Water Use in the Professional Car Wash Industry
International Carwash Association

• Trade association representing the professional car wash industry
• 2000 members worldwide, representing 15,000 car washes
• Focus on trade, education, research and advocacy
Study Information

- Original study conducted in 2002
- Measured water use, evaporation and carry out in commercial car washes
  - Conducted in three markets - Orlando, Phoenix and Boston
- Recent study conducted in summer of 2017
  - One market – Northern California
- Both studies conducted by Chris Brown Consulting
Agenda

• Water Use in Conveyor Car Wash
• Water Use in an In-Bay Automatic Car Wash
• Use of Reclaim
• Conclusions
• Perspectives from a Car Wash Owner and Customer
Methodology

- Doppler meter inserted in the final discharge pipe from the car wash separation tank to the sanitary sewer.
- Only car wash water was counted
- Metered water supply tracked and compared to the discharge.
- Six conveyor car washes
- Six in-bay automatic car washes
Methodology

• Evaporation and carryout calculated by averaging the total freshwater purchased per vehicle versus the wastewater discharged per vehicle

• Reclaim* values determined by accounting for number and type of water uses supplied by:
  • Freshwater
  • reclaim water
  • spot free water

*Presented in ratio of gallons of reclaim to freshwater
Conveyor Car Wash

- Car is pulled through a tunnel
- Configuration is different for every car wash, including length of tunnel and type and amount of washing equipment used
- Typically includes high pressure washing, with soft cloth and soap applications. Includes a final rinse.
- Three components to washing
  - Chemical
  - Friction
  - Water
## Conveyor Car Wash

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-soak</strong></td>
<td>An automated nozzle or hand held spray.</td>
<td>It was present in all of the washes in this study. It is not found in all car washes.</td>
</tr>
<tr>
<td><strong>Wash</strong></td>
<td>High-pressure spray or cloth material with detergent solution.</td>
<td>According to industry reports, almost all conveyors now use cloth features</td>
</tr>
<tr>
<td><strong>Rocker panel/undercarriage -</strong></td>
<td>Cloth material or high pressure sprays on sides and bottom of vehicle.</td>
<td>In a conveyor these may be operated on independent arms or carriages that spray upward from below or beside the vehicle. All sites used reclaim water.</td>
</tr>
<tr>
<td><strong>First Rinse</strong></td>
<td>Typically a high-pressure water rinse</td>
<td>Can use reclaim or freshwater. Not spot free.</td>
</tr>
<tr>
<td><strong>Wax/Sealers/Polishes</strong></td>
<td>An optional surface finish is sprayed on the vehicle.</td>
<td>Typically freshwater, although in some cases, spot free reject water, or highly treated reclaim water will be used.</td>
</tr>
<tr>
<td><strong>Final Rinse</strong></td>
<td>Low-pressure rinse</td>
<td>Spot free rinse with fresh or membrane-filtered/deionized water.</td>
</tr>
</tbody>
</table>
Reverse Osmosis

• Most facilities used Reverse Osmosis (RO) to produce spot free water in the final rinse
• Reject water is directed in to the reclaim tanks for use in a future wash cycle
Evaporation and Carry Out

• Amount is not directly measurable but estimated
• Water input – water outflow + change in storage
  • Change in storage irrelevant in this study as RO storage tanks were topped up each day and separation tanks were full at the beginning and end of the study period
## Evaporation and Carryout Values

### Table C1
Freshwater Use, Evaporation and Carryout in Conveyor Car Washes (California, 2017)

<table>
<thead>
<tr>
<th>Car Wash</th>
<th>Freshwater GPV</th>
<th>GPV E &amp; C</th>
<th>Percent E&amp;C</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>27.4</td>
<td>6.1</td>
<td>22.2</td>
</tr>
<tr>
<td>CB</td>
<td>23.3</td>
<td>5.7</td>
<td>24.5</td>
</tr>
<tr>
<td>CC</td>
<td>31.1</td>
<td>5.0</td>
<td>16.0</td>
</tr>
<tr>
<td>CD</td>
<td>23.7</td>
<td>6.1</td>
<td>25.9</td>
</tr>
<tr>
<td>CE</td>
<td>37.9</td>
<td>6.3</td>
<td>16.6</td>
</tr>
<tr>
<td>CF</td>
<td>36.5</td>
<td>8.5</td>
<td>23.3</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>30.0</strong></td>
<td><strong>6.3</strong></td>
<td><strong>21.4</strong></td>
</tr>
<tr>
<td><strong>StDev</strong></td>
<td>6.3</td>
<td>1.2</td>
<td>4.15</td>
</tr>
</tbody>
</table>

### Table C2
Conveyor Car Wash Values (2002 ICA Study)

<table>
<thead>
<tr>
<th>Location</th>
<th>Freshwater GPV</th>
<th>GPV E &amp; C</th>
<th>Percent E&amp;C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orlando</td>
<td>34.3</td>
<td>5.2</td>
<td>15.1</td>
</tr>
<tr>
<td>Boston Area</td>
<td>26.7</td>
<td>4.3</td>
<td>16.1</td>
</tr>
<tr>
<td>Phoenix</td>
<td>43.8</td>
<td>7.3</td>
<td>16.7</td>
</tr>
</tbody>
</table>
In-Bay Automatic Car Wash

- Car remains stationary while equipment moves around the car
- Typically found in gas station/self-service applications
- Friction vs. touchless
- More uniform application than conveyor washes
# In-Bay Automatic Car Wash

<table>
<thead>
<tr>
<th>Presoak</th>
<th>Initial low pressure pass</th>
<th>Contains solutions to help lift dirt off vehicle surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash</td>
<td>High pressure pass in the touchless washes –or– Cloth brushes, which are watered with low pressure sprays</td>
<td>May use reclaim water</td>
</tr>
<tr>
<td>Hub scrub</td>
<td>A circular brush which removes dirt and shines the hubcaps and tires –or– a high pressure spray</td>
<td>When equipment is present</td>
</tr>
<tr>
<td>First rinse</td>
<td>Typically low pressure.</td>
<td>To remove solutions still on the vehicle surface.</td>
</tr>
<tr>
<td>Clear coat</td>
<td>Low pressure spray</td>
<td>Contains solutions to protect the vehicle finish</td>
</tr>
<tr>
<td>Final rinse</td>
<td>Low pressure. Spot free water</td>
<td>Treated to remove small suspended solids which can leave spots as the vehicle dries.</td>
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Evaporation and Carry Out Values

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<tr>
<td>IA</td>
<td>45.3</td>
<td>9.8</td>
<td>21.7</td>
</tr>
<tr>
<td>IB</td>
<td>50.1</td>
<td>10</td>
<td>20.6</td>
</tr>
<tr>
<td>IC</td>
<td>26.8</td>
<td>7.1</td>
<td>26.4</td>
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<td>11</td>
<td>15.6</td>
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<td>5.4</td>
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Table I-2
In Bay Automatic Car Wash Values (2002 ICA Study)

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<th>Freshwater</th>
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<tr>
<td>Boston Area</td>
<td>40.0</td>
<td>11.4</td>
</tr>
<tr>
<td>Phoenix</td>
<td>72.5</td>
<td>23.8</td>
</tr>
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</table>
Reclaim Use in a Car Wash

• Filters which remove all particles above 5 microns are sufficient for all cycles except the spot-free rinse.
• Many facilities also have a RO unit to produce spot-free water.
• Reject water can be used:
  • In reclaim cycles
  • To landscape
  • Other cycles prior to the spot-free rinse
Reclaim Use in a Car Wash

• Study measured and reported reclaim water as the number of gallons per gallon of fresh water used per vehicle.
• Compared to 2002 study, all of the sites were using a reclaim system within their wash.
Reclaim in a Conveyor Car Wash

Reclaim to Freshwater Ratios (Gals/Gals)
for Six Conveyor Car Washes
Reclaim in an In-Bay Automatic Wash

Reclaim to Freshwater Ratios (Gals/Gals) for Six In Bay Car Washes
Conclusions

• Numbers will vary in a conveyor wash due to length and variations of equipment. However, fresh water used per vehicle is relatively low, due to reclaim use.

• Compared to the 2002 study, conveyor car washes are using less gallons of fresh water per vehicle.

• More conveyor sites are using reclaim than they were in 2002.

• Reclaim water is making up more than 50% of the water applied in a conveyor wash.

• Use of reclaim will lead to greater water savings in an in-bay automatic car wash.
Conclusions

• In-bay Automatics can realize greater water savings by using their reclaim system in multiple wash applications

• Evaporation and carry out is much higher in an in-bay automatic car wash and can account for almost 1 of every 5 gallons of fresh water used.
Conclusions

• The most noticeable difference between in-bay automatics and conveyor washes is the amount of evaporation and carryout per vehicle
  • Conveyor: 6.3 GPV
  • In-Bay Automatic: 8.7 GPV

• Reasons include:
  • Area of the trench versus the manhole that recovers water
  • Mist from high pressure cycles in the in-bay exit the wash
  • Increased use of dryers in a conveyor wash
Perspectives from the Car Wash Owner

• Water is considered a precious resource (On the Front Range)
• Conservation is a matter of;
  • Economics
  • Being a good steward of resources.
  • It’s good to be seen as a “Green” business
  • ICA’s Water Savers program is great advertising

• Be seen as a partner with our local Utility.
  • Drought conditions – ex. Denver Water Board
Perspectives from the Car Wash Customer

• We use a lot of water!
• Don’t understand reclaim vs. fresh water (don’t care)
  • Subaru commercial – rainfall cleaning your car
• Don’t understand the concept of waste water vs. storm water.
• Education is a key component – before the drought
  • ICA Water Savers program
  • Its all “fun and games” until we have a prolonged drought