

# Lean & Clean

Prepared for CME  
and NRC IRAP

## Case Study



Facility: Carlson Engineered Composites

Location: Winnipeg, Manitoba

Lean Opportunities: \$310,00/yr with 0.2 year ROI

Clean Opportunities: \$370,000/yr with 2 year ROI

## Background

CME and NRC IRAP are interested in helping Canadian industries to secure the economic, environmental, and social sustainability benefits associated with lean & clean assessment work. In March 2010, CME retained Enviro-Stewards Inc. (Enviro-Stewards) to undertake a Lean & Clean opportunities assessment of Carlson Engineered Composite's (Carlson's) fibre glass bus and tractor component fabrication facilities.

## Participants

### Carlson Engineered Composites

As a leader in the Fibre Glass Reinforced Plastics Industry, Carlson Engineered Composites Inc. provides uncompromised quality and customer satisfaction. Our team continues to develop partnerships upon a tradition of integrity and profitable growth. We are committed to maintaining our competitive advantage through education, innovation and technological advantage..

### Enviro-Stewards Inc. (Enviro-Stewards)

Enviro-Stewards is an environmental engineering consulting firm specializing in Pollution Prevention (P2), Cleaner Production, Utility Conservation, Toxics Reduction, and Sustainable Development.

## Process

Carlson presently manufactures fibre glass components in open and closed (RTM, light RTM, compression and VARTM) moulds. Depending on customer needs, fibre glass components are gel coated, prepared, and painted.



The Lean & Clean assessment at Carlson consisted of:

- A Lean & Clean training session, where the concepts of lean manufacturing and P2 were introduced;
- An in-plant process study and discussion of Lean & Clean opportunities with Carlson staff; and
- A Lean & Clean Review study report.

### Summary of Opportunities

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#### Lean Opportunities

CME had previously worked with Carlson staff to identify lean opportunities for the facility. In addition to these opportunities, the present assessment identified a number of additional lean opportunities:

- The front masks (covers) of buses presently require windows, defroster vents and destination sign areas to be cut out from the completed fiber glass component (consuming resources and generating scrap). Much of these areas could be blanked off in the moulds and the openings could be strengthened (for transportation) by:
  - laying thin strips of fibreglass across these open areas,
  - fibre glassing returnable strengthening grids in the cut out areas, or
  - Installing returnable flash shipping jigs
- The production facility presently operates under a vacuum (0.14 in of water) relative to the outdoor air. Therefore, when exterior doors are opened particulate laden air can infiltrate the building (summer) and frigid air can enter the building (winter) and interfere with the resin curing process. This can be addressed with air balancing
- The paint line drying and baking ovens are located adjacent to paint booths. As such, a significant quantity of heat is extracted from the ovens and exhausted by the booths. This makes it difficult to maintain setpoint temperatures and associated quality. Better sealing oven doors and air balancing can address this issue

#### Clean Opportunities

##### Water Conservation

- Install water-efficient tap aerators, dual flush toilets, in remainder of washrooms on production floor
- Test higher efficiency rinse nozzle for pre-rinses ahead of painting

##### Air Emissions

- Continue transition to closed moulds where practical
- Continue transition of remaining paint guns (CNH booth) to High Volume Low Pressure (HVLP)
- Replace magnum gun in roofline (and other locations in OEM) with lower emitting guns (such as Glasscraft)
- Continue trend towards higher solids & lower VOC paints
- Place covers over gun cleaner and acetone containers
- Investigate electrostatic painting (potential 15% reduction)
- Monitor progress of low styrene and styrene free resins
- Complete an acetone conservation assessment to reduce consumption in the OEM area
- Improve capacity of acetone still

##### Solid Waste

- Adjust moulds to reduce cutout areas (such as front masks of buses)
- Address ventilation air deficiency to reduce defects and rework
- Send all metal drums & pails to a metal recycler

##### Program Participants

#### Energy

##### Ventilation

- Interlock spray booths with spray guns for maximum exhaust during spraying, modest exhaust during flash off and then no exhaust
- providing flash off vent intakes to minimize use of general exhaust fans
- Interlock air makeup units to maintain a slight positive pressure in the building
- Routinely replace all spray booth filters to reduce fan pressure losses
- Improve seals on oven doors

##### Lighting

- Replace T-12 lamps with T-5 or T-8
- Investigate "Staybright" HID's (15% more light with 10% less power) compared to standard 400 watt bulbs

##### Compressed Air

- Implement procedure to find & repair leaks
- Tie the facility's three compressors into a common loop and install receivers so that one compressor can remain offline
- Install timers & solenoids on air mixers (contact paint vendor)
- Redirect exhaust air from the North compressor into an adjacent hallway to recover thermal energy and air makeup