Salvaging Recycling, New Developments in Construction and Demolition Materials

Andy Lake CSI NDA CMRA

Recycling Infrastructure Process Specialist
ABP Technology
Armstrong World Industries

GRC 20th Annual Conference

Who We Are

- **A Global Leader In The Design & Manufacture Of Commercial And Residential:**
  - Standard and Custom Ceiling Panels
  - Ceiling Installation Systems (grid)
  - Resilient Sheet and Tile Flooring
  - Hardwood Flooring
  - Cabinets (residential)

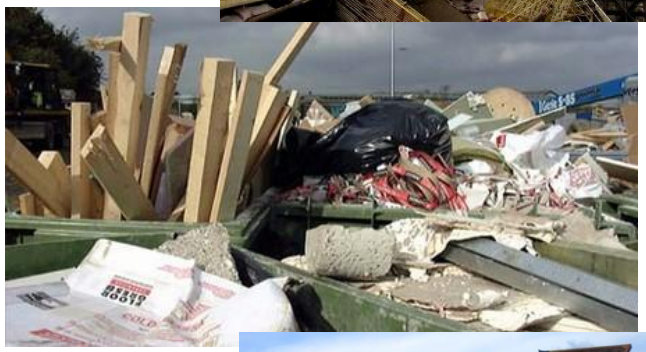
- Global Fortune 1000 Company
- $2.8 billion in Sales in 2010
- Environmentally-responsible products, programs & operations
- Operate 36 plants in 9 countries and employ ~10,000 employees worldwide
- Corporate Headquarters in Lancaster, PA - LEED EB Platinum certification
- Member of the Climate Registry, Energy Star and EPA Green Power Partnership
- Founding Member of USGBC and CAGBC

The primary focus will be:

- ⇨ Drivers for C&D Recycling - New Developments
  - ⇨ Market
  - ⇨ Manufacturer's Perspective
- ⇨ Armstrong's Recycling Programs
  - ⇨ Ceiling Tile Recycling
  - ⇨ Vinyl Composite Tile

Background

- ⇨ 136 million tons of construction debris are dumped in U.S. landfills every year
- ⇨ 95% of building-related construction waste can be recycled



- ⇨ Concrete/Rubble: 40% – 50%
- ⇨ Wood: 20% – 30%
- ⇨ Drywall: 5% – 15%
- ⇨ Asphalt Roofing: 1% – 10%
- ⇨ Metals: 1% – 5%
- ⇨ Bricks: 1% – 5%
- ⇨ Plastics: 1% – 5%
- ⇨ Interior Finishes: 1% – 5%

Market Drivers

- Mandates (Required)
  - Recycling Goals
  - Disposal Bans
- Building Rating Systems
  - Leadership in Energy and Environmental Design (LEED)
  - Green Globes
  - Collaborative for High Performance Schools (CHPS)
- Building Code (New - Pending)
  - California Green Building Code (CalGreen)
  - International Green Construction Codes (IgCC)

Mandates to prevent C&D waste from entering the landfill are increasing

Market Drivers – Building Codes

International Green Construction Code (IgCC) – International Codes Council:

- 502.1 Construction material and waste management plan. Not less than 50 percent of non-hazardous construction waste shall be diverted from landfills, except where other percentages are indicated in Table 302.1.
- Expected to be finalized in 2012
- Adopted by the Rhode Island and jurisdictions in New Hampshire, Arizona, Washington, & Colorado

California Green Building Code:

- 65% waste diversion from all new construction (January 1, 2011)

Market Drivers – Building Rating Systems

Construction Waste Management - MR Credit 2:

- Develop & implement a waste management plan
- Divert Construction Debris from Landfill (weight or volume)

Recycled or Salvaged	Points
50%	1
75%	2

Recycled Content - MR Credit 4:

- Use materials with recycled content
- Post-consumer + ½ Pre-consumer
- Based on cost of the total value of the materials in the project

Recycled Content	Points
10%	1
20%	2

Voluntary, but many entities in the United States are requiring such systems

Market Drivers - Mandates

Disposal Bans:

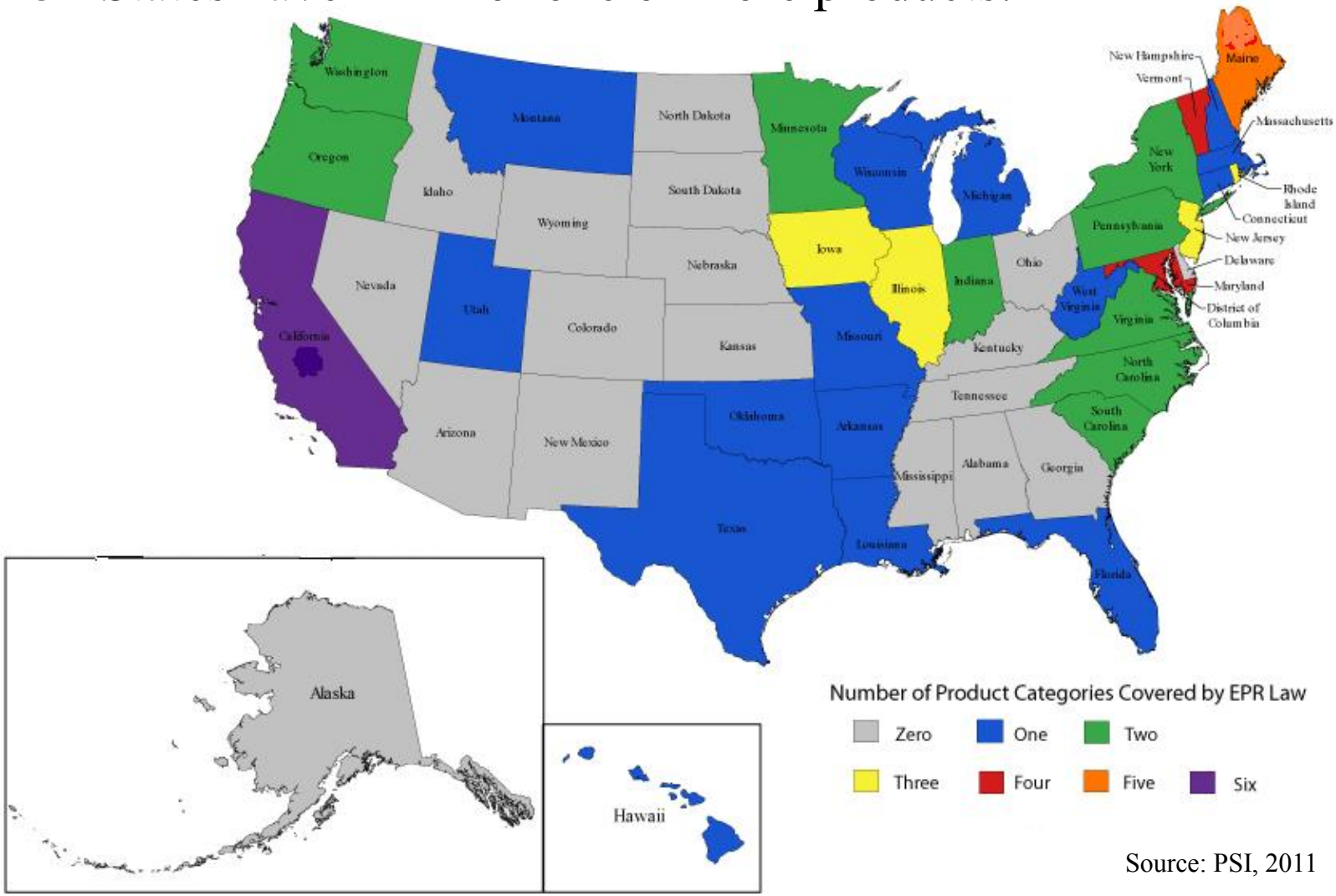
- ⇨ Broad Category (Construction & Demolition (C&D) waste)
  - **Massachusetts** - Bans C&D disposal in landfills - must send to C&D processor or directly to recycling market – 2006
  - **Portland, OR** - All C&D waste must go to a C&D processor
  - **Wisconsin** - State Construction State Facilities will be requiring C&D debris to be recycled. Covers any construction project >$5 million or demolition project after Jan. 1, 2010.

- ⇨ Product Specific
  - **Massachusetts** - Bans lead batteries on disposal or incineration or transfer for disposal at a solid waste disposal facility (310 CMR 19.017) - 1990



Extended Producer Responsibility

32 States have EPR for one of more products:



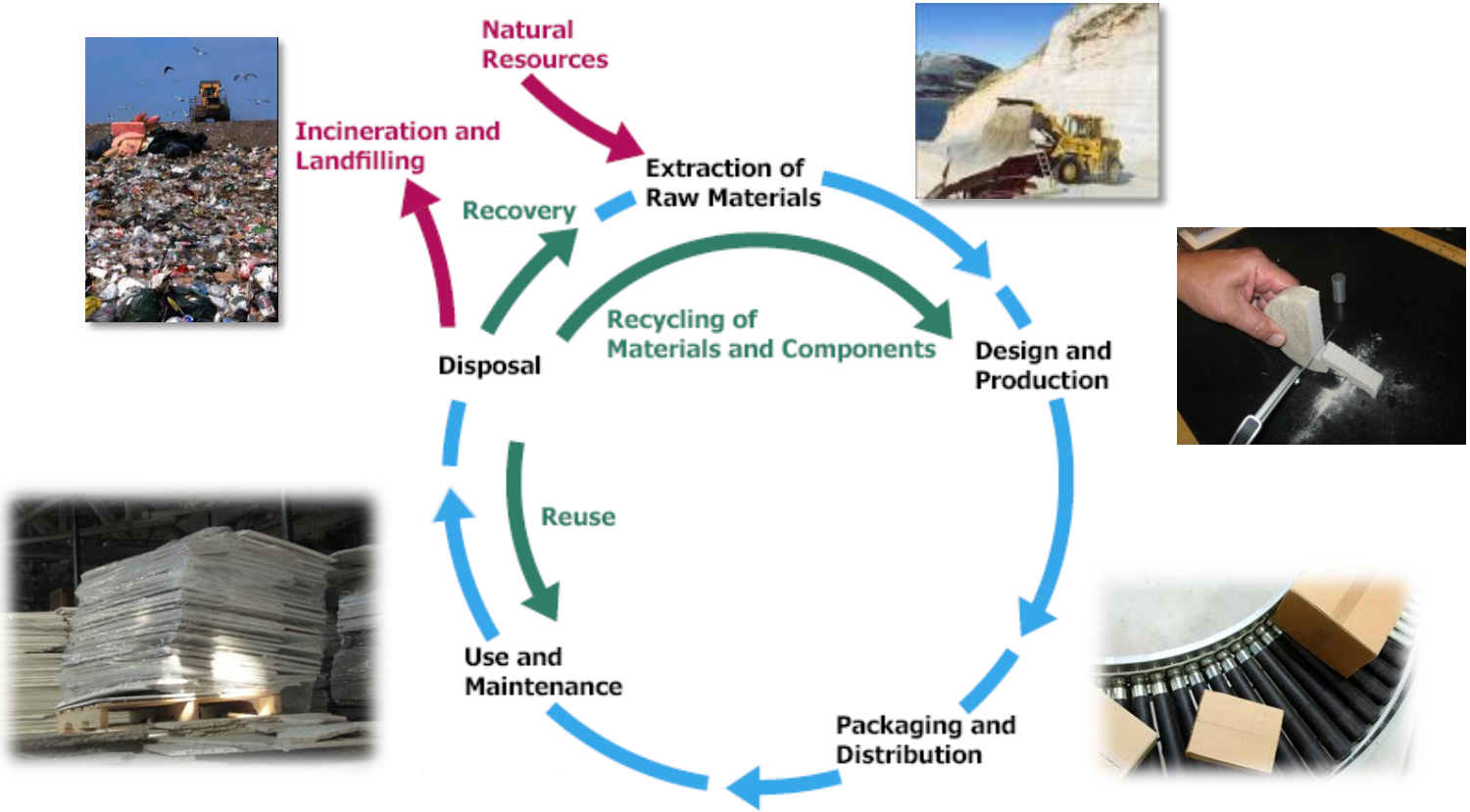
Source: PSI, 2011

In the United States, EPR applies mainly to materials that pose a toxicity hazard

The Manufacturer’s Perspective

Internal Drivers for Manufacturers

- Market differentiation
- Branding/Image/Customer Expectations
- Reduce product costs (raw materials)
- Reduce product environmental footprint



A Manufacturer's Perspective

What are the issues associated with using recycled materials?

- Supply fluctuations (production planning)

- Quality supply
  - Composition
  - Meets specifications
  - Free of hazardous waste, trash, and contaminates

- Risk associated with uncertainty
  - Employee health
  - Customer health
  - Company risk tolerance

Raw Material Issues

How do you know what it is?

- Examples:
  - Carpet: use a hand held FTIR analyzer to identify fiber type

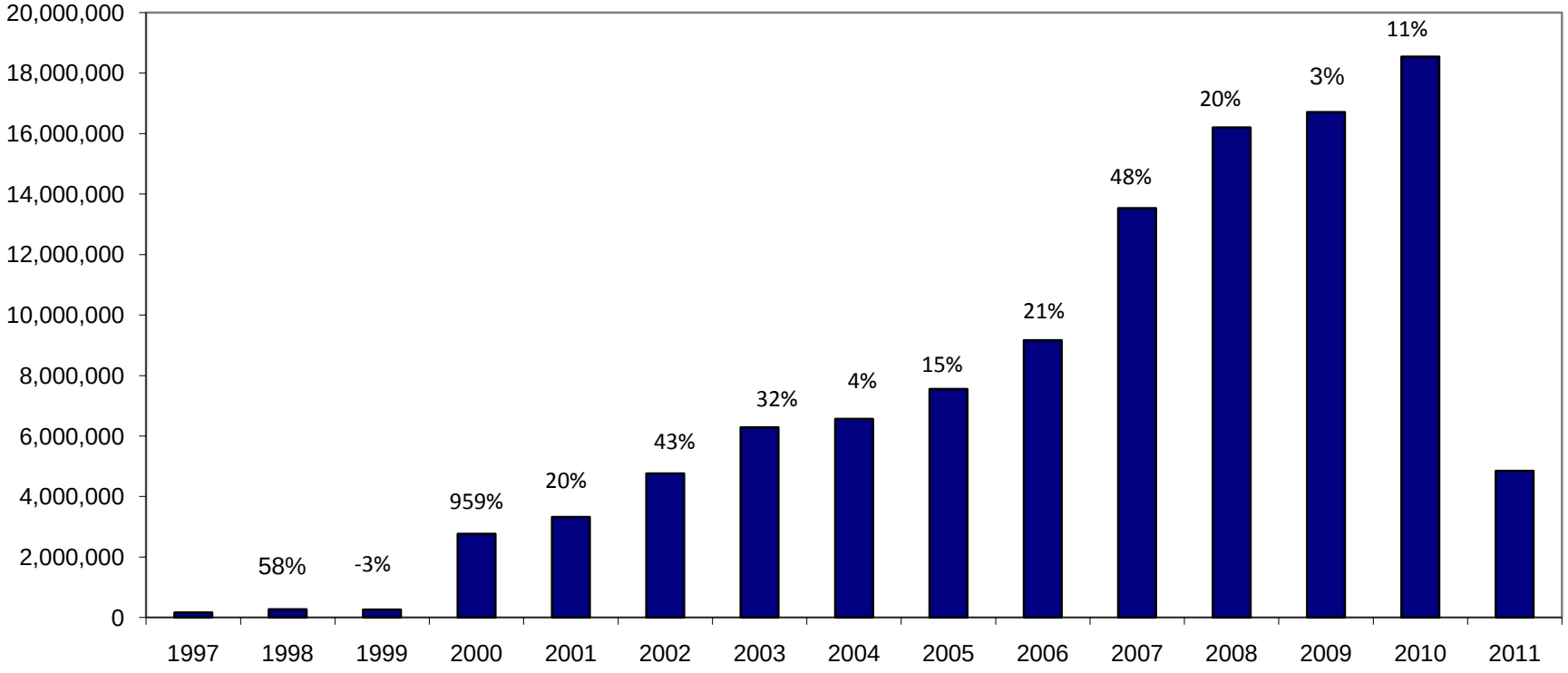
  - Plastics: sort according the code; may need to test for plasticizers
  - Metals: use handheld XRF detector to determine alloy composition

Raw Material Issues

Trash from two 1000lbs. post consumer paper bales after a 4 person negative sort

The Armstrong Ceiling Recycling Program

Armstrong has recycled 111 million square feet



Palletized Recycled Ceilings Model

Palletized Material

Consolidators

(mix of Network Consolidators and Outside Interior Removal Companies

C&D Contractor

Armstrong Plants

Segregates recycled ceilings into palletized stacks & sends to Armstrong or certified consolidator

Stores material & loads on truck once enough collected

<u># of Locations</u>
Contractors = 75
Distributors = 156
Removal Companies

Covers freight costs and ships to plant

Armstrong World Industries' Ceiling Tile Recycling Program

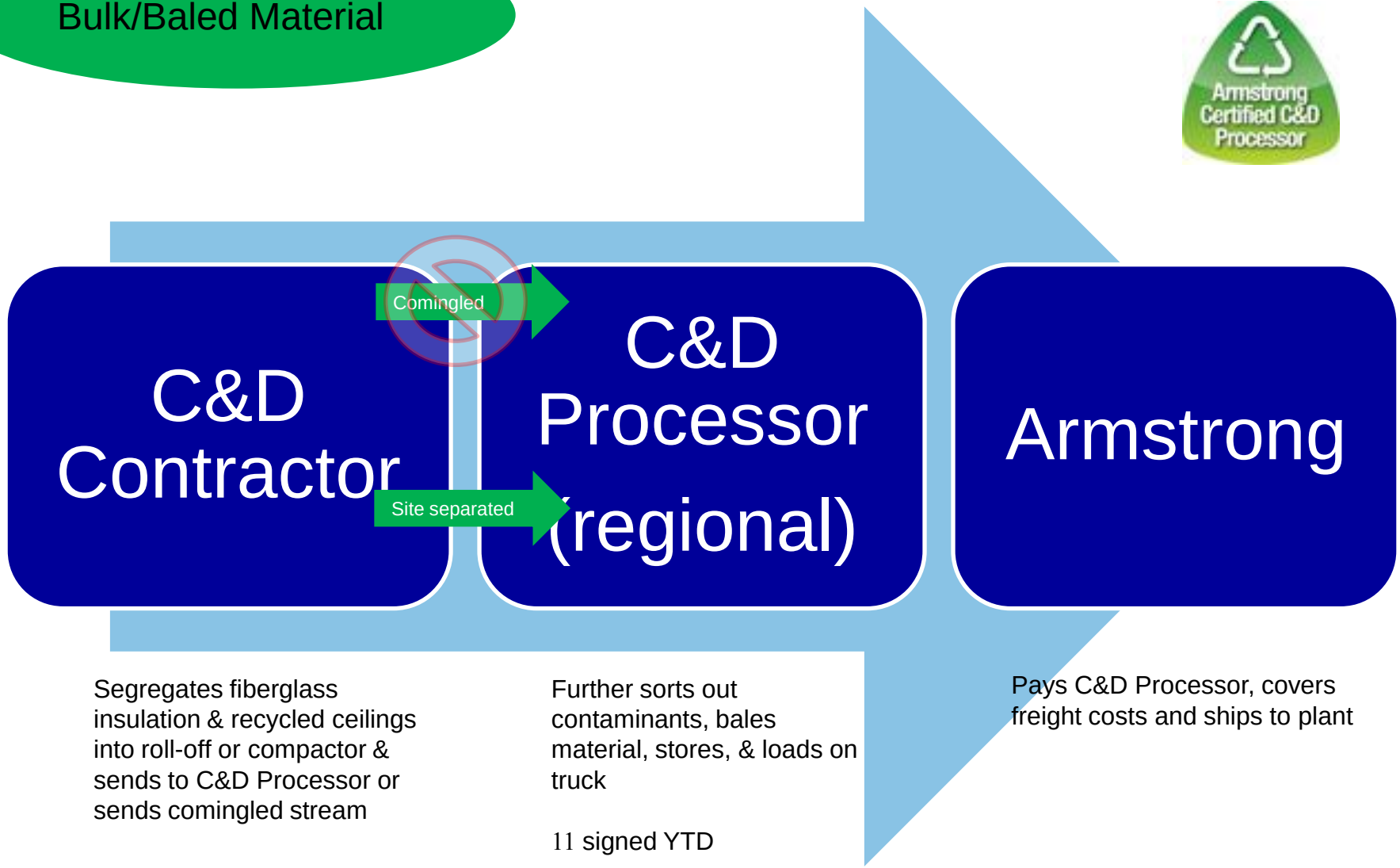
Keith Mullen

Armstrong World Industries' Ceiling Tile Recycling Program

Bulk Solution

Bulk Recycled Ceilings Model

Bulk/Baled Material



Segregates fiberglass insulation & recycled ceilings into roll-off or compactor & sends to C&D Processor or sends comingled stream

Further sorts out contaminants, bales material, stores, & loads on truck

11 signed YTD

Pays C&D Processor, covers freight costs and ships to plant

Note: current consolidator recycled ceiling model would remain (pallets)

C&D Processors

C&D Processors

Armstrong Bulk Solution

CEILING&WALL | SYSTEMS

Between us, ideas become reality™

10 years

The first in the industry – Celebrating 10 years of recycling.

In 1999, Armstrong Ceilings introduced the concept of ceiling recycling to the industry. Since that time, Armstrong – in collaboration with partners around the country – has diverted more than 80 million square feet of old ceilings from landfills. That's more than 40,000 tons of construction waste. And it keeps growing. Now, we are recycling in bulk methods in specific regions. Below are the requirements for recycling fiberglass insulation in bulk containers.

What types of fiberglass can be recycled in bulk containers?

ACCEPTABLE FIBERGLASS INSULATION:

- Yellow, pink, white or black fiberglass insulation rolls, batts or sheets without backing.

NON-ACCEPTABLE FIBERGLASS:

- Fiberglass contaminated with any hazardous material (i.e. asbestos, lead, cadmium, PCBs).
- Roll-offs which contain debris.
- Any fiberglass with backing (asphalt, paper, plastic or otherwise).
- Brown, bright orange and green fiberglass.
- High-density fiberglass or hard fiberglass.
- Wet or moldy fiberglass.
- Loose fiberglass or fiberglass dust (spray on).
- Fiberglass with non-glass fiber material or hard material.

How should the fiberglass insulation be packaged for shipment?

- Material must be clean, dry and in the acceptable category above.
- No wood, metal, construction debris or hazardous materials of any kind can be included. If C&D waste is included with the fiberglass, possible charges can be incurred for disposal. Contractors should police what is placed in covered roll-off containers.
- Material should be placed in a covered regular or compaction roll-off container. This container must have a water impermeable cover such that materials inside do not get wet. Material should not be loaded above the top of the container.
- Container should be labeled in English and Spanish, "Fiberglass Insulation Only – No Trash," "Solamente Aislamiento de Fibra de vidrio – No desperdicio." 24" x 32" x ¾" sign board at a minimum should be used.
- If you have special loading or removal circumstances, please contact your Armstrong representative. We will be as flexible as possible to accommodate your project needs.

Where should the fiberglass insulation be sent?

Materials should be sent to an Armstrong approved construction and demolition waste processor or recycle center. Recycling documentation and material verification is required prior to accepting any material. For a local list of approved C&D processors, call Armstrong at 1-877-276-7876, option 1, then 8.

CS-4214-310

For more information on the Armstrong Ceiling Recycling Program, visit armstrong.com/recycling or call 1-877-276-7876, option 1, then 8

Armstrong Certified C&D Processor

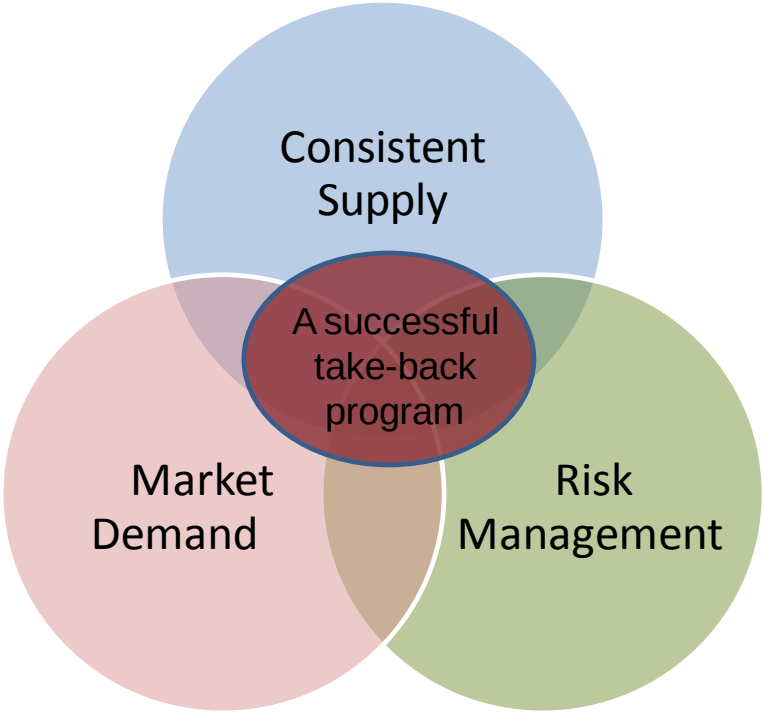
CEILING RECYCLING PROGRAM Armstrong 10 years AND GROWING

Baled recycled Ceiling Tile

Baled Recycled Ceiling Tile

In Summary

- The market is encouraging:
  - C&D recycling
  - Manufacturers are developing products and processes for using C&D recycled material
- For manufactures to success
  - Supply must be constant and consistent
  - Risk must be minimized



Thank you!

Armstrong®

Leading with integrity for 150 years