

## Project Overview



**Industrial Placement Intern:** Jaime Michelsen  
**Major:** Industrial and Management Systems Engineering  
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### Company Background:

Lincoln Composites, a commercial and industrial based manufacturer of composite products, is owned by Hexagon Composites Group. The Lincoln facility operates advanced manufacturing processes custom designed to produce filament wound composite pressure vessels. Lincoln Composites is the leading provider of TITAN™ and TUFFSHELL® tanks for natural gas and hydrogen storage. Also, they offer a diverse automotive and transit product line for the alternative fuel industry.

### Project Description:

Lincoln Composites received assistance from the P3 program in 2011 to analyze and identify solid waste generated from manufacturing operations with the goal to minimize waste. The first step involved investigating the manufacturing operations producing significant amounts of solid waste and tracing, quantifying, and developing source reduction recommendations for each waste stream.

### Pollution Prevention Benefits:

Source reduction of landfilled solid waste was the driving force for the offered recommendations. Implementing these recommendations result in reducing excessive disposal costs, removing **503 MT CO<sub>2</sub>e of greenhouse gas emissions**, and improving the facility's environmental impact. The most significant recommendations involved finding a recycler for scrap tanks, identifying a reusable substitute for cardboard flooring, and changing from drums to bulk containers for resin products.

### Results:

The pollution prevention benefits and results are summarized in Table 1 below:

**Table 1: Pollution Prevention Benefits and Results**

Waste Type	Potential Annual Cost Savings	Hazardous/Landfill Solid Waste Eliminated Per Year
Cardboard (Flooring, catch lids)	\$58,600	110,500
Empty 55-Gallon Steel Drums	>\$24,000	64,000
Solvents	\$8,500	18,300 (hazardous)
Miscellaneous (Scrap tanks, packaging, etc.)	\$3,600	316,000
<b>Total</b>	<b>\$94,700</b>	<b>508,800 Pounds</b>