CONSERVATION OF RESOURCES

Fluid Conditioning Of Refuse Truck Fleet

Technical Application Bulletin

PROJECT BACKGROUND

DISCOVER

- High ingression of contamination due to operational environment and cylinder actuation.
- Frequent hydraulic system component failure, requiring replacement.
- Frequent complete fluid replacement.

DIAGNOSE

- Design and implement solution for oil monitoring and maintenance program.
- Solution needed to be simple and user-friendly.
- Average existing fluid cleanliness ISO code of 20/18/15.
- Required fluid cleanliness ISO code of 18/15/13.
- Annual fluid replacement costs for 100 trucks accounting for approximately $43,500 per year.

DESIGN

What We Did: We developed an AMFS | Asset Management Filtration Station® in collaboration with the customer.

- Schroeder estimated that fluid life could be extended by at least a factor of two (2) with the Asset Management Filtration Station® and an efficient maintenance program put in place.

- Estimated annual fluid replacement cost savings for 100 trucks to be approximately $43,500 per year.
DELIVER

- The Asset Management Filtration Station® and an efficient maintenance program were successfully implemented onto the 100 fleet trucks.
- The AMFS filtered precisely to the 18/15/13 ISO cleanliness requirement on every truck, recording the cleanliness data for each service for each truck.
- Yielded impressive fluid cost savings after the first and second years.

<table>
<thead>
<tr>
<th>Refuse Truck</th>
<th>Without AMFS</th>
<th>With AMFS</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of Fluid per truck</td>
<td>70 gallons</td>
<td>70 gallons</td>
<td>-</td>
</tr>
<tr>
<td>Cost of Fluid</td>
<td>$7.00 / gallon</td>
<td>$7.00 / gallon</td>
<td>-</td>
</tr>
<tr>
<td>Fluid replacement cost</td>
<td>$490.00 / truck</td>
<td>$490.00 / truck</td>
<td>-</td>
</tr>
<tr>
<td>Quantity of trucks</td>
<td>100 units</td>
<td>100 units</td>
<td>-</td>
</tr>
<tr>
<td>Fluid replacement cost</td>
<td>$49,000 / fleet</td>
<td>$49,000 / fleet</td>
<td>-</td>
</tr>
<tr>
<td>Fluid replacement interval</td>
<td>6 months</td>
<td>18 months</td>
<td>+12 months</td>
</tr>
<tr>
<td># of fluid replacements</td>
<td>2 / year</td>
<td>0.67 / year</td>
<td>+1.33 / year</td>
</tr>
<tr>
<td>Total cost</td>
<td>$98,000 / year</td>
<td>$32,830 / year</td>
<td>+$65,170.00</td>
</tr>
</tbody>
</table>

CUSTOMER BENEFITS

- Fluid life extended from 6 months to 1.5 years
- Significant fluid cost savings
- Refuse truck availability increased by reducing system component damage
- Maintenance labor availability increased

FURTHER APPLICATION AREAS

- OEM roll-off cleanliness (e.g. first-fill fluid cleanliness certification on tractors)
- In-plant service
- Lubricant reclamation/recycling

ROI

Overall Cost-Savings After 1 Year

Return On Investment After 1 Year

Fluid Saved Per Year

Underlying values:
Overall fluid replacement cost w/o AMFS per year = $490 per truck (100 total x 2 times a year) $490 x 100 x 2 = $98,000.00
Overall fluid replacement cost w/ AMFS per year = $490 per truck (100 total x 0.67 times a year) $490 x 100 x 0.67 = $32,830.00

PRODUCT SPECS

AMFS | Asset Management Filtration Station®

Flow: 5 gpm (19 L/min)
Temp. Range: -20°F to 150°F
Viscosity: up to 1000 SUS (216 cSt)
Bypass Cracking: 30 psi (2 bar) x 2
Compatibility: All petroleum-based hydraulic fluid compatible with Viton®