

# Minnesota Technical Assistance Program (MnTAP) Intern Program

Solutions that benefit businesses, communities  
and our future workforce

Toxics Release Inventory (TRI) Virtual Conference – September 21<sup>st</sup>, 2022

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UNIVERSITY OF MINNESOTA

**Driven to Discover<sup>SM</sup>**

**Mn  
TAP**

# Introduction

- MnTAP background
- Intern program overview
- Benefits beyond the numbers



# Minnesota Technical Assistance Program

## Based at University of Minnesota

Helping Minnesota (MN) businesses find **cost-effective solutions that reduce waste, conserve water, save energy, and prevent pollution.**

**Confidential, non-regulatory, and no-cost**



# Industry examples



Brewing & Distilling



Dry Cleaning



Ethanol Production



Fiber Reinforced Plastics



Food Processing



Healthcare



Iron Mining



Machining & Metal Fabrication



Metal Casting



Metal Finishing



Painting & Wood Finishing



Pulp & Paper Mills



POTWs



Printing



Vehicle Maintenance

# MnTAP Services

- **Technical Assistance**
  - Site assessments
  - Intern program
  - Phone & email requests
  - Demonstrations/research
- **MN Materials Exchange**
- **Outreach and Training**



# MnTAP Summer Intern Program

- **15-20 Intern Projects**
  - **Pollution prevention**
  - **Process efficiency/lean manufacturing**
  - **Waste prevention**
  - **Water & Energy Conservation**
- **Full-time, 500 hours (13 weeks)**
- **Intern = project lead**
- **MnTAP advisor – follow-up with company for minimum of 2 years**



*The 2022 MnTAP Intern Cohort*

# Interns take the lead

- Work on-site at the company
- Learn the processes
- Consult with operators
- Reach out to vendors
- Research solutions
- Make recommendations



# Showcasing results

- Annual Symposium event
- Project executive summaries published in *MnTAP Solutions*



**Cemstone**

**Company Background**  
Cemstone Products Company is a ready-mixed concrete producer with 43 plants in Minnesota and a total of 57 plants in Minnesota, Iowa and Wisconsin. Many of their largest plants are located in the Twin Cities Metro area as is their corporate headquarters, which is in Mendota Heights. Cemstone employs about 600 people, a majority of which are residential truck drivers who deliver concrete to customers. The concrete that Cemstone produces is used to build large commercial buildings such as US Bank Stadium as well as residential walls and driveways.

**David Franko**  
Chemical Engineer  
University of Minnesota, Twin Cities

"Through my internship at Cemstone, I have been able to use my passion for water conservation to find and implement large water savings not typically seen in a residential capacity, further opening my eyes to industrial water use. I now feel fully equipped to make an informed decision on where I would like to work and what jobs fit my specific skill set." - David Franko

**Project Background**  
Cemstone uses water from both private wells and municipal sources depending on the plant. This water is used in new concrete production, truck tire clean truck wash-out, and saddle tank filling. Cemstone has also built air-wash systems which collect surface and drive water at their ready-mixed concrete facilities which make it possible to reuse the water used to wash out truck drums. The wash systems also catch the water so that it can be used in the production of new concrete. Through this project, the company wanted to learn more about how water could be best conserved and reused in their process.

**Incentives To Change**  
Cemstone prides itself on being an environmentally friendly company. Of the 43 plants studied, the average plant used 4,200,000 gallons of water a year with 21% used to mix concrete. By using less water, Cemstone will reduce their water and electricity bills, double incentives to change the National Ready Mixed Concrete Association (NRMCA) Sustainability certification. By earning enough points, awarded for specific environmental practices like water reduction, a ready-mixed concrete plant can be certified through the NRMCA. This would put Cemstone in a group of only four companies with a certified plant. Many of the plants that Cemstone operates are within five points of being certified, and reducing water usage will help them reach this goal.

**SOLUTIONS**  
**Install Automatic Shut-off Nozzle for Tank Filling**  
The truck saddle tanks are topped off before each concrete delivery. During this process, hoses overflow while drivers pressure their trucks for loading, spilling 4,200,000 gallons of water per year. Installing automatic shut-off nozzles would stop the flow of water when the tank is full, similar to a gas nozzle. This option is recommended for all 43 plants since it is easy to install and has the potential to save 21% of overall freshwater use.

**Reuse Wash Water**  
Of the total water used in concrete production, only 4% is recycled wash water. All concrete processes water used

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**Install Load and Go Wash Systems**  
Cemstone is currently using 3,000 gallons of water annually for rinsing trucks after they are loaded in. A 2,000,000-gallon sewage could be treated with a Load and Go Wash System installed at all of the plants. The Load and Go system is a high-pressure wash system that cleans the truck in 30 seconds as opposed to the average 4 minutes for manual washing. This not only saves water, it also saves time and prevents injuries.

**Uniform Driver Training**  
There is a large discrepancy in how drivers use water, prompting the recommendation of a more uniform training regime. The training should include a portion on water conservation and how to appropriately use the wash system, the saddle tank, and all hoses at the plant.

**Collect Rainwater**  
The roof area of many of the plants exceeds 5,000 ft<sup>2</sup> which could collect more than 1,000 gallons of water in an average rainfall event. Rainwater is nearly potable and could be used in any application without filtration other than for drinking water. This would be advantageous for dust suppression, saddle tank filling, and cooling the aggregate piles in the summer and is recommended for sites with roof areas of 5,000 ft<sup>2</sup> or greater.

The only two sites with a fully enclosed weir system are Burnsville and Minneapolis. The benefit of enclosing the

Recommendation	Annual Reduction	Annual Savings	Status
Install automatic shut-off nozzles	4,200,000 gallons	\$0,000	Being tested
Reuse wash water	2,750,000 gallons	\$8,900	Partially implemented
Install load and go wash systems	2,750,000 gallons	\$8,900/yr	Recommended
Uniform driver training	180,000 gallons	Variable	Partially implemented
Collect rainwater for reuse	900,000 gallons	Not known	Speculating



The water in the basins of the wash system is first used for washing out the truck drums and has a pH of between 9-10 as well as suspended solids, which makes it suitable only in the production of new concrete. The pH is too high for use in truck tire clean or saddle tank filling. Adding a CO<sub>2</sub> bubbling system to the final leg of the weir system would lower the pH of the water. This would also precipitate out the dissolved solids in the water which would make the water more usable in hoses and pumps. This option is recommended for plants that do not need a Load and Go system, since this system is cheaper and would provide the same water savings.

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# Intern Project Example

 **RUST-OLEUM**

*Brooklyn Park, MN*



**Key goals:**

- Reduce Methyl Ethyl Ketone (MEK) use
- Increase overall process efficiency

**Approach:**

- Research and test substitutions
- Explore process improvement opportunities

# Intern Project Example



## Key solutions:

- Dual-solvent approach: substitute MEK with Tetraoxaundecane (TOU) and Dibasic Ester (DBE)
- Reusable sprayers, standard operating procedure (SOP) improvements



## Results:

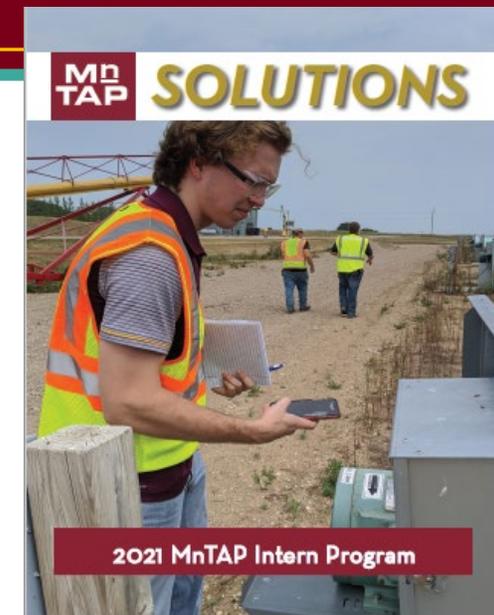
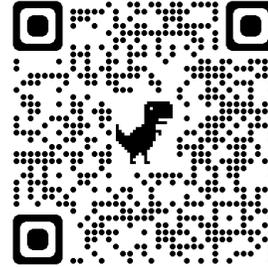
- 98,000 lbs hazardous waste and 13,000 lbs solvent reduced
- 5,000 lbs of product saved
- \$85,000



# 2021 Results

2022 publication – *coming soon!*

Scan Quick Response (QR) code to the right to see all past issues of MnTAP Solutions



Recommendation	Reduction	Cost Savings	Equivalents (annual)
Water Conservation	24,000,000 gallons	\$74,000	Water for more than 1,000 Minnesota residents
Waste	630,000 lbs	\$410,000	Annual waste from 300 Minnesota residents
Chemicals	190,000 lbs	\$60,000	Nearly 400 55 gallon drums
Electricity	4,000,000 kWh	\$430,000	Electricity for 2,800+ Minnesota homes
Gas	200,000 therms	\$90,000	CO2 emissions from 220 passenger vehicles
Production Impacts	---	\$14,000	---
Total Potential Cost Savings	---	\$1,078,000	---

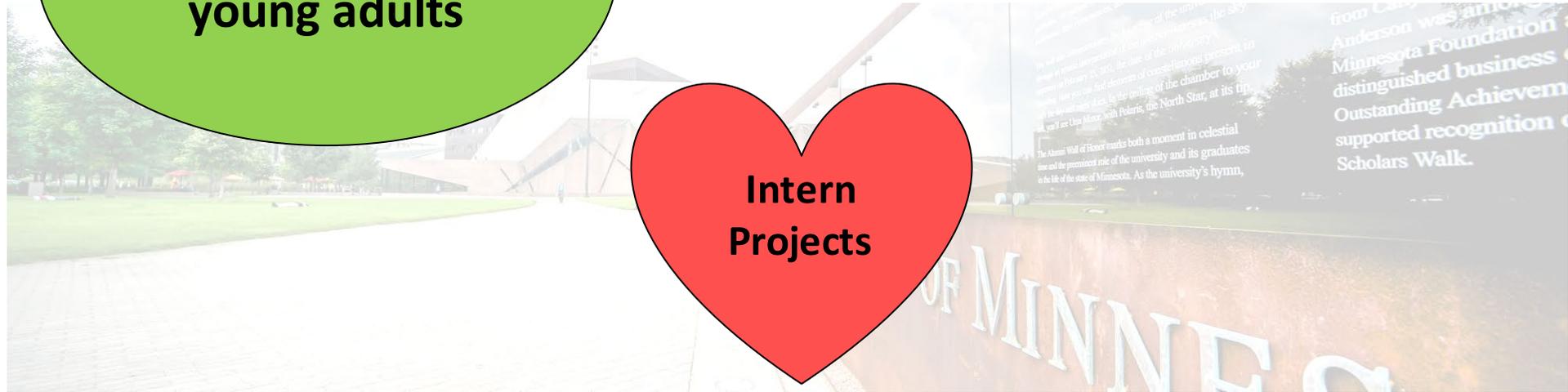
# Benefits beyond the numbers...



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Empowering opportunities for young adults

Intern Projects



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**Community-  
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# Benefits beyond the numbers...

**Empowering opportunities for young adults**

**Companies gain confidence in environmental solutions**

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**Community-company trust and collaboration**

**Interns “show us the way!”**

# Thank You!



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