

CertainTeed Corporation Kansas City, Kansas

Intern: Katie Brennan

Major: Chemical Engineering

School: Kansas State University

The Company

CertainTeed is a leading North American manufacturer of building materials. The company has

approximately 9,000 employees and 70 manufacturing facilities throughout the United States. The Kansas City plant specializes in insulation manufacturing and employs about 500 people.



Project Background

Safety is number one at CertainTeed, so reducing hazardous materials is a top priority. Recently, new information has been discovered about the hazards of hexavalent chromium (Cr^{6+}). The furnace at CertainTeed is lined with refractory brick that contains chromium. Due to the extreme heat in the furnace, the trivalent chromium (Cr^{3+}) originally in the brick is oxidized to Cr^{6+} . Brennan's project was to prove that ascorbic acid reduces hexavalent chromium to trivalent chromium, and to focus on removing this hazard from the furnace slag and the electrostatic precipitator (EP) dust.

Incentives for Change

All five CertainTeed insulation plants have in place an environmental management policy that conforms to ISO 14001 standards. CertainTeed knows that maintaining the highest level of environmental management provides the company with a competitive advantage and is the only way to succeed in today's market. CertainTeed is classified as a large quantity generator of hazardous waste, and reducing the amount of hazardous material produced is a top priority.

Projects Reviewed for P2 Potential

1. Slag Treatment Project

Slag from the furnace is barreled twice a week in 55-gal drums and taken to on-site hazardous waste storage. Each month, an average of 11 barrels are picked up and taken to a hazardous waste treatment center. Through experimental testing with an ascorbic acid solution, Brennan found that up to 98% of Cr^{6+} can be eliminated from furnace slag. By converting the chromium, CertainTeed would eliminate 36 tons of hazardous material. Because RCRA (Resource Conservation and Recovery Act) does not distinguish between types of chromium, the slag will still be considered a hazardous waste. However, the health risk would be eliminated, and CertainTeed could recycle the slag into their batch materials.

2. EP Dust Treatment Project

Fumes from the furnace go through electrostatic precipitators to clean the air before it is released to the atmosphere. The particles that come out of this process (EP dust) are sent to a pelletizer room where they are sprayed with a mist of water and form pellets. CertainTeed is currently producing approximately one ton of EP dust each day. CertainTeed is currently recycling the pellets back into the batch. Brennan's tests found the chromium in EP dust was completely converted to non-hazardous Cr^{3+} . By converting this hazard, CertainTeed will be removing the only area in the plant that currently exceeds the permissible exposure limit (PEL). They could save over \$23,000 annually currently spent on testing and personal protection equipment.

3. Furnace Project

Some sections of the refractory brick above the glass-level of the furnace can be replaced by non-chrome refractory brick. This brick doesn't last as long and certain areas cannot be replaced because of high-wear locations, but any brick that can be replaced will be helpful to minimize hazardous waste at the source. The brick below the glass level is not at risk of forming Cr⁶⁺.

Another personal hazard around the furnace is during cleaning, which occurs about once every two to three years. The ascorbic acid solution can be put into a sprayer and used to hose down the inside of the furnace before cleaning. Because the Cr⁶⁺ is highly soluble, it will be pulled from the cooled glass by the solution and reduced back to Cr³⁺ again. This will remove the personal health hazard to the cleaners who remove the cooled glass from the interior of the furnace.

Summary of 2008 P2 intern recommendations for CertainTeed				
P2 Category	Project Description	Environmental Impact	Annual Cost Savings	Status
Hazardous materials	Slag treatment project	36 tons/year	Minimal	Recommended
Hazardous materials	EP dust treatment project	365 tons/year	\$23,000	Recommended
Hazardous materials	Furnace brick/cleaning project	Removes hazardous area/situation	Not calculated	Further research needed

