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## Elimination of Organic Solvent at Dynamic Manufacturing

By: Malcolm Boyle

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Dynamic Manufacturing, Inc. is family-owned and operated Illinois retail transmission remanufacturing business in Melrose Park, IL. Dynamic worked with technical assistance specialists from the Illinois Sustainable Technology Center (ISTC) to evaluate aqueous parts washers to replace organic solvent cleaner systems.

### **Background:**

Dynamic Manufacturing, Inc. was established in 1951, and started as a single retail transmission remanufacturing business. Today, the company specializes in the remanufacture of all make and model torque converters and transmissions (both automatic and manual) for vehicle and industrial applications. Dynamic currently operates in nine locations, occupying over 750,000 sq. ft. of manufacturing, warehousing, and office space, while employing 550 skilled employees. In 2003, Dynamic was awarded the Illinois Governor's Pollution Prevention Award for its pollution prevention (P2) activities in reusing transmission fluid during the transmission test runs. The company's P2 activities have been expanded to evaluating the elimination of organic solvent in the parts washers.

### **Solvent Replacement:**

Dynamic encourages its employees to evaluate P2/waste minimization alternatives and is open to trying alternatives to solvent-based cleaners. The company started evaluating aqueous parts washers (sink-on-a-drum and immersion arrangements) to replace similar naphtha-based (organic) solvent cleaner systems and turned to ISTC for help. Dynamic leased Solvent System International's (SSI) "Grease Gator" aqueous parts washing systems to replace the organic solvent parts washers. The aqueous parts washers (with oil separation and removal system) were put on production lines (pump disassembly, teardown, small parts, and servo) and operated at a temperature of 110°F.

On the pump disassembly line alone, approximately 425 oily/dirty parts per day are manually cleaned using the aqueous system. Water was added to the parts washers as make-up for evaporation and cleaner drag-out on the parts. Every other day, a five-gallon bucket of oil was decanted from the pump disassembly aqueous parts washers.

The normal procedure for maintaining the solvent parts washers was to replace the spent organic solvent with fresh solvent every week. The spent solvent was collected

and sent off-site for fuel blending. With the aqueous cleaner, the solution has yet to be changed. The extended life of the cleaner solution reduced chemical and maintenance costs. The design of the aqueous parts washers makes for easy maintenance and oil removal. A turn of a valve allows the oil to be drained from the cleaning solution, keeping the cleaning solution from becoming contaminated with oil.

More information about the "Grease Gator" can be found on the SSI website: <http://www.solvent-systems.com/index.htm>.

**Benefits:**

The aqueous cleaner solution eliminates the solvent odor. The temperature required to obtain maximum cleaner strength does not create a problem either, approximately 110°F (warm bath water). Being an aqueous based system, there are no risks, such as fire or explosion.

The aqueous parts washing system reduces VOCs by 99.5%, reduces chemical and maintenance costs, and improves employee morale and working conditions. The total amount of organic solvent eliminated by using aqueous parts washers is estimated to be 198,400 lbs/yr. This is by replacing 10 organic solvent parts washers with an average capacity of 75 gallons.

Dynamic was receiving \$0.07 per gallon for waste oil; the low price was due to the amount of water in the oil degrading its BTU value. The water came from various sources (floor wash, the plastic case for shipping transmissions, wash down, etc.). But with the implementation of an oil management and aqueous parts washing, the quality of the waste oil improved to the point that Dynamic is now receiving \$0.50 per gallon.

Upcoming solvent parts washer replacement with aqueous systems has the potential to eliminate an additional 335,000 lbs of organic solvent per year. The associated cost savings with leasing the "Grease Gator" is estimated to be \$50,164 per year, with a 0.9-year payback.

<b>Table 1: Cost Benefit/Payback</b>	
<b>Annual Organic Solvent Costs:</b>	
Organic Cleaner Cost	\$79,235
Service/Labor/Disposal Cost	\$15,929
Total Cost	\$95,164
<b>Annual Aqueous Cleaner Costs:</b>	
Aqueous Cleaner Leasing Cost	\$45,000
Total Cost	\$45,000
<b>Estimated Annual Savings:</b>	
Total Savings	\$50,164
<b>Estimated Payback:</b>	
<b>Payback</b>	<b>0.9 years</b>

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