Recycled Rubber Products Moving into More Markets and Applications

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Approximately 1 Billion scrap tires generated annually on global basis

**Scrap Tire Disposition**

**Miscellaneous Uses**
- Other, 2.6%
- Reclamation Projects, 1.3%
- Electric Arc Furnaces, 0.7%
- Exported, 2.6%

**Ground Rubber**
- Automotive, 2%
- Export, 1%
- Asphalt, 15%
- Sports Surfaces, 25%
- Molded/Extruded, 35%
- Playground Mulch, 22%

**Tire-Derived Fuel**
- Land Disposed, 11.4%
- Miscellaneous Uses, 7.1%
- Civil Engineering, 7.0%
- Tire-Derived Fuel, 48.6%

Scrap Tire Stockpiles

Did you know?

In 1990, about a billion scrap tires were in stockpiles in the U.S.

By 2015, over 93% of those tires have been cleaned up! Only 67 million more stockpiled tires still to go.

Scrap Tire Challenge and Austin Rubber Solution

• **Challenge**: find sustainable solution for handling scrap tires and unlock value by separating them into base components
  - More than 1 Billion scrap tires generated on global basis annually
  - 2015 U.S. Scrap Tire Disposition (Source: Rubber Manufacturers Association, 2016)
    - Landfilled (11%)
    - Tire-derived fuel (48%), ground rubber (25%), civil engineering (7%), exported (3%), other (5%)
    - Reclamation projects (1%)
  - In addition, Millions of tons other/industrial (non-tire) rubber scrap generated annually

• **Solution**: Austin Rubber has a patented process to “upcycle” end-of-life rubber into high purity components
  - Components are worth more separated because users can better manage new formulations
  - Expands uses of the recycled materials
  - Reduces end user raw material cost without sacrificing performance
Austin Rubber Overview

Locations
- Headquarter: Austin, TX
- Pilot Plant: New Orleans, LA
- Commercial Plant & Compounding Lab: Greenville, PA

Technology
- Chemical process
- Extensive IP development
- Pilot operation – process improvement/optimization, generate design data
- Commercialization – full scale plant, 50 tpd capacity
- Rubber compounding laboratory – develop formulations using recycled materials

Products
- Recycled rubber (NR/SBR) comprising carbon black (“composite elastomer”)
- Recycled process oil comprising additives (e.g., process oil, accelerators, curatives)
Patented Devulcanization Process

Austin Rubber’s Technology
- Chemical process
- Low tech
- Low environmental impact
- Scalable
- Vetted

APX® – Recycled Rubber
- Contains approx. 65% natural and synthetic rubbers
- Contains approx. 35% tire-grade carbon black
- Repurpose for rubber compounding applications
- Reduces raw material use/production

APOTM – Recycled Plasticizer
- Contains process oil (aromatic, paraffinic, naphthenic)
- Contains accelerators, curatives, antioxidants, etc.
- Repurpose for rubber compounding applications
- Repurpose for typical process oil applications
- Reduces raw material use/production

Purchase from tire recyclers
Technology Overview

Austin Rubber Benefits
- Cost – recycled products are less expensive than raw materials
- Performance – maintain or improve compound physical properties
- Production – integrates easily into existing compounding process and infrastructure
- Sustainability – helps achieve green goals

General Challenges
- Commodity driven market
- Greenfield operation (over budget, behind schedule can be typical)
- Must educate customers how to use material
- Licensing versus purchase order sales
- Offtake commitments – “chicken and egg” problem
- Capital investment (economy of scales)
Footwear - Bata

BATA GOING GREEN – NOW A TIRE CAN BECOME A SNEAKER WITH APX®

BATA is a global footwear company with a business model based on quality and accessibility.

CUSTOMER CHALLENGE: BATA has a revolutionary pilot project in Batangar, India where they were seeking sustainable solutions for their manufacturing.

SOLUTION: Austin Rubber joined forces to create a cutting-edge, sustainable supply chain utilizing its sophisticated in-house compounding lab to create the APX® compound customized for BATA’s needs. The myriad benefits include: financial, environmental and performance.

RESULTS: Through a collaboration with Austin Rubber, BATA created a sustainable supply chain. BATA achieved a cost savings replacement for virgin rubber that also included superior physical properties and improved processing and handling. BATA was able to provide recipes of their products and perform testing through the Austin Rubber compounding lab.
TREDAGAIN – THE WORLD’S FIRST UPCYCLED TIRE SHOE USING APX®

TREDAGAIN™ is a lifestyle footwear company designing both Men’s and Women’s styles with outsoles made from recycled tires.

CUSTOMER CHALLENGE: TREDAGAIN™ is a new footwear company with the challenge of identifying a key differentiator within the footwear marketplace. The company wanted to provide a sustainable and eco-friendly offering to the consumer marketplace.

SOLUTION: Austin Rubber utilized its sophisticated in-house compounding lab to create the APX® compound that can be utilized in the outsoles of footwear. Austin Rubber worked with TREDAGAIN™ on product goals to create a compound made with 50% recycled scrap tires.

RESULTS: Through a collaboration with Austin Rubber, TREDAGAIN™ was able to bring the 1st Upcycled Tire Shoe to market, a key differentiation in the marketplace. After a year on the market, TREDAGAIN™ has expanded its line to over 10 Men’s and Women’s styles using APX® in footwear outsoles and retail locations across the country. TREDAGAIN™ was also able to save money utilizing APX®.
Upcycled versus Recycled?

“Recycle” can have a negative connotation, especially in case of poor/mediocre products that target industries burned in the past.

“Upcycle” is often misunderstood, not used appropriately or the industry does not care.
Austin Rubber Applications

- Footwear
- Tires – passenger, truck, OTR, agricultural, recreational, etc.
- Solid tires, tire retreads and rubber tracks
- Industrial Conveyor belts
- Other Industrial applications
- Sheet goods
- Molded compounds
Questions

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