

USDP reduces waste in bottling process

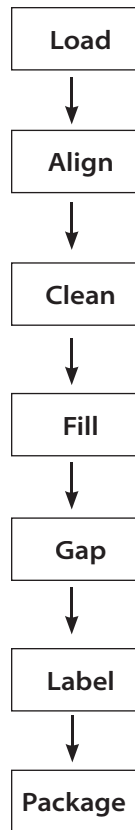
The MnTAP intern who worked with United States Distilling Products was able to determine four steps during the bottling process where wastes were occurring but could be reduced significantly. The company implemented many of the intern's recommendations and realized environmental and economic benefits to reducing wastes.

United States Distilled Products (USDP), located in Princeton, Minnesota, is a leading contract bottler and producer of alcoholic beverages. The company, in business since 1981, annually produces two million cases of liquor, spirits, and cordials in a 245,000 square-foot facility.

Process Overview

USDP purchases alcohol, sweeteners, flavorings, and other components that are mixed and bottled per each customer's formula specifications. The facility does not do any distillation and focuses instead on bottling and packaging, the primary operations at USDP. There are six bottling lines; each line performs seven steps as shown to the right.

The bulk bottles are loaded onto the front end of the conveyor system. They are then aligned, cleaned, filled with product, capped, and labeled. The finished bottles are then placed into cardboard cases for shipping. While each line follows this process, they all have different degrees of automation that range from mostly manual to near total automation.



Issues Needing Resolution

At USDP, primary raw materials include empty plastic and glass bottles and liquid product. The bottles represent the highest cost raw material. Upon examining the inventory and purchasing records, it was discovered raw material losses at USDP were running higher than industry average. This presented an opportunity for cost and material savings. Losses of bottles result in higher raw material costs, while losses of liquid product cost money and increase wastewater



MnTAP sponsored an intern project at United States Distilled Products to reduce waste.

treatment costs. Because the loss mechanisms and magnitude of each mechanism were unclear, this project was developed to identify the loss mechanisms and determine solutions to prevent them from occurring.

Throughout the project, the MnTAP intern observed four of the six bottling lines at USDP and recorded the cause of each waste generating event. The results of this survey are shown in Figure 1. Most of the raw material losses (52%) occurred in the labeling operation, while cleaning, filling, and loading operations each experienced 11% of the losses.

Once the causes were determined, waste reduction opportunities were identified and implemented in the labeling, loading, and cleaning steps.

Benefits Overview

	(reduced)
raw material waste	1,100 lb
water use	43,000 gal
raw material savings	\$25,000

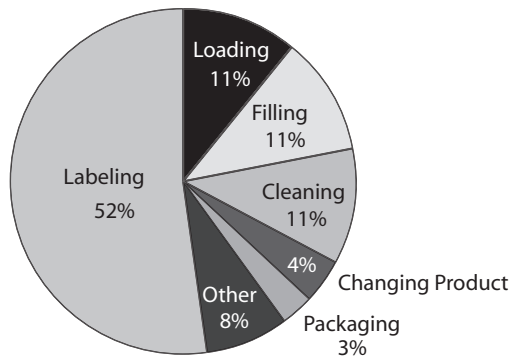


Figure 1: Bottling Line Waste Generation

Labeling

Labeling at USDP is performed by high-speed, automated machines. The labeling machines must quickly rotate and align the bottles to apply the label in the proper position. A notch, molded on the backside of the bottles, is read by a fiber optic eye to give the labeling machine feedback about bottle alignment. However, the fiber optic eye would often misread the notch due to another molding on the bottle that reads “1.75 LITRES.” USDP worked with their bottle supplier to have the molded letters moved so they would not interfere with the operation of the fiber optic eye.

Waste is also generated at the labeling operation when machine adjustments are incorrect. Previously, waste generated at the labeling operation was not tracked, and no root cause for errors was sought. After identifying the labeling operation as the largest source of waste, the MnTAP intern worked with USDP management to bring in a labeling specialist to conduct training with the USDP operators on how to find and solve the cause of labeling errors. The MnTAP intern also developed a training manual and standard operating procedures for USDP by using the information provided by the specialist.

Loading

The MnTAP intern observed a significant number of bottles falling onto the floor in the loading area. Despite having a catch bin in place, the line was often overwhelmed and excess bottles spilled onto the floor. Due to sanitation concerns, once a bottle hits the floor it becomes waste. After observing the line’s operation, the MnTAP intern determined that a larger catch bin would give the line enough time to use the bottles in the loading area before they were pushed onto the floor. A larger catch bin was designed, fabricated, and installed that now prevents bottles from being wasted and saves 425 pounds per year of raw materials.

Cleaning

One of the main sources of wastewater at USDP comes from rinsing of tanks. Previously, static spray balls were used to rinse residue from the walls of the tank. These static sprayers used over 67 gallons of water per minute. After researching options, the MnTAP intern recommended that USDP replace the static sprayers with a whirling nozzle that would rinse the tank walls just as effectively using only 20 gpm. This resulted in reduced water use and reduced transportation costs since USDP ships its high-strength wastewater to Zimmerman for treatment.

Results and Benefits

As a result of this MnTAP intern project, USDP reduced their raw material waste by over 1,100 pounds per year and their water use by over 43,000 gallons per year for a total cost savings of over \$25,000 per year.

This project was conducted in 2005 by MnTAP intern Mark McGuire, a junior in industrial and mechanical engineering at the University of Minnesota Duluth



For More Information

MnTAP has a variety of technical assistance services available to help Minnesota businesses implement industry-tailored solutions that maximize resource efficiency, prevent pollution, increase energy efficiency, and reduce costs. Our information resources are available online at <mntap.umn.edu>. Please call MnTAP at 612.624.1300 or 800.247.0015 for personal assistance or more information about MnTAP’s Intern Program.