, type of mandrel, start and stop meter readings, and time to remove the mandrel. After taking data for three weeks, analysis showed that on average, plastic mandrel uses 25.4 gallons of water per thousand foot of hose to remove. Rubber uses much more at 46.6 gallons per thousand feet. However, more variety of hose diameters were tested for plastic mandrel—many of them being much smaller in diameter—and to get a true comparison, more data needs to be collected and analyzed.

Summary of 2013 E2/P2 intern recommendations for Gates Corporation

Project description	Annual estimated environmental impact	Annual estimated cost savings	Status
Vacuum pump	561,600 gallons	$2,028.62	Recommended
Cooling tank	709,800 gallons	$4,008.17	Recommended
Filter tanks—200’	293,504 gallons	$1,657.39	Recommended
Filter tanks—high volume	665,420 gallons	$3,757.83	Not recommended
Hump hose vulcanization	2,100 therms	$6,973.20	Recommended
Rubber vs. plastic mandrel	N/A	N/A	Further research needed
Total savings *	**1,564,304 gallons**	**$14,669.38**	
GHG reductions *	**47.37 metric tons CO_2e**		

* Does not include projects that are “not recommended” or where “further research is needed.”