

4.6.1 Plastics Manufacturing: Fiber-reinforced Plastics

Case Study #1

BUSINESS: Sunrise Fiberglass; Wyoming, Minnesota
WASTE ORIGIN: Fiber-reinforced Plastics Production
WASTE TYPES: Styrene Vapor Emissions, Conventional Low-styrene Resins, and Volatile Organic Compound (VOC) Air Emissions

COMPANY BACKGROUND

Sunrise uses the open-mold procedure to manufacture products ranging from water-directive flumes, to large cabs used for heavy equipment.

MOTIVATION

Increased government regulation to reduce styrene vapor emissions. Styrene is listed as a hazardous air pollutant by the 1990 Clean Air Act Amendments (CAAA). Worker health concerns by OSHA required companies to reduce styrene vapor exposure limits 50 percent by 1993.

STRATEGIES

Reduce styrene emissions by using low styrene emission (LSE) resins in place of standard resins in an open-mold FRP operation.

ORIGINAL PROCESS

Data from the 1989 Toxic Release Inventory (TRI) showed that open-mold FRP operations make up the largest use of styrene resin in Minnesota in terms of number of facilities using the operation, volume of resin consumed, and volume of styrene released to the environment.

NEW PROCESS

Two low-styrene resins were substituted directly into production without equipment or process changes. A third resin would require modifications to existing spray equipment (approximately \$1,200).

RESULTS

Waste Reduction

Styrene emissions reduced from 25 to 45 percent.

Economics

Potential Savings: \$1,800 to \$4,400/year (by reduced need for increased ventilation to meet OSHA exposure standards).

Operating/Maintenance Cost: Information not available.

Payback Period: None.

HEALTH & SAFETY BENEFITS

Styrene is a suspected carcinogen, an experimental poison by ingestion and inhalation, and an eye and skin irritant. Moderately toxic when inhaled, styrene can produce experimental teratogenic and reproductive effects.

PROBLEMS

Initial FRP Industry preconceptions about low-styrene resins: cost, specialized process equipment, workability of material, resulting physical properties of the laminate.