Water Conservation at Cemstone Products Company

By: Brent Vizanko
Advisor: Michelle Gage
Cemstone Supervisor: Pat Bergin
Company Background

• Ready mixed concrete producer with 40+ plants.
  • Serving Minnesota, Wisconsin and Iowa
• Focused on 12 plants in and around the metro
  • Red Wing, Hastings, Northfield, Jordan, Rosemount, Burnsville, St. Paul (2), Minneapolis, Dayton, East Bethel, and Columbus.
Need for MnTAP

• Goal: Reduce fresh water consumption by 10%
  • Will aid in NRMCA sustainability certification

• Quantify reduction using water balance
  • Identify major water saving areas
  • Develop system for future

• Optimize existing systems
  • Weir system
Motivation

• Cost Reduction

• Reduced risk of process water discharge
  • Environmental compliance

• NRMCA Certification
  • Only four companies with certification

Average Yearly Water Totals for Each Plant

- Fresh Water: 4,723,000 gal
- Domestic: 144,000 gal
- Batching: 2,164,000 gal

Savings Potential: 2,415,000 gal
**Steps Taken**

1. Site visits, process understanding, and water balance
2. Identification of possible water saving areas and vendor contact
3. Development of site specific solutions
Opportunities for Fresh Water Reduction

• Water Reduction Options
  • Saddle tank overfilling
  • Rinse down/out procedure at the plant and at the jobsite
  • Pre-delivery truck wash

• Water Reuse Options
  • Clarified water use in concrete production
  • pH control for truck wash
  • Rainwater harvesting
Recommendations - Water Reduction

• **Automatic Shut-off Nozzle**
  - **Problem/Opportunity:**
    - Overflow occurs when saddle tank is filled
    - Saddle tank is filled before each delivery
  - **Solution:**
    - Install nozzle on all saddle tank fill hoses
    - Eliminate most overflow from saddle tank
  - **Benefits:**
    - Easy to install/use
    - Difficult to work around

Photo courtesy of OPW Global ([opwglobal.com](http://opwglobal.com)).

<table>
<thead>
<tr>
<th>Water Savings/Year: 4,100,000 gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Cost/Nozzle: $500</td>
</tr>
<tr>
<td>Average Payback Period: 2.8 years</td>
</tr>
</tbody>
</table>
Recommendations - Water Reduction

• **Automatic Rinse Down System**
  • **Problem/Opportunity:**
    • Overuse of water during wash down
  • **Solution:**
    • Install automatic wash system
    • Optimize system for reduced water use
  • **Benefits:**
    • Completely automatic
    • Reduces time, water and injuries

Water Savings/Year: **2,700,000 gallons**

Implementation Cost/System: **$58,700**

Average Payback Period: **1.4 years**

Photo courtesy of Key Solutions (readymixwash.com).
Recommendations - Water Reduction

• Driver Training
  • Problem/Opportunity:
    • Inconsistent driver training across all plants
    • Not all drivers are conscious of water use
  • Solution:
    • Create a “best practices” document
    • Start a water conservation initiative to raise awareness
  • Benefits:
    • Reduces the risk of a process water discharge
    • Potentially reduce saddle tank water use by 10%

Water Savings/Year: 780,000 gallons
Implementation Cost/System: $0
Average Payback Period: N/A
Recommendations - Water Reuse

• **Weir Water Use**
  
  • **Problem/Opportunity:**
    • Weir systems have usable water
    • Weir water has pH of 11-13
  
  • **Solution:**
    • Use more water from weir systems
    • Install pH control for added uses
    • Enclose existing weirs for year round use
  
  • **Benefits:**
    • Large overall water reduction
    • Applies to all plants that have a weir system

Water Savings/Year: 7,680,000 gallons

Implementation Cost/Plant: Varies

Average Payback Period: Varies
Recommendations - Water Reuse

• Rainwater Collection
  • Problem/Opportunity:
    • Many plants with roof areas of >5700 ft²
    • Auxiliary buildings also have large roofs
  • Solution:
    • Install storage tank and gutter systems to catch rain water
    • Route water to truck wash stations and aggregate piles
  • Benefits:
    • Not considered process water
    • Supplemental water for when weir is being cleaned

Water Savings/Year: 730,000 gallons
Implementation Cost/Plant: TBD
Average Payback Period: TBD
# Recommendation Summary

<table>
<thead>
<tr>
<th>Water reduction option</th>
<th>Water saved (gal per year)</th>
<th>% Reduction</th>
<th>Implementation cost</th>
<th>Average cost savings (per year)</th>
<th>Payback period</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Shut-off Nozzles</td>
<td>4,100,000</td>
<td>7.2%</td>
<td>$8,500</td>
<td>$5,664</td>
<td>1.5 years</td>
<td>In testing</td>
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<tr>
<td>Weir Water Use</td>
<td>7,680,000</td>
<td>13.6%</td>
<td>Varies</td>
<td>$9,029</td>
<td>Varies</td>
<td>Partially Implemented</td>
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<tr>
<td>Load and Go Rinse System</td>
<td>2,700,000</td>
<td>4.8%</td>
<td>$352,200</td>
<td>$265,384</td>
<td>1.3 years</td>
<td>Recommendation</td>
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<tr>
<td>Rainwater Collection</td>
<td>730,000</td>
<td>1.3%</td>
<td>Unknown</td>
<td>$2,508</td>
<td>Unknown</td>
<td>Researching</td>
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<td>Driver Training</td>
<td>780,000</td>
<td>1.4%</td>
<td>$0</td>
<td>Varies</td>
<td>N/A</td>
<td>Partially Implemented</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16,020,000</strong></td>
<td><strong>28.3%</strong></td>
<td></td>
<td><strong>$282,585</strong></td>
<td></td>
<td></td>
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</tbody>
</table>
Personal Benefits

• Engineering is not exact, but it’s close
• The plant is the best source of information
• Talking on the phone is a skill and an art form
• Environmental compliance is paramount
• Got to ride in a Cemstone Truck
Questions?

This project was sponsored in part by Metropolitan Council Environmental Services