Rubber Industry Waste and Its Management

By Lim Sum Teck
What is Waste?

- According to United Nation Statistic Division, Glossary of Enviroment Statistics, "Wastes are materials that are not prime products (that is products produced for the market) for which the initial user has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose.

- Wastes may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities.

- **Residuals recycled or reused at the place of generation are excluded.**

(Source: Wikipedia)
Introduction to Rubber Industry - Dry Rubber & Latex

Dry Rubber Industry Process
  - Mixing, Shaping, Vulcanizing
  - Waste in Dry Rubber Industry

INTRA-INDUSTRY WASTE UTILIZATION

Latex Industry
  - Latex Industry Process
  - Waste in Latex Industry

Waste Problem faced by the Rubber Industry
Introduction to Rubber Industry

• Rubber are made from latex collected from a tree called *Hevea brasiliensis*.

• Comes from Brazil, transported to SEA by the British.
Introduction to Rubber Industry
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The rubber industry can be divided into 2 areas:

- **Dry Rubber Industry**
  - Eg. Tyre, Fenders, O-rings, Shoe soles, Industrial Rubber Goods, etc.

- **Latex Industry**
  - Eg. Gloves, Condoms, Catheters, Foam, Rubber Threads etc
Dry Rubber Mixing - Rubber + Chemical
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Dry Rubber - Shaping (Calendering, Extrusion, Moulding)
Dry Rubber Industry Process

Mixing
- Rubber + Filler + Chemical

Shaping
- Extrusion
- Moulding
- Calendering

Vulcanizing
Waste in Dry Rubber Industry

- **Used packaging material**
  - **Value-added Recovery**
    - SEPARATION OF WASTE: KEEP IT AS ‘**CLEAN’** AS POSSIBLE.
    - Collected for recycling.
    - PE / PP bag can be made into useful raw materials like Thermoplastic Elastomers (TPE).
  - **Heat Recovery.**
Waste in Dry Rubber Industry

- **Chemical powder from mixing**
  - Factory sweeping of rubber chemicals can be filtered and collected.
  - Collected in the dust collector, Can be re-used back into rubber formulation.
Waste in Dry Rubber Industry

- **Grease and lubricant oil used in Machineries**
  - Collected to be used as lower grade oil/lubricant for different industries.
Waste in Dry Rubber Industry

- Unvulcanized Compound from Process
  - Re-used back into production
  - Re-formulated to cater for other rubber products
Waste in Dry Rubber Industry

- **Scorched Compound (Large volume)**
  - Can be used to produce other rubber products eg. Tyre compound, Car Mats, industrial parts.
Waste in Dry Rubber Industry

- **Vulcanized / Rejected Product**
  - Trims and flashes to be crushed into rubber powder for reclaiming.
  - Metal recovery using technology.
Waste in Dry Rubber Industry

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INTRA-INDUSTRY WASTE UTILIZATION

Rubber Industry

Road Construction and Surfacing

Cement Industry
Reclaimed Rubber

- Latex Glove Reclaim Rubber
- Natural Rubber Reclaim Rubber
- Tyre Reclaim Rubber
- Butyl Reclaim Rubber
Latex Industry

- Consists of the glove, condoms, thread and foam industry.

- All Natural Rubber waste can be recycle and reuse efficiently.
Latex Glove Industry Process

Taken from Top Glove website. Credits to Top Glove
Waste in Latex Industry Process

- Coagulant from latex tank
  - Currently being collected and be made into dry rubber raw material.
Waste in Latex Industry Process

- Water Treatment Tank
  - Sludge collected at the treatment can be recycled back as Dry Rubber Raw Materials
Waste in Latex Industry Process

- Rejected Glove
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Waste Problems faced by the Rubber Industry

- Dry Rubber and latex waste contain metal oxide.
  - Requires special handling according to DOE’s schedule waste management.
  - Complicate the recycling process through the Tripartate discussion between DOE/MRB/Industry.
  - DOE has made a great move to classify materials as factory waste

- Latex coagulum
  - Awaiting DOE’s approval on MRB proposal for Re-use, Recycling and handling process.
Credits

- All pictures used in this slides are for educational purposes only.
THANK YOU

Q & A