Zero Waste Roofing

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• A long history of environmental stewardship
  – 1960’s: First “Reduce, Reuse, Recycle” initiative: cardboard
  – In-store collection stations for plastic bags, glass, plastic and aluminum containers, cell phones, MP3 players, ink cartridges
Target Corporation Construction Initiatives

• Goal is to have all their stores Energy Star Certified
• Zero Waste Target
  Interim Goals
  - Recycle 80% of roofing waste
  - Recycle 50% of all construction waste
Roofs: A critical element in retail stores

- Typically > ¾ of the building envelope

- Cost driver – Construction
  - Maintenance
  - Energy

- Leakage – Damaged finishes
  - Wasted inventory
  - Slip hazards for guest
Thermoplastic PVC Roofing
A long track record on Target buildings

• Began using 20 years ago
• Became primary membrane 10 years ago
  – Consistent specifications
  – Higher quality installations
  – High degree of institutional familiarity, knowledge
Life Cycle Asset Management System

• All Stores surveyed 4× / year by store staff
• Data logged, repairs or other follow-up actions initiated as required
• Stores within a couple of years of their predicted service life scheduled for corporate inspection
• Decision made on when to re-roof
• Budgeted for, executed, well before failure
Pro-Active Approach

- Minimization interruptions of store operations due to roofing issues
- Thermal insulation and cover board still in serviceable condition
  - 730 m³ (26,000 ft³) of waste avoided per store
  - Significant cost savings
  - Reuse of valuable materials
Sustainable Roofing Model

- Reflective membranes to reduce cooling loads, and the Urban Heat Island Effect
- Longest lasting thermoplastic membrane
- Comprehensive, preventative maintenance program
- Re-use of insulation and cover boards
Room for improvement?

- The membrane being removed was being sent to landfill
- 14,000kg (31,000 lbs) from a typical store
- Membrane recycling?
Since the Late 1990s
Production Trimmings, Scrap

- Converted into 100% pre consumer recycled content accessories like walkway pads and membranes
Post consumer membrane recycling

- In Europe since 1994
- In North America since 2005
- Target Silver Springs MD 2007
State of the Art Grinding Equipment
Newest Generation Production Lines

Up to 15% by weight preconsumer recycle content
Handling Learning Curve

- 610 mm (2’) optimize shipping, but increase labor
- Tape issue to manufacturing
- Palletizing unwieldy
Best Solution to Date

- Membrane cut 915 mm (26in.) to 990 mm (29in.) wide
- Rolls about 15 m (50ft.) in length
- Can tack weld ends as required
- Load in Gaylords
• Original fasteners and plates left in place

• New scraps recycled with old roof membrane

• Pallets, packaging, etc. recycled separately
• Contractors palletizes full gaylords

• Loads them for shipping

• Manufacturer arranges for shipping to processing plant
Material Processing

- Materials pulverized into fine powder and forwarded to membrane manufacturer
Recycling into Finished Goods

All materials (Including competitors membranes)

Manufacturer's own materials
Post Consumer Recycling

• Materials being recycled back into new membrane
• No “downcycling”
• Currently limited to loose laid membranes
• Foresee adhered membranes being recycled in the next 2-5 years
Third Party Certification

First, only low slope roofing material with 3rd Party Certified Recycle Content
Program Recognition

• Commonwealth of Massachusetts Office of Energy and Environmental Affairs Citation
  – “…Groundbreaking resource recovery program for roofing materials…”
  – “…Literally taking recycling to new heights…”
Target Program to Date

• More than 30 roofs approximately 370,000 m$^2$ (4,000,000 ft$^2$) recycled
• Approximately 450,000 kg (1m lbs)
• 15 different states
• At least cost neutral to Target Corporation
Evolution of the Program

- Further reduce handling
- Increase amount of material per truck load
- Expectation is to recycle all roof membranes going forward
Model for Sustainability

- Long lasting roof membrane
- Cool roofing for energy savings and reduction of the UHIE
- Proactive maintenance program to insure longevity
- Reuse insulation and cover board
- Recycle aged membrane into new membrane
QUESTIONS?

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