



Twin City Tanning Co.



Shane Johnson

Chemistry and Environmental Studies
Macalester College

Company Background

Twin City Tanning began operation in 1987 in their current facility in South Saint Paul. True Blue Tanning was running the facility until TCT took control. The 79,100 square foot facility employs 79 people. TCT is majority owned by S.B. Foot, who is also a primary customer most known for Red Wing Shoes. The company primarily processes raw cattle hides into wet blue leather that is further processed at other facilities to turn into eventual leather products. TCT also performs several collagen processes that are used in products such as pet bones and sausage casings.

Twin City Tanning Company, LLP

"Working at TCT gave me a new found appreciation for the leather making industry as it was far more complex and fascinating process than I had initially realized. I appreciate both MnTAP and TCT for giving me the opportunity to learn and grow in an independent yet supportive atmosphere." ~ SJ

Project Background

Leather tanning and manufacturing is an inherently water-intensive process, and TCT wished to find ways to lower the amount of spending associated with influent water use and wastewater generation. Additionally, organic wastes and chemicals from the tanning process generate high concentrations of chemical oxygen demand (COD) and total suspended solids (TSS) in wastewater. Having these parameters be high is common in the leather tanning industry and is impossible to fully avoid due to the nature of the industry.

Incentives To Change

Twin City Tanning sought assistance through MnTAP for primarily economic motives. The facility used approximately 135,000,000 gallons of city water in 2021 which amounted to \$1,034,000 in the year. For wastewater surcharges, TCT spent another \$1,174,000 due to high COD and TSS present in the facility effluent. By lowering the amount of water used in the process and sent through the effluent, there is plenty of opportunity to save a lot of water and money.

SOLUTIONS

Recycle Tanning Water

Within TCT's operations, tanning drums use approximately 28% of all daily water. Approximately 24% of the water used within the drums can be recycled. TCT already had a preexisting system in place to recycle this water after it goes through on-site pre-treatment. However, the system was not operational during this summer. Reimplementation of this system would involve performing maintenance of the system that holds the water for reuse in other parts of the tanning drum process. With the recycling system reimplemented, TCT can reduce their annual water usage by 7,900,000 gallons. Maintenance on the drums is projected to cost \$48,000 with an annual savings of \$174,000.

"Our intern's time here was focused on areas of production and water usage at a much deeper, more analytical level than the company normally can do as staff are busy with daily operations. It was good to see the data and have the questions asked outside of our regular work view. Our intern is going to make some company very happy as a future employee."

*~ Garrett Kramer, Assistant Plant Manager
Twin City Tanning*

Solutions

Lower Bate Wash Volume

One single step in the tanning drum process, referred to as the bate wash step, uses approximately 18% of all daily water or 64% of all tanning drum water. This step was a generalized 30-minute running wash done to remove residual chemicals from the hides and lower their temperature. This step did not take into consideration the incoming flow rate for the given drum nor the size of the tanning drum load to streamline the process for the drum operators. Analysis was performed on this step in the operation to determine which drums were running most optimally, defined as using the least amount of water per pound of hide. It was suggested to TCT that the wash time should be more specific to the variables of the load to avoid using excessive water. Lowering the bate wash volume for the drums using excess water would lower annual water usage by 4,300,000 gallons with an annual savings of \$95,000.

Minimize Wringer Pre-Wash Loss

Prior to the wringing process, where excess water is removed from the hides, the hides receive a brief wash to remove excess organic matter from the hides to extend the life of the wringing machine. The washing system experiences significant loss due to the hides splashing water out of the system as they enter the wash. Minimizing this loss is conservatively estimated to save 18,000 gallons of water and \$300 annually. The experiment performed to determine this did not catch as much lost water as hoped and more study is necessary to get a better idea of the potential savings.

Collagen Accounting

TCT was interested in tracking how much water was being retained in products leaving the facility. Collagen processing was identified as a process that tended to absorb a lot of water. By accounting and reporting for how much water was being absorbed by the product, TCT could save up to \$2,300 annually.



Recommendation	Annual Reduction	Annual Savings	Status
Recycle Tanning Water	7,900,000 gal water	\$174,000	Recommended
Lower Bate Wash Volume	4,300,000 gal water	\$95,000	Investigating
Minimize Wringer Pre-Wash Loss	18,000 gal water	\$300 (est.)	Investigating
Collagen Accounting	N/A	\$2,300	Investigating

MnTAP Advisor: Kevin Philpy, Senior Engineer