

# Zero Waste Roofing

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# Target Corporation

- 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  $> \frac{3}{4}$  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 m<sup>3</sup> (26,000 ft<sup>3</sup>) 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

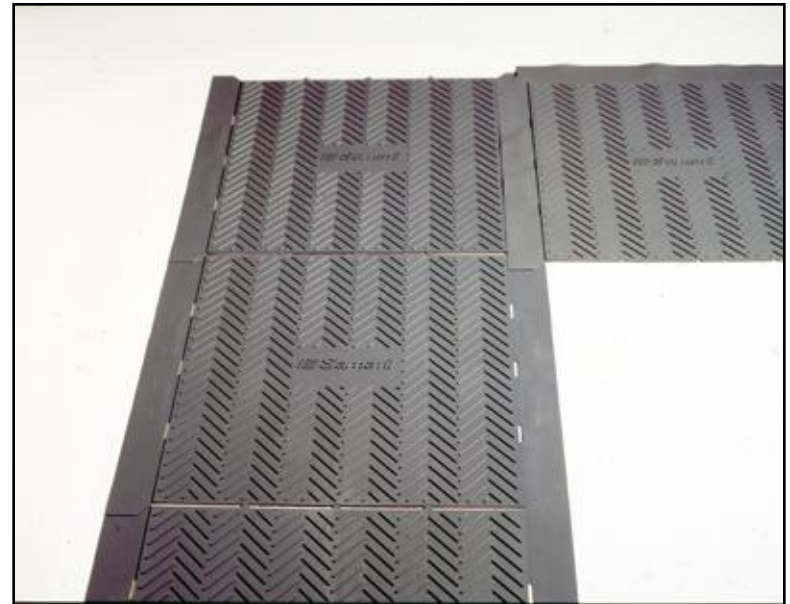


# Room for improvement?

- 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

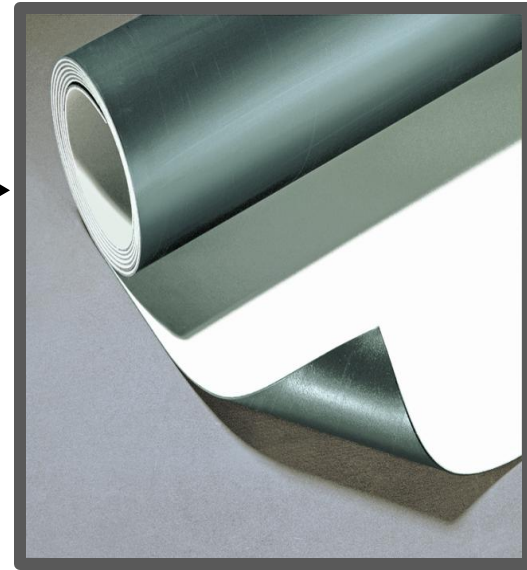


- Target Silver Springs MD 2007

# 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

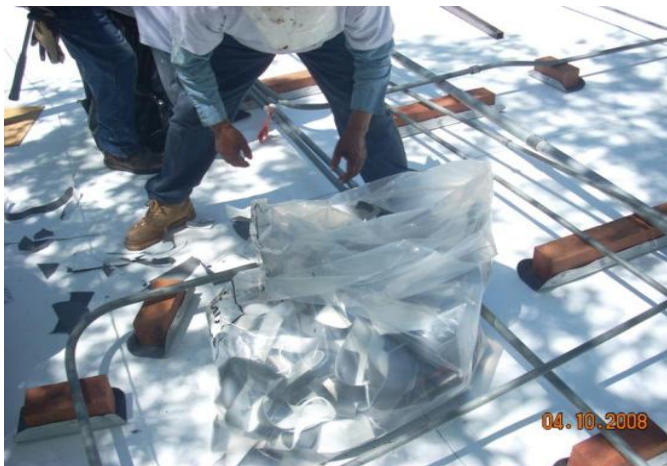
# Best Solution to Date



- 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



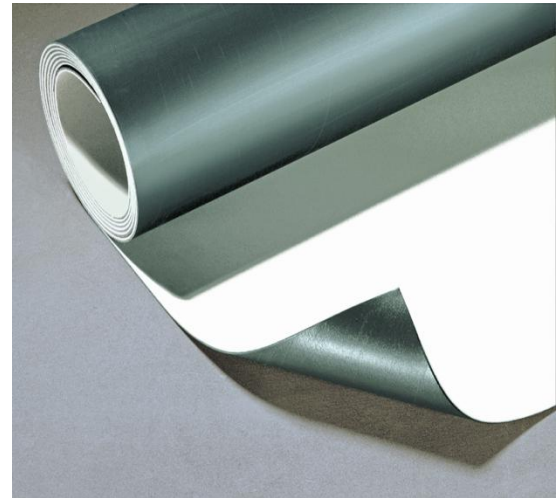
- Materials pulverized into fine powder and forwarded to membrane manufacturer



# Recycling into Finished Goods

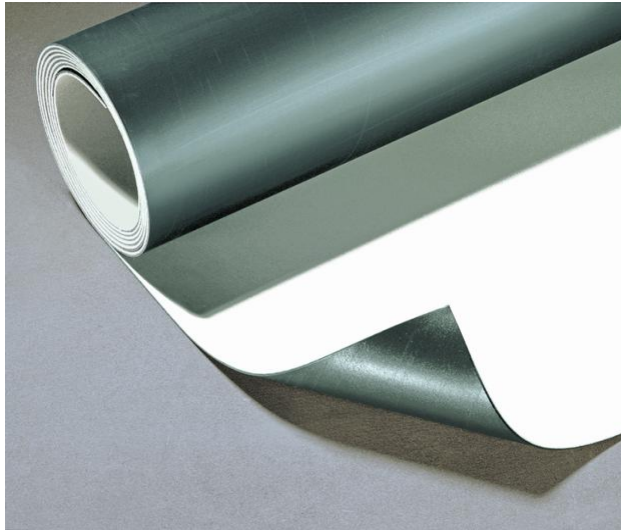


All materials (Including competitors membranes)



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 3<sup>rd</sup> 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<sup>2</sup> (4,000,000 ft<sup>2</sup>) 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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