GREENING THE SUPPLY CHAIN USING INDUSTRY/UNIVERSITY COLLABORATIONS

Art Hoekstra, Steelcase
Ryan Smith, Landscape Forms
David Meade, Western Michigan University

13th Annual Midwest Supply Chain Management Conference, March 17, 2016
The GMIC: Who We Are

- Founded in 2010
- Started by Dr. John Patten, WMU professor, through a DOE grant.
- The initiative then and still focuses on working with manufacturing companies to green their processes and designs, beginning to end.
- From its creation to now, the GMIC has:
  - Logged 11,000 hours of project work by students at various companies.
  - Helped over 50 students in receiving direct industry experience.
  - Identified $750,000 per year savings on completed projects.

Partners:

U.S. Department of Energy
Michigan Manufacturing Technology Center-West
Department of Environmental Quality
Sustainable Research Group
Green Manufacturing?

Green Products
Our Mission

The Green Manufacturing Industrial Consortium (GMIC) has a three part mission:

1. To engage engineering students in meaningful applied research activities aimed to enhance their value to future employers.

2. To provide a forum for manufacturers to coordinate research and share results, while leveraging R & D funding, at the pre-competitive stage.

3. To support advancement in manufacturing practice through the creation of more energy efficient and environmentally benign processes and products while enhancing productivity and sustaining or increasing output.

Pursuing Environmental, Energy, and Economic opportunities in partnership with Industry
Green Manufacturing @ WMU

• Two Primary Areas of Focus:
  • Energy
    » Natural Gas
    » Electricity
  • Materials
    » Reduce
    » Reuse
    » Recycle
    » Replace

Extension of Lean Manufacturing
What We Do

- Energy analyses
- Landfill assessments
- Lean manufacturing
- Water conservation
- Material usage evaluation
- Process optimization
- Visual factory
- Ergonomics studies
- Zero Waste to Landfill

Material & Process Optimization
Cleaning Water Reduction
Ergonomics Study
Zero Waste to Landfill (ZWTL)

❖ Definition

- The *ability to avoid diverting any excess material resources in a landfill* or other non-reclamation waste center.

❖ Flexibility

- Zero landfill does not have a standard definition.
- Not all definitions are the same, but generally have the *same theme*.
- Different companies will likely have different guidelines for achieving zero landfill.
Zero Waste to Landfill (ZWTL)

Collect Data
Analyze
Develop Plan
Implement

…go from here...

TO HERE!
ZWTL Process

**Phase I**
- Establish the baseline
- Understand your waste stream
- Initial dumpster dives
- Define recycling program

**Phase II**
- Employee education/training
- Local dumpster dives
- Identifying inefficient processes

**Phase III**
- Continuous improvement
- Re-define recycling program
- Visual Factory
- Optimizing receptacles locations
- Extending best practices to supplier network
Why ZWTL?

- Reduced waste management costs and waste pickups;

- Cost savings from recycling, landfill diversion, scrap re-sale, and/or revising service agreements (e.g. cash back, bill credits or no cost pickups for certain commodities); and

- Identification of wasteful, inefficient areas (e.g. departments, processes, throughout supply chain)

Powerful green + lean statement
Fabri-Kal Inc: 7.5 Month payback on investment with the implementation of one of several recommendations.

DENSO: 1.5 Month payback on investment with the implementation of all recommendations.

BOLD Furniture: 7.5 Month payback on investment with the implementation of one of several recommendations.
GMIC & ZWTL

Landfill Audits

Visual Factory

Training
The Supplier Network

Steelcase
The Supplier Network

2006

4 suppliers

2015

50+ suppliers

Honda benchmark

Started with steering committee (the “original four”)

Steelcase- / supplier-hosted events

Keynote speakers in / outside furniture industry
What is the mission of our network?

• Learn lean (enterprise excellence) – share knowledge and resources
• Share best practices
• Build relationships, work together, network
• Make extended value streams more competitive, more agile (*a strong supplier makes for a strong Steelcase*)
<table>
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<th>Workshop Title</th>
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<td>Feb 21</td>
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Zero Waste to Landfill

ZWTL Workshop Overview/Proposal

✓ What is zero-landfill?
  ✓ Why is ZWTL important?
  ✓ Conditions for success

✓ 3-phase plan
  ✓ Phase I: establish baseline, understand the waste, initial waste assessment, first recycling program
  ✓ Phase II: inform associates, local assessments, identify inefficient processes
  ✓ Phase III: continuous improvement, optimization, visuality, system support, extend knowledge to suppliers

✓ Train with actual examples, company data

✓ Hands on activities
  ✓ Conducting a waste assessment
  ✓ Sorting the waste
  ✓ Tracking the waste
  ✓ Visualizing the waste
  ✓ Forms of waste disposal
    ✷ Hierarchy: most desired versus least desired
  ✓ Tackling the waste

✓ Examples
  ✓ GMIC partners

✓ Benefits
  ✓ Environmental
  ✓ Economical

Date
Monday, September 22 9 am – 1 pm

Location
Steelcase Kentwood Plant
Grand Rapids, MI

Map
https://www.google.com/webhp?sourceid=chrome-steelcase%20kentwood%20plant

Audience
Lean leaders, people leaders
(e.g., team leaders, supervisors, plant managers)

Maximum seats for class: 20
Manufacturers present: Metal Components, Production Fabricators, Dickinson Press, Vista Manufacturing, Metals USA, Light Corp., Metalworks, Supply Chain Solutions and Ventura Manufacturing.

A major takeaway from this workshop was the story sharing between suppliers in regards to how they handle certain types of waste. Furthermore, participants talked about their partnership with Steelcase, engaging in activities that contribute to greening the supply chain. For example the re-use of dunnage and pallets, and tracking environmental metrics once green initiatives are in place.
Membership:

- **How do I become a member?** Simply contact your supply chain leader or a member of the steering committee. Shortly after your request, information will come your way regarding LSN history, direction, and future events.

- **Who should be a member?** Members should be a Steelcase Supplier that is serious about using a principle driven approach towards continuous improvement.

- **Benefits:** Benefits of membership include access to the Lean Village, regional events, monthly training workshops, networking opportunities, benchmarking, Genga walks, and personalized coaching.

- **Expectations of members:** Members have a responsibility and expectation to participate and share with others their learnings along their improvement journey. Members may be asked to host an event, present at regional events, be a coach and mentor to a fellow member.
Using Supplier Networks to Learn Faster

Jeffrey H. Dyer and Nile W. Hatch
Where will we be?

Initiation

Mature
ZWTL Case Study
13th Annual Midwest Supply Chain Management Conference

Greening the Supply Chain Through Industry/University Connections
Ryan S. Smith
March 17, 2016
Form team
Perform waste assessment
Set baseline and goals
Educate and inform employees
Launch and implement program
Track and measure progress
Analyze progress & reevaluate program
Form team
| Date   | Fee | Landfill/Cardboard/Wood | Fuel/Enviro | Admin | Reg/Fee | SVC Charge | Fuel/Enviro | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fee | SVC Charge | Admin | Reg/Fe...
Form team
Perform waste assessment
waste assessment

- filters
- compost
- plastic
- foam
- returnables
- metal
- paper
- glass
- wood
- food wrappers
- grinding pads
- other
Form team
Perform waste assessment
Set baseline and goals
so far...

2013 goal

10 pulls

2012

13 pulls
Form team
Perform waste assessment
Set baseline and goals
Educate and inform employees
LEAN MANUFACTURING

PRODUCTION

WASTE WORK

MANUFACTURING

QUALITY

IMPROVEMENT

FLOW

REDUCTION
waste hierarchy

reduce
reuse
compost
recycle
waste-to-energy
incineration
landfill

most favorable

least favorable
Form team
Perform waste assessment
Set baseline and goals
Educate and inform employees
Launch and implement program
receptacle mapping

*●* = receptacle locations  *■* = center of gravity

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Track and measure progress
so far...

1/13  2/16  3/26  6/4  7/24  8/28  10/8  12/13

2013 goal

10 pulls

2012

13 pulls
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Analyze progress & reevaluate program
waste stream % by volume 2014

- co-mingled recycle: 5.7%
- compost: 17.1%
- wood dust: 25.4%
- steel: 18.3%
- wood recycle: 17.1%
- wood scrap: 8.5%
- waste powder: 2.4%
- cardboard: 13.7%
- landfill: 2.0%
- shredded paper: 0.1%
- aluminum: 2.7%
- stainless: 0.3%
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ZERO WASTE WHY?
GOES BEYOND RECYCLING AND ASKS THE QUESTION WHY? CREATE WASTE IN THE FIRST PLACE
waste hierarchy

reduce → reuse → compost → recycle → waste-to-energy → incineration → landfill

most favorable → least favorable