

Closed Loop Innovations in Business & Manufacturing

Katie Chapman
JRB Enterprises & Duro-Last, Inc.

Nate Koster
Anterior Quest

JRB Enterprises & Duro-Last Inc.



JRB Enterprises & Duro-Last Inc.

- HQ in Saginaw, MI
- 700 employees
- Locations in Texas, Mississippi, Oregon, Iowa, & Oscoda, Michigan
- Vertically integrated
- PVC single-ply roofing
- Pond liners, aquaculture, geomembranes
- Metal roofing, edge detail
- Screws
- Resilient flooring



Duro-Last Prefabrication

- Custom-sized deck sheets
- Factory welded seams
- Less labor for install
- Less waste generated on-site



JRB & Duro-Last Sustainability



Performance & Durability

- Solar reflectivity
- Energy efficient buildings
- Green building standards & codes



Design for Environment

- Take back program
- NSF/ANSI 347 certification
- LCA & EPDs
- Supply chain



Sustainable Operations

- Zero landfill company-wide
- Energy intensity (kWh/yard)
- Transportation & packaging



Employee, Contractor, & Community Engagement

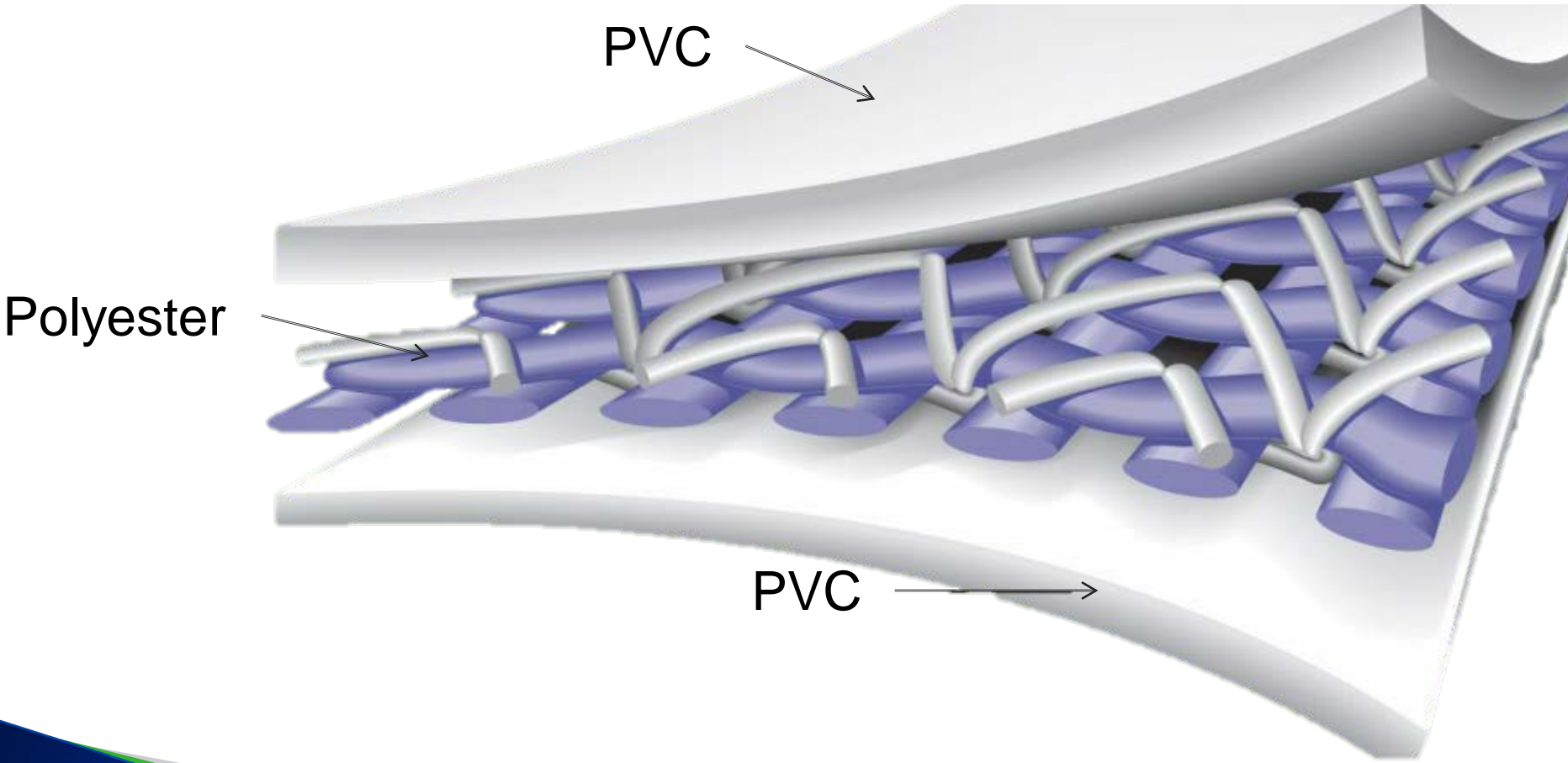
- Safety
- Contractors
- Volunteering
- Charitable donations

Recycling Programs

- Post-industrial recycling
 - PVC membrane scrap
- Post-consumer take back program
 - Recycle Your Roof
- Corporate Recycling
 - Cardboard, stretch wrap, banding, paper, etc.



PVC Membrane Recycling



Post-Industrial Recycling

- Founded Oscoda Plastics in 1993
- 100% raw materials from Plastatech and Duro-Last
- Resilient flooring, concrete expansion joints, roof walk-way pads
- 80 million pounds recycled
- Business is growing faster than scrap is produced



Recycle Your Roof

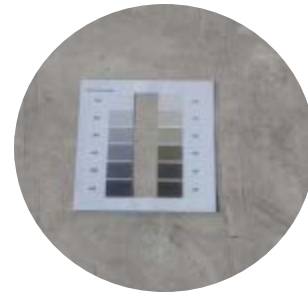
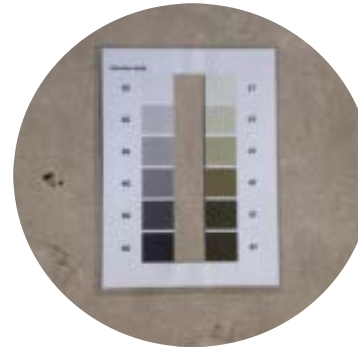
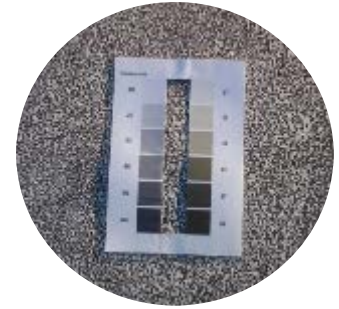
- Take back old Duro-Last roofs & installation scrap
- Contractor pays freight to Duro-Last plant
- Minimal additional labor for contractor
- Contractor saves on dumpster rental and disposal fees
- 2015: 18,000 lbs. recycled
- 2016: 50,000 lbs. recycled





Recycle Your Roof

- Challenges
 - Contamination: debris, screws, trash
 - Messy process
 - Labor intensive
 - Break even- not a revenue source
- Next steps
 - Develop new products
 - Find 3rd party processors
 - Improve equipment
 - Expand program to recycle entire roof
 - Insulation, deck material, competitor's material



Corporate Recycling

- 93% landfill diversion at Saginaw campus
 - 2014:
 - 400,000 lbs. recycled
 - \$12,000 in costs
 - 2015:
 - 1.2 mill lbs. recycled
 - \$25,000 revenue
- Implementing at other facilities
 - \$60,000 YTD savings
- *No non-recyclable disposable cups*
- *No desk waste baskets*



Partnering on Difficult Materials

- Water Jet paste
- Transform material into a recyclable state
- SVSU Engineering Program Senior Project
 - Reduces water jet downtime
 - Transforms paste into recyclable material
 - Found second use to dry rags



Thank You



Thank you for your time.

Katie Chapman

kchapman@duro-last.com

Questions?





ANTERIOR
QUEST

Protecting the environment through green dentistry!

Amalgam Containment and Recycling:

Attaining Zero Mercury
Discharge in Dental
Office Wastewater



The Problem

- Mercury getting into our local water supply.
- Dental offices are the single largest source of Mercury that enters the Publicly Owned Treatment Works (POTW); they remain the single largest source of Mercury in wastewater.
- POTW's deal with a lot of water on a daily basis. This makes it very difficult to get the mercury out of the water.

Legislation:

- Regulations Effective December 31, 2013
- Amalgam Separator; installation and operation; Requirements.
 - Removal Efficiency of not less than 95%.
 - “Dentists who install and use a holding tank and do not discharge amalgam waste.”
 - EPA Federal Proposal
- 3 options: Filter, Collector, Containment.

ISO Certification

- International Organization for Standardization (ISO) 11143:2008
- Separators target solids.
- They are designed to meet an ISO particle standard.
- They are designed to capture 95% of the solids by weight, not total Mercury, some solid Mercury can still get through as well as all of the Ionic Mercury (Mercury dissolved in the water.).

Filter and Collection Testing

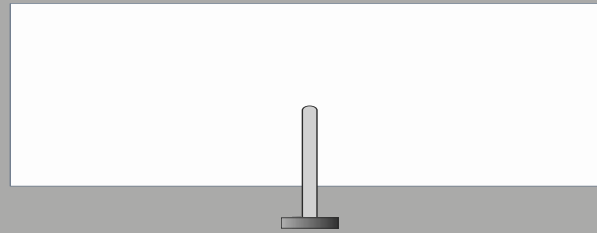
- Mission of Mercy City of Big Rapids tests.
 - Level of mercury in dental waste taken after a Filter based Amalgam separator.
 - Day 1: 37.7 ppm
 - Day 2: 52.2 ppm
- Collection based amalgam separator.
 - 8-10 hours of settling.
 - Level of mercury in dental waste:
 - 19-20 ppm
- **Both of these systems release 200,000+ times the non-detect legal discharge limit.**
- We are aware of other organizations that have conducted similar testing that support our findings.

Anterior Quest Product's




**ANTERIOR
QUEST**
Software





ment Series can be attached
to wet or dry vacuum systems.

- **Captures & Disposes of 100% of Mercury**
- **Low Capital Equipment Cost**
- **Filterless Technology**
- **No Office Maintenance Required**
- **Eliminates Long-Term Liability**

How it works

- All Tank sizing is based from a two month structure.
 - Contributes to Consistency of the water
 - Also helps the contents stay in liquid form.
- Established Routes Evacuate Tanks every 2 months.
 - The two tank containment system does not require a shut down to empty tanks.
 - The material pumped out is then recycled.
 - **CLEAN** water is returned to the water system. <0.0002 ppm the scientific non-detect for mercury levels in water. EPA Method 245

How it works

- Based on the size of each office they determine what size system and office will need.
- There are 4 standard size tanks.
 - HG30
 - HG60
 - HG90
 - HG120
- There are also custom tanks based on office needs.

NUMBER OF CHAIRS _____ CUPS OF CLEANING SOLUTION USED DAILY _____

The Amalgam waste is calculated in gallons for a 60 day period with the dental office being open 5 days per week.

# of Chairs"	CUPS OF CLEANING SOLUTION USED PER DAY PER CHAIR"			
	1"	2"	3"	4"
2"	6.2!	12.1!	17.7!	23.3!
3"	9.7!	18.1!	26.6!	35!
4"	12.9!	24.2!	35.4!	46.7!
5"	16.2!	30.2!	44.3!	58.4!
6"	19.4!	36.3!	53.2!	70!
7"	22.6!	42.3!	62!	81.7!
8"	25.9!	48.4!	70.9!	93.4!
9"	29.1!	54.4!	79.7!	105!
10"	32.3!	60.5!	88.6!	116.7!
11"	35.6!	66.5!	97.5!	128.4!
12"	38.8!	72.6!	106.3!	140.1!

Gallons of Amalgam waste collected in 60 days"

System Sizes"

HG30 = 30 gallon!

HG60 = 60 gallon!

HG90 = 90 gallon!

HG120 = 120 gallon!

Custom sizes and tanks are available upon request"

RECOMMENDED HG CONTAINMENT SYSTEM"

HG30 HG60 HG90 HG120'



3rd Party Testing

- State Regulation needed this.
- A Containment system is The Dental Advisors highest rated product EVER!
- Containment does not require any maintenance from the dental office. It is the only hands off system.
 - The **ONLY** requirement of the office is to check the Site tubes weekly. These site tubes indicate the fullness of each tank. If they see any fluid they call the containment company who work with the office to fix the problem.
- Containment Systems are the only system on the market that captures 100%.
- WWTP's prefer a containment system over the competition because it does not put anything into their city water supply.
 - Often times dentists do not get tested by the plants if they contain.
- 100% of dentists who have containment systems recommend them to others.



Top Amalgam
Containment
System

Facility



Recycling Facility

- Precious Metals Dental Waste Recovery Facility
- There is only one company in North America specifically Allendale, MI that is collecting 100% of dental waste and recycling the contents back to clean water.
- This company takes the dental waste recovered from the office extracts metals and other contaminants and eliminates the mercury from the water.
- Containment and recycling of the dental waste has in many cases allowed city municipalities to lift water testing requirements on offices with the AQ system.
- This Recovery Facility is run and supervised by a state licensed Waste Water Treatment Official.



Environmental Water Quality Impact

- There are no mercury discharges to the POTW
- Level of mercury in dental waste with no amalgam separation.
 - 23 PPM
- Level of mercury in dental waste taken from recycled water
 - <0.0002 PPM (non-detect EPA Method 245)
- In 2015 we recycled 46,000 gallons of water
 - 1 Gram of Mercury is enough to contaminate 20 acres of lake. Making the fish unsafe to eat. (www.WisconsinEnvironmental.org)
 - Saves almost 77,000 acres of lake from further Mercury contamination.
 - 2014 = 55,000 acres
- As containment technology continues to more widespread use these numbers will only increase.

Line Cleaner

- AQ Solution Powered By Bio Pure
- Better, Safer, and Environmentally Friendly
 - Made from 100% recycled dental water.
 - Organic
 - No Chemicals
- The addition of this product creates a closed loop true recycling program.
- Anterior Quest is the only Zero Landfill option on the market.



Anterior Quest Software

- 3 essential components designed into the software.
 - AQ Oversight and Service Users
 - The Dental Office
 - Regulatory Oversight
- The Software collects, stores and shares the data.
- Each component is critical for the proper maintenance and management of the amalgam waste collected.



Environmental Non-Water Quality Impact

- Much less hazardous risk to dental workers.
 - Both Cleaner and Containment System
- Recycling Dental wastewater
- Facilitate better and complete recycle of mercury in the waste industry.
 - Zero Landfill
- More complete recording of material contained and recycled.
- Working great with local POTW's with their mercury minimization plans.
- The HG containment system makes a complete closed loop recycle and zero-discharge standard a reality.



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