

Achieving Pollution Prevention Success: Establishing a Fiber Reinforced Plastics Sector Economy, Energy, and Environment Pilot Project in Minnesota

Grantee: Minnesota Pollution Control Agency

Title: Fiber Reinforced Plastics Sector Economy, Energy, and Environment Pilot

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Project Description

Partially funded by a U.S. Environmental Protection Agency (EPA) Pollution Prevention (P2) grant, the Minnesota Pollution Control Agency in partnership with the Minnesota Technical Assistance Program (MnTAP) at University of Minnesota, piloted the Fiber Reinforced Plastics Sector Economy, Energy, and Environment (E3) project. The team's goal was to work with the fiberglass reinforced plastic (FRP) sector to provide direct technical assistance and encourage and measure reductions, efficiencies, and associated savings.

Project Approach

The project focused on the FRP sector to: 1) identify FRP supply chain-connected companies within the state of Minnesota; 2) conduct outreach to FRP manufacturers and their supply chain-connected companies and form a group of four E3 pilot participants; and 3) conduct environmental, energy and LEAN components of E3 assessments. MnTAP encouraged implementation, identified actions taken as a result of these assessments and quantified outcomes resulting from those actions.

MPCA and MnTAP conducted E3 assessments (including P2, energy efficiency and LEAN manufacturing) at four companies in Minnesota, and assisted the companies in implementing recommendations. In addition, the project partners worked with members of the FRP supply chains to support additional sustainability.

Reason for Focus on the FRP Sector

Styrene, a chemical emitted by the FRP sector, is a "Chemical of High Concern" to the Minnesota Department of Health, with health effects to the endocrine system, eyes, nervous and respiratory systems. It is also a hazardous air pollutant according to the federal Clean Air Act, as well as a volatile organic compound that can contribute to the formation of ground-level ozone (smog) and can aggravate a number of respiratory problems, including asthma.

Educational Events

MnTAP prepared and published a series of ten electronic "FRP Tips Newsletters" to promote the E3 in FRP program, plus a "special edition" newsletter to allow additions to the mailing list to catch up on project basics. Each newsletter was structured with information about an aspect of the E3 in FRP program, followed by a "Did You Know" section containing tips, case studies, and money-saving suggestions on a P2 or energy efficiency topic common to the industry. The idea was to provide information the companies would find useful in order to encourage them to read the newsletters, and possibly implement some efficiency and resource conservation improvements on their own.

In addition to the newsletters, MnTAP hosted a FRP Best Practices Training at St. Cloud Technical College on November 18, 2014. Eleven FRP industry employees attended from five companies along

with additional E3 partners, resulting in a total attendance of about 30 people. A significant portion of the event focused on the E3 in FRP projects. Information on conserving resources, utilizing utility rebates and financial assistance from the Minnesota Small Business Development Center, the benefits of LEAN manufacturing, and how E3 approaches would result in cost saving for the FRP facilities was presented. In addition, the most innovative, efficient FRP spray equipment and operation of a small-scale closed molding were demonstrated.

Information generated and best management practices developed can be accessed on the E3 Project in FRP project page on the MnTAP website at <http://mntap.umn.edu/industries/air/e3infrp.html>.

Lessons Learned and Results

There were many obstacles encountered during the course of this project. Most of the FRP companies in Minnesota are small job-dependent shops that tend to be managed by one or only a few owners. Time constraints prevented some FRP shop owners from participating in the E3 program, however, those that did achieved significant cost savings. The time owners were willing to commit to implementing project recommendations was limited, despite the significant cost savings that could potentially be achieved.

Despite these obstacles, this project was successful in achieving significant environmental benefits and facility cost savings.

One company reduced their styrene use by 33,000 lb/yr by installing new spray guns with less overspray saving \$33,000/yr. They used lean processes to reduce down time, consolidating daily production from 19.5 hours to 12 hour resulting in energy savings of 77,000 kWh and \$3,600/yr.

Another company reduced acetone purchases and hazardous waste generation by 2,860 lb/yr saving \$14,300 through recycling solvent. Improving work flow doubled the capacity of their closed molding area, which generates 90% lower styrene emissions compared to open mold operations.

A third company implemented standard work processes and work flow improvements allowing a 16% increase in production during busy periods, enabling additional product worth \$320,000 in sales to be produced from existing operations. They also optimized their product formulation to reduce required gel coat thickness, saving 870 lb of gel coat, 260 lb in styrene reductions, and \$9,800 in labor costs.

Overall, implementation of E3 assessment recommendations at facilities resulted in 41,330 lbs. of hazardous waste avoided and 121 metric tons of carbon equivalent emissions reduced, saving \$461,300 annually for participating facilities.

¹ Pollution Prevention involves the reduction or elimination of pollution at the source by modifying production processes, using less toxic substances, implementing resource conservation techniques, conserving water and energy, and reducing greenhouse gases. Energy and water conservation, hazardous materials and greenhouse gas reductions, and cost savings are all benefits of a P2 approach. EPA provides grant assistance to states and tribes to help businesses identify and implement P2 practices.